Textbook

Mathematics 5

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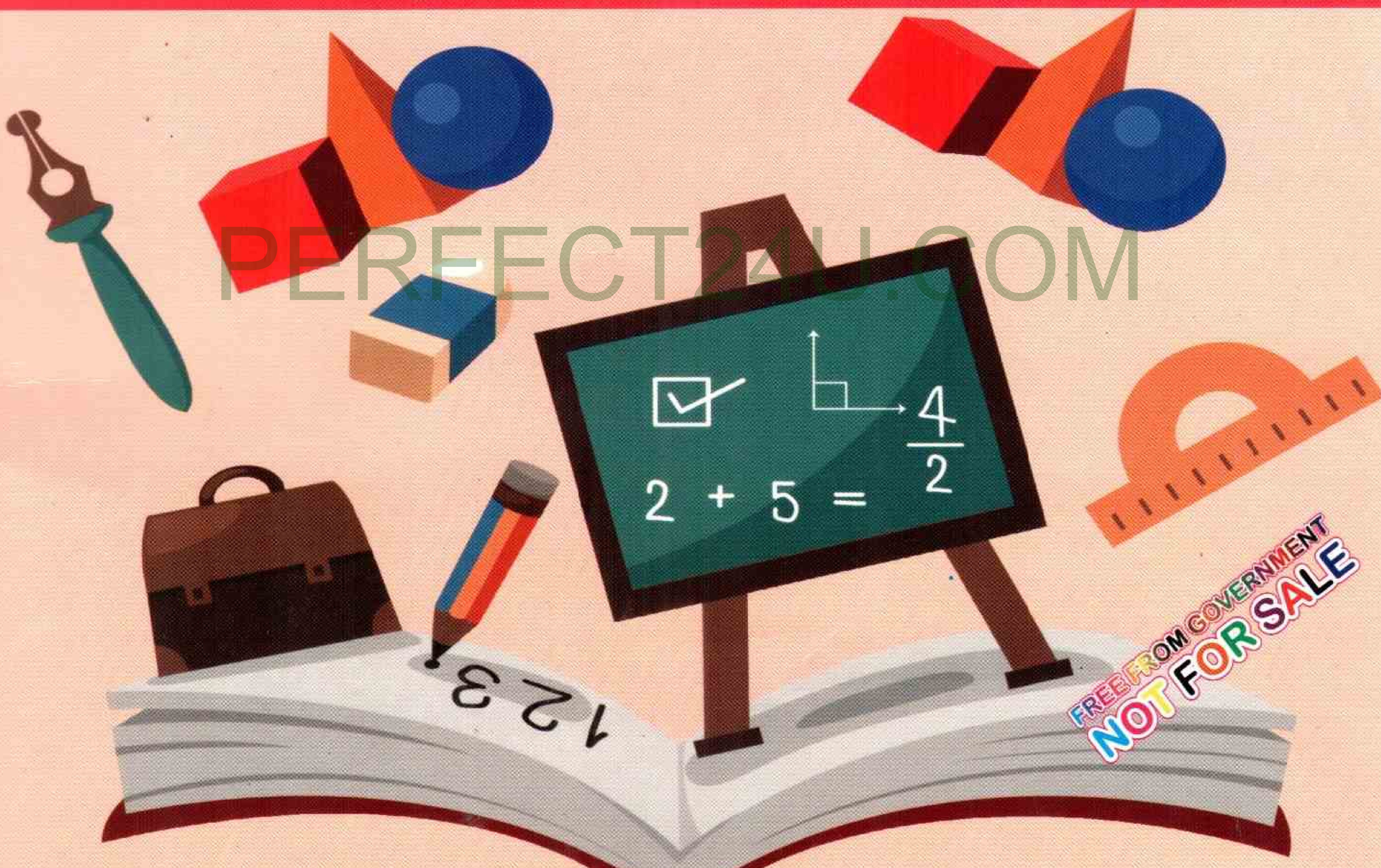
Based on Curriculum 2020



Khyber Pakhtunkhwa Textbook Board, Peshawar

Textbook

MATHEMATICS

5

Based on Curriculum 2020

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KHYBER PAKHTUNKHWA TEXTBOOK BOARD

Khyber Pakhtunkhwa Textbook Board, Peshawar

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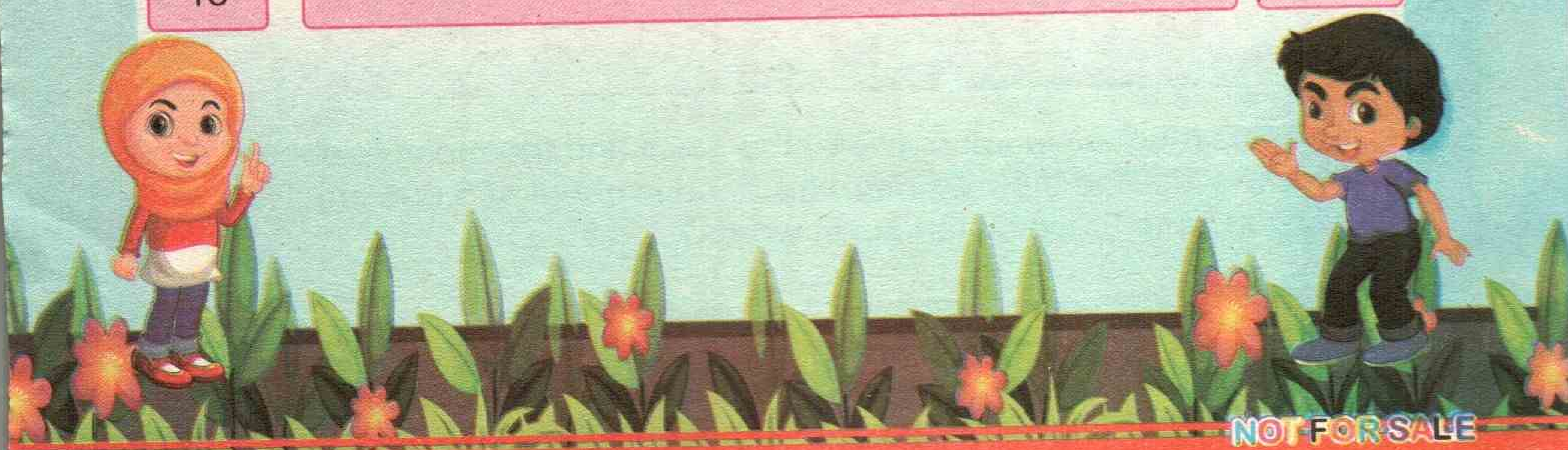


Unit 1

Whole Numbers and Operations

Learning Outcomes

By the end of this unit, you will be able to:

- read numbers up to 1,000,000 (one million) in numerals and words.
- write numbers up to 1,000,000 (one million) in numerals and words.
- add numbers up to 6-digit numbers
- subtract numbers up to 6-digits
- multiply numbers, up to 5-digits, by 10, 100, and 1000.
- multiply numbers, up to 5-digits, by a number up to 3-digits.
- divide a number up to 5-digits by 10,100 and 1000
- divide numbers up to 5-digits by a number up to 2-digits.
- solve real-life situations involving operations of addition, subtraction, multiplication, and division.
- identify and apply a pattern rule to determine missing elements for a given pattern
- identify the pattern rule of a given increasing and decreasing pattern and extend the pattern for the next three terms
- describe the pattern found in a given table or chart.

The minimum distance between the earth and the moon is about 363,104 km and the maximum distance is about 405,696 km. How will you write these distances in words?

Numbers up to 1 Million

There are about 391,000 types of plants in the world. How can we write this number in words?

To denote place values, we learnt that commas are put after every 3 digits, from the right.
We can also denote this by putting spaces after every 3 digits, from the right. For example 391,000 becomes 391 000.

The number 391 000 can be read as "Three hundred and ninety-one thousand".

We know that 999,999 is the greatest 6-digit number. If we add 1 to it, we get one million; (1,000,000) which is the smallest 7-digit number. 1,000,000 is the smallest 7-digit number.

$$\begin{array}{r} {}^{1}{}^{1}{}^{1}\ {}^{1}{}^{1} \\ 9\,9\,9,9\,9\,9 \\ +\qquad\quad 1 \\ \hline 1,0\,0\,0,0\,0\,0\,0 \end{array}$$

We can write this number with the help of a place value chart as shown below.

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
	9	9	9	9	9	9
1	0	0	0	0	0	0

Try Yourself

How many hundreds are there in one hundred thousands?
How many thousands are there in one million?

The number 1,456,907 in a place value chart is written as:

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
1	4	5	6	9	0	7

We write 1,456,907 it in words as, one million four hundred and fifty-six thousand, nine hundred and seven.

Let's write the value and place value of each digit in this number.

1 is at the millions place, its place value = $1 \times 1{,}000{,}000 = 1{,}000{,}000$

4 is at the hundred thousands place, its place value = $4 \times 100{,}000 = 400{,}000$

5 is at the ten thousands place, its place value = $5 \times 10{,}000 = 50{,}000$

6 is at the thousands place, its place value = $6 \times 1{,}000 = 6{,}000$

9 is at the hundreds place, its place value = $9 \times 100 = 900$

0 is at the tens place, its place value = $0 \times 10 = 00$

7 is at the ones place, its place value = $7 \times 1 = 7$

TEACHING POINT

Give flash cards with place value written in numerals and words. Write a few numbers on the board and ask the students to write the place value of each digit.

1,456,907 = 1,000,000 + 400,000 + 50,000 + 6,000 + 900 + 00 + 7

Writing a number as the sum of the place value of its digits is called expanded form.

write the value and place value of each digit in 5,987,516.

5 is at millions place, so its place value	$= 5 \times 1,000,000 =$	5,000,000
9 is at hundred thousands place, so its place value	$= 9 \times 100,000 =$	900,000
8 is at ten thousands place, so its place value	$= 8 \times 10,000 =$	80,000
7 is at thousands place, so its place value	$= 7 \times 1,000 =$	7,000
5 is at hundreds place, so its place value	$= 5 \times 100 =$	500
1 is at tens place, so its place value	$= 1 \times 10 =$	10
6 is at ones place, so its place value	$= 6 \times 1 =$	6

5,987,516 is read as "five million, nine hundred and eighty-seven thousand, five hundred and sixteen".

5,987,516 = 5,000,000 + 900,000 + 80,000 + 7,000 + 500 + 10 + 6

Try Yourself

K-2 is the 2nd highest mountain in the world. It is located on the Pakistan-China border. Its height is 861 100 centimetres.

a) Write the height in expanded from.

b) Write the place value of each digit.

c) Write the height in words.

TEACHING POINT

Divide the students in groups. Ask them to make a 7-digit number and write the value and place value of each digit.

Try It! Challenge

What number am I?

I am a 7-digit number. My tens digit is 5.
My ten thousands digit is 3 less than my tens digit.
My ones digit is the greatest 1-digit even number.
My thousands digit is 3 times my ten thousands place digit.
My greatest place value digit is the sum of my tens digit and my ten thousands digit.
My hundred thousands place digit is the ones digit of the smallest 2-digit number.
My hundreds place digit is the product of my tens place digit and my hundreds place digit.

Exercise 1

1. Write the following numbers in words.

a) 290,014 b) 433,453 c) 1,010,009
d) 9,871,653 e) 1,252,140 f) 2,688,061
g) 1,874,454 h) 6,495,523

2. Write the following numbers in expanded form.

a) 131,441 b) 6,000,900 c) 4,949,181
d) 6,466,456 e) 7,286,019 f) 9,479,321
g) 8,510,602 h) 1,202,001

3. Match Column A with Column B.

Column A	Column B
a) Eight million, seven thousand and eight hundred.	8,808,808
b) Two hundred and seventy-eight thousand and seventy-eight.	2,006,002
c) Eight Million, eight hundred and eight thousand, eight hundred and eight	8,007,800
d) Two million seven thousand five hundred and five	278,078
e) Two million six thousand and two	2,007,505

4. Write the value and place value of the coloured digits.

a) 4,545,445 b) 9,846,532 c) 6,782,456 d) 9,080,714
e) 2,997,924 f) 8,425,419 g) 7,817,656 h) 1,701,232

5. According to 2017 census, the population of Islamabad is 1,014,825.

a) Write it in words.
b) Write the place value of each digit.
c) Write it in expanded form.

6. The speed of light in vacuum, is 299,792 kilometres per second.

a) Write it in words.
b) Write the place value of each digit.
c) Write it in expanded form.

Addition and Subtraction

Addition

After the construction of new national hospitals, 40,655 beds were arranged during first month. In the second month, 32,263 more beds were arranged. Find the total number of beds.

By adding the numbers 40,655 and 32,263 we can find the total number of beds,

			T.th	Th	H	T	O
					1		
Number of beds in first month	=		4	0	6	5	5
Number of beds in second month	=	+	3	2	2	6	3
Total beds	=		7	2,	9	1	8

Thus, the total number of beds arranged are 72,918

Try Yourself

Add 567,098 and 381,940.

There are 124,789 Mathematics books and 200,699 English books in a digital library. Find the total number of books.

		H.th	T.th	Th	H	T	O
				1	1	1	
Mathematics books	=	1	2	4	7	8	9
English books	= +	2	0	0	6	9	9
Total books	=	3	2	5	4	8	8

So, total number of books = 325,488

Add 293,109 and 625,834.

	H.th	T.th	Th	H	T	O
	1				1	
	2	9	3	1	0	9
+	6	2	5	8	3	4
	9	1	8	9	4	3

Try Yourself

Find the sum of the smallest and the greatest 6-digit numbers.

Subtraction

During a tree plantation campaign, 554,876 trees were planted in March. In April, 263,755 trees were planted. Find:

a) In which month more trees were planted?

b) How many more trees were planted?

		H.th	T.th	Th	H	T	O
Trees planted in March	=	5	5	4	8	7	6
Trees planted in April	= –	2	6	3	7	5	5
Difference	=	2	9	1	1	2	1

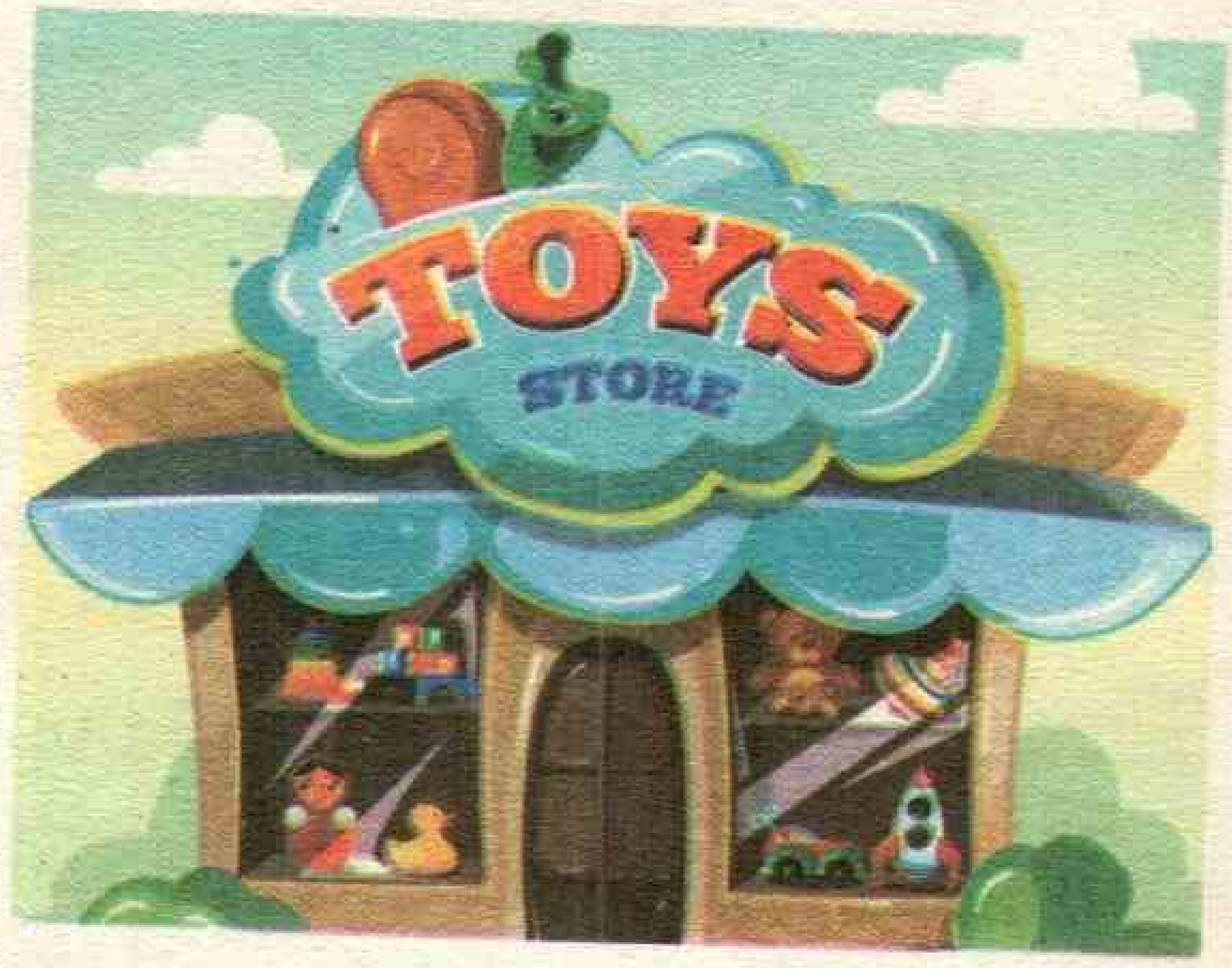
a) More trees were planted in march.

b) 291,121 more trees were planted

Try Yourself

Make any two 6-digit numbers. Then find their difference.

A toy factory manufactured 598,248 toys out of which 446,719 toys are of plastic. How many toys are non-plastic toys?



To find the number of non-plastic toys, we will subtract 446,719 from 598,248.

		H.th	T.th	Th	H	T	O
Total Toys	=	5	9	8	2	4	8
Plastic toys	= –	4	4	6	7	1	9
Non-plastic toys	=	1	5	1	5	2	9

Thus, the number of non-plastic toys = 151,529

Subtract 289,344 from 760,862.

	H.th	T.th	Th	H	T	O
	7	6	0	8	6	2
–	2	8	9	3	4	4
	4	7	1	5	1	8

Try Yourself

Find the difference of the smallest 6-digit number and the greatest 5-digit number.

TEACHING POINT

Write the digits from 0-9 on the board and ask the students to make two 6-digit numbers. Ask them to subtract the number.

Exercise 2

1. Solve the following.

a) 100,700 + 291,562 b) 417,381 + 309,201 c) 591,727 + 702,929

d) 319,898 + 428,888 e) 766,442 + 611,222 f) 542,001 + 621,416

2. Solve the following.

a) 209,856 – 205,660 b) 788,991 – 206,070 c) 395,108 – 165,439

d) 673,265 – 656,600 e) 686,898 – 333,333 f) 744,762 – 565,656

3. Sadia bought a plot for Rs. 659,814 and another plot for Rs 799,999. Find the total amount she paid for both plots.
4. Amaan has an annual income of Rs. 456,750. He spends Rs 125,295 on the construction of a Masjid. How much money does he have left?
5. Town A has population of 459,814 and town B has population of 325,919.
   a) What is the total population of the two towns?
   b) Which town has more population and how much?
6. The annual yield of a mango field in one year is 656,565 kg. In the second year, the yield decreased by 100,984 kg. How much mango was produced in the second year?
7. The government built 386,655 houses for the homeless in one year. The second year 24,521 fewer homes were built than the previous year. How many houses did the government build in both the years?
8. Fatima has Rs 954,888 in her bank account. If she withdraws Rs. 135,600 from the bank to buy a laptop. How much money was left with her?
9. A factory owner gave Rs. 448,870 as reward to his employees in one year. In the second year 437,995 rupees were given as reward.
   a) What is the total reward was given in both years?
   b) What is the total amount given less in second year.
10. Farhan donates Rs. 600,000 to two welfare organizations. If he pays Rs. 385,990 to one welfare organization, how much does he pay to the other?

Multiplication and Division

Multiplication

If the price of a solar panel is Rs. 18,250, then find:

- a) the price of 10 panels.
- b) the price of 100 panels.
- c) the price of 1,000 panels.

To find the price of 10, 100 and 1,000 panels, we will multiply the price of one panel by 10, 100 and 1,000 respectively.

price of 10 panels	=	18,250 × 10	=	Rs 182,500
price of 100 panels	=	18,250 × 100	=	Rs 1,825,000
price of 1,000 panels	=	18,250 × 1,000	=	Rs 18,250,000

Key Fact

- When we multiply a whole number by 10, we put one zero to the right of the number.
- When we multiply a whole number by 100, we put two zeros to the right of the number.
- When we multiply a whole number by 1,000, we put three zeros to the right of the number.

Multiply 34,523 by 10, 100 and 1,000.

Try Yourself

Find the product:

a) $100 \times 100 = ?$

b) $1,000 \times 100 \times 10 = ?$

c) $1,000 \times 10 = ?$

$34,523 \times 10 = 345,230$

$34,523 \times 100 = 3,452,300$

$34,523 \times 1,000 = 34,523,000$

The price of a laptop is Rs 102,900. How much will 215 such laptops cost?

To find the price of 215 laptops, we will multiply the cost of 1 laptop by 215.

Price of 1 laptop	=				1	0	2	9	0	0	
Number of laptops	=	×						2	1	5	
					5	1	4	5	0	0	102,900 × 5
				1	0	2	9	0	0	0	102,900 × 10
		+	2	0	5	8	0	0	0	0	102,900 × 200
Total cost	=		2	2,	1	2	3,	5	0	0	

Thus, the total cost of 215 laptops is Rs. 22,123,500

Try Yourself

Multiply the greatest 6-digit number by the greatest 2-digit number.
Multiply the greatest 6-digit number by the smallest 3-digit number.

A company buys 185 motorbikes. If the cost of one bike is Rs. 79,459, what will be the total cost of 185 motor bikes?

Cost 1 bike	=				7	9	4	5	9
Number of bikes	=	×					1	8	5
				3	9	7	2	9	5
			6	3	5	6	7	2	0
		+	7	9	4	5	9	0	0
Total cost	=	1 4 ,	6	9	9 ,	9	1	5	

Thus, the cost of 185 bikes is Rs. 14,699,915

Find the product of 23,678 and 32.

		2	3	6	7	8
×					3	2
		4	7	3	5	6
+	7	1	0	3	4	0
	7	5	7	6	9	6

$32 \times 23{,}678 = 757{,}696$

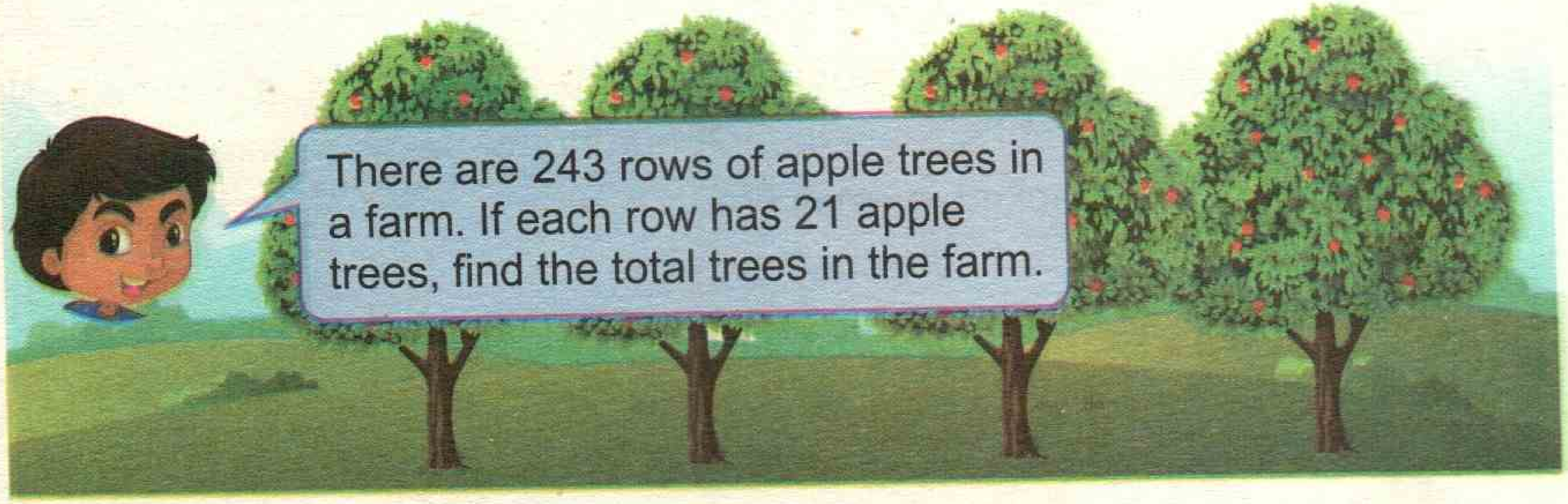
Find the product of 60,392 and 425.

			6	0	3	9	2
		×			4	2	5
		3	0	1	9	6	0
	1	2	0	7	8	4	0
+ 2	4	1	5	6	8	0	0
2	5	6	6	6	6	0	0

$425 \times 60{,}392 = 25{,}666{,}600$

TEACHING POINT

Explain the method of multiplication of 5 digit numbers by 3-digit numbers. Ask the students to write a few 5-digit and 3-digits numbers on their notebooks and find the product.



First write both numbers in their expanded form.

243 = 200 + 40 + 3
21 = 20 + 1

Now write one number horizontally and the other one vertically in grid as shown in the table.

×	200	40	3
20			
1			

Now multiply every digit in horizontal grid by every digit in vertical grid one by one.

×	200	40	3	
20	4,000	800	60	4,860
1	200	40	3	243
	4,200	840	63	5,103

Finally add the resulting products (in blue grids). This will give us the product of 243 and 21.

4,000 + 800 + 60 + 200 + 40 + 3 = 5,103

So, there are 5,103 apple tress altogether in the farm.

Try Yourself

Find the product of 5,623 and 418 using box method.

Explain the box or grid method of multiplication to the students by multiplying various numbers.

Division

A mask manufacturing factory produced 45,000 masks which are to be packed in boxes of three different sizes. Find the number of boxes required if:

- 10 masks can be packed in small box.
- 100 masks can be packed in medium box.
- 1,000 masks can bed packed in large box.

To find the required number of boxes, we will divide the total number of masks by 10, 100 and 1,000 respectively.

Number of small boxes having 10 masks each = 45,000 ÷ 10 = 4,500

Number of medium boxes having 100 masks = 45,000 ÷ 100 = 450

Number of large boxes having 1000 masks = 45,000 ÷ 1,000 = 45

Key Fact

- When we divide a whole number 0 at its ones place by 10, we remove one zero from the right side of the number.
- When we divide a whole number 0 at its ones and tens place by 100, we remove two zeros from the right of the number.
- When we divide a whole number having 0 in its ones, tens and hundreds place by 1,000, we remove three zeros from the right of the number.

TEACHING POINT

Explain the method of dividing a 5-digit number by 10,100 and 1,000. Ask the students to write a few 5-digit numbers which have zeros at their ones, tens and hundreds places. Then ask them to divide these numbers by 10, 100 and 1,000.

Divide 76,000 by 10, 100 and 1,000.

$76,000 \div 10 = 7,600$

$76,000 \div 100 = 760$

$76,000 \div 1,000 = 76$

I have saved Rs 16,620 from my pocket money. I want to distribute this amount among 12 children. How can I find the amount each child will get?

To find the amount each child will get, we will divide 16,620 by 12.

$$
\begin{array}{lr|l l}
 & & \;\;\;1385 & \text{— Quotient} \\
\cline{3-3}
\text{Divisor —} & 12 & 16620 & \text{— Dividend} \\
 & & -12 & \\
\cline{3-3}
 & & \;\;\;46 & \\
 & & -\;36 & \\
\cline{3-3}
 & & \;\;\;102 & \\
 & & -\;\;96 & \\
\cline{3-3}
 & & \;\;\;\;\;60 & \\
 & & -\;\;\;60 & \\
\cline{3-3}
 & & \;\;\;\;\;\;0 & \\
\end{array}
$$

Thus, each child will gets Rs. 1,385

$16,620 \div 12 = 1,385$

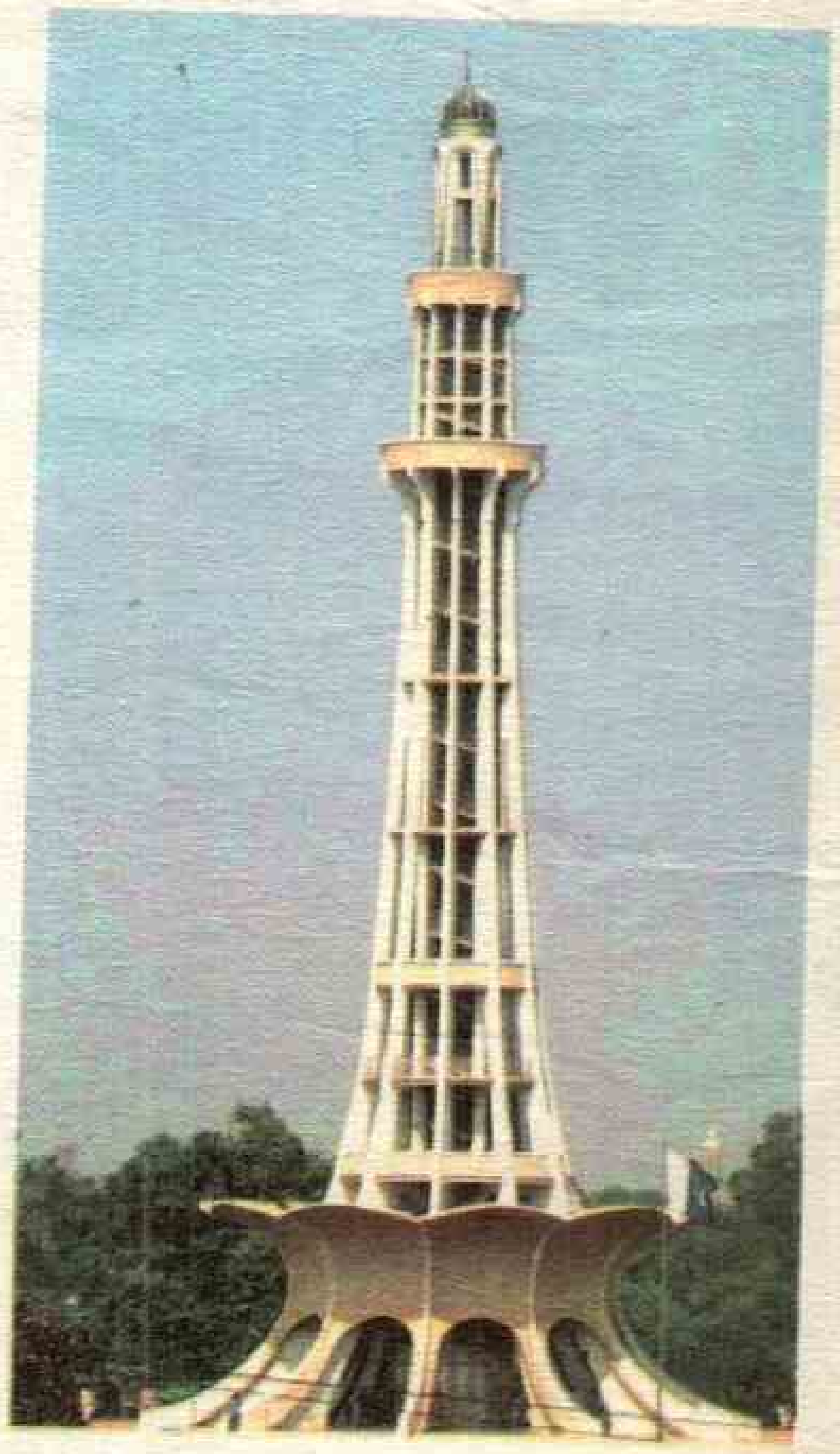
Quotient $= 1,385$

For Pakistan Day celebrations, 10,125 students participated from all over the country. If groups of 95 students are to be made, then find:

a) How many groups can be made?

b) Find the number of un-grouped students.

c) If 720 students cannot participate due to some reason, then how many groups can be made?



a) To find the number of groups, we will divide 10,125 by 95.

```
        1 0 6
     ----------
9 5 | 1 0 1 2 5
    -   9 5
    -----------
        6 2
    -     0
    -----------
        6 2 5
    -   5 7 0
    -----------
          5 5
```


$10,125 \div 95 = 106$ 55

Number of groups = 106

Un-grouped Students = 55

b) If 720 students cannot participate;

I) We will subtract 720 from 10,125 to find the students

$10,125 - 720 = 9,405$

ii) Now we will divide 9,405 by 95 to find the number of groups

$9,405 \div 95 = 99$

So, 99 groups can be made.

```
        9 9
     ---------
9 5 | 9 4 0 5
     -8 5 5
     ---------
        8 5 5
     -  8 5 5
     ---------
          0
```

Divide 45,205 by 74 and find the quotient and remainder.

```
        6 1 0
     ___________
7 4 | 4 5 2 0 5
     -4 4 4
     ___________
          8 0
     -    7 4
     ___________
            6 5
     -        0
     ___________
            6 5
```

45,205 ÷ 74 = 610 r 65

quotient = 610, remainder = 65

Key Fact

When a number is divided by another number, the result is called the quotient and the left over quantity is called the remainder.

Exercise 3

1. Multiply the following numbers by 10, 100, 1000.

   a) 381 b) 4,090 c) 97,509 d) 269,472 e) 852,118

2. Divide the following numbers by 10, 100, 1000.

   a) 49,000 b) 78,000 c) 65,000 d) 597,000 e) 210,000

3. Solve the following.

   a) 624 × 23 b) 2,456 × 90 c) 1,092 × 981 d) 78,543 × 49

   e) 45,201 × 561 f) 111,256 × 342 g) 790,902 × 643 h) 356,219 × 101

4. Solve the following numbers.

a) $13,440 \div 15$ b) $86,449 \div 29$ c) $32,536 \div 56$ d) $47,088 \div 48$

e) $56,780 \div 20$ f) $26,166 \div 98$ g) $73,810 \div 11$ h) $64,454 \div 32$

5. Aliya has Rs. 22,580. She wants to distribute it among 18 people.
   a) How much money will each person get?
   b) How much money will be left?

6. Omar's monthly income is Rs. 13,582. Find his total income in 3 years.

7. A toy factory manufactures 28,550 toys in 25 days. How many toys will it manufacture in one day?

8. Hammad bought one laptop, for Rs. 89,710. Find the price of 10 such laptops.

9. There are 145 boxes of pencils each containing 5 pencils. If 48 boxes have blue pencils and the rest have red pencils, find:
   a) the total number of pencils.
   b) the number of red pencils.

Number Patterns

Arham has started exercising. He increased his exercise time gradually. He exercised for 5 minutes on Monady, 7 minutes on Tuesday and 9 minutes on Wednesday. If he keeps increasing the time in the same manner, for how many minutes will he exercise on Thursday?

First write the given values (duration/minutes) in increasing order.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
5	7	9	?	?	?	?

Now try finding out a rule in it. Observe that time is increasing by 2 minutes everyday.

5 7 9 ? ? ?

+ 2 + 2 + 2

It means by adding 2 to 9, we will get the next number that is 11.

5 7 9 11 $\square$ $\square$ $\square$

+ 2 + 2 + 2

Thus, Arham will exercise for 11 minutes on Thursday.

Can you tell how much time will be taken on Friday, Saturday and sunday?

Arham's exercise time follows a pattern according to a specific rule.
The rule is:
Add 2 to the previous term.

By adding 2 to the previous term we can get the next term.

The list of number following a specific rule is called number sequence. The number in the sequence are called terms of the sequence.

TEACHING POINT

Divide the students in 2 groups. Ask each group to make at least 5 patterns. Then exchange these patterns with other groups and ask them to identify the rules of the pattern.

If we look at the terms of this pattern,

4, 12, 20, 28, 36, ...

- Find its rule.
- Find the next three terms.

4 12 20 28 36 ? ? ?

+ 8 + 8 + 8 + 8

Rule: this is on addition pattern in which every next number is obtained by adding 8 to the previous number.

So, the next three terms are:

44, 52, 60

Try Yourself

Identify the rule for this pattern and find the next three terms. 52, 47, 42, __, __, __

Now observe this pattern.

2, 4, 8, 16,___, ___, ___

- Find its rule.
- Find the next three terms.

2 4 8 16 ? ? ?

× 2 × 2 × 2

Its a multiplication pattern in which every next number is obtained by multiplying the previous number by 2.

Rule of the pattern: Multiplying by 2

Next 3 terms = 32, 64, 128.

Try Yourself

Ahad had a plant in the pot. He observed that the height of the plant is increasing by 4 cm daily. If on Monday the height of plant was 12 cm, find on which day the plant will be 24 cm high?

Look at this number patterm:

400,000, 40,000, 4,000, ...

- Find its rule.
- Find the next three terms.

400,000 40,000 4,000 ?

÷ 10 ÷ 10 ÷ 10

If we look at the terms of this pattern, we see that by dividing 400,000 by 10, we get 40,000 and by dividing 40,000 by 10, we get 4,000.
It means this is division pattern.

This is a division pattern in which next term is obtained by dividing the previous term by 10.

Rule: dividing by 10.

Try Yourself

Identify if this pattern is increasing or decreasing and then find the next three terms.

60, 600, 6,000, 60,000, ___, ___, ___

Its next 3 terms =

400, 40, 4

We can also find patterns in a chart or table.
Observe the given hundreds chart:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

By starting at 10, we can see that pattern is being made in coloured boxes, every next number is obtained by adding 9 to the previous one.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

By starting at 100, we can see that a pattern is being made in coloured boxes, every next number is obtained by subtracting 11 from the previous one.

Try Yourself

Observe the hundreds chart and find 3 patterns operations. Identify the rules for the patterns.

TEACHING POINT

Divide the students in groups. Ask each group to create a table of patterns. Then ask the other groups to identify the rules of the patterns given in the table.

Consider the following sequence:

3, 6, 9, 12, ...

We can find the position number and term using the following.

Position:	1st	2nd	3rd	4th	5th	....
Term:	3	6	9	12,	....	....
	+3	+3	+3	+3		

Rule * of pattern is adding 3 to previous term.

We can write this pattern in table form as:

Position	Term
1	3
2	3 + 3 = 6
3	6 + 3 = 9
4	9 + 3 = 12
5	12 + 3 = 15

Try Yourself

Identify the rules of these pattern and also find the next three terms.

a) 3, 6, 12, 24, ____, ____, ____.

b) 5, 7, 10, 14, ____, ____, ____.

c) 100, 96, 92, 88, 84, ____, ____, ____.

d) 8, 80, 800, 8,000, ____, ____, ____.

e) 900,000, 90,000, 9,000, ____, ____, ____.

Exercise 4

1. Identify the rules of this pattern and also find the next three terms

   a) 10, 40, 160, 640,____, ____, ____.

   b) 22, 220, 2200,____, ____, ____.

   c) 352,176,88, ____, ____, ____.

   d) 780, 880, 980, ____, ____, ____.

   e) 560, 540,520, 500, _____, _____, _____.

2. Observe the given hundred chart. Find at least five patterns and identify the rules of these patterns.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

3. Observe the given tables and find the rules of number the pattern.

a)

Position	Term
1	4
2	5
3	6
4	7
5	8

b)

Position	Term
1	12
2	22
3	32
4	42
5	52

c)

Position	Term
1	11
2	22
3	33
4	44
5	55

d)

Position	Term
1	100
2	200
3	300
4	400
5	500
6	600

I Have Learnt

- reading numbers up to 1,000,000 (one million) in numerals and words.
- writing numbers up to 1,000,000 (one million) in numerals and words.
- adding numbers up to 6-digit numbers
- subtracting numbers up to 6-digits
- multiplying numbers, up to 5-digits, by 10, 100, and 1,000.

Vocabulary

numbers	digit
place value	addition
subtraction	multiply
division	pattern
ascending	descending
table	chart

- multiplying numbers, up to 5-digits, by a number up to 3-digits.
- dividing a number up to 5-digits by 10,100 and 1,000.
- dividing numbers up to 5-digits by a number up to 2-digits.
- solving real-life situations involving operations of addition, subtraction, multiplication, and division.
- identifying and apply a pattern rule to determine missing elements for a given pattern
- identifying the pattern rule of a given increasing and decreasing pattern and extend the pattern for the next three terms
- describing the pattern found in a given table or chart.

Review Exercise

1. Encircle the correct option.

a) We put commas after every ______ digits in numbers.

i) 2 ii) 3 iii) 4 iv) 16

b) The value of 2 in the number 6,985,621 is ________.

i) 2 ii) 20 iii) 200 iv) 2,000

C) In 7,856,211 the digit ______ is the thousands place digit.

i) 2 ii) 5 iii) 6 iv) 8

d) When we multiply a number by _______ we put 3 zeros to its right end.

i) 10 ii) 100 iii) 1,000 iv) 1

e) When we ________ a number by 10 we remove a zero from its right.

i) Add ii) Subtract iii) Multiply iv) Divide

2. Write the following numbers in words.

a) 8,734,123 b) 6,965,129 c) 4,982,009 d) 9,012,011

3. Solve the following.

a) 212,121 + 56,234 b) 18,315 + 102,376 c) 727,191 + 92,921

d) 139,657+ 247,777 e) 532,481 + 100,008 f) 200,454 + 126,654

4. Solve the following.

a) 675,921 - 31,412 b) 986,543 - 65,219 c) 108,761 - 70,021

d) 846,109 - 591,089 e) 865,439 - 761,212 f) 696,349 - 288,888

5. Solve the following.

a) 12,356 × 122 b) 65,781 × 100

c) 262,825 × 522 d) 837,564 × 519

6. Solve the following.

a) 66,693 ÷ 33 b) 35,788 ÷ 42 c) 25,111 ÷ 69

d) 28,000 ÷ 1,000 e) 58,580 ÷ 10 f) 28,104 ÷ 28

7. What are the rules for these patterns? Also find the next three terms of each pattern.

a) 50,100,150,200, ____, ____, ____.

b) 180, 165, 150, 135, ____, ____, ____.

c) 18, 90, 450, 2250, ____, ____, ____.

d) 6,100,000, 610,000, 61,000, ____, ____, ____.

Fill in the blanks and complete the pattern.

a) 10 × ____ = 10
10 × ____ = 100
10 × ____ = 1,000
10 × ____ = 10,000

b) ____ ÷ 10 = 1,000
____ ÷ 100 = 100
____ ÷ 1,000 = 10
____ ÷ 10,000 = 1

9. The price of a car is Rs. 456,721 and the price of another car is Rs. 987,676. Find the total price of both.

10. There are 768,121 children and 456,789 women in the City. How many more children are there than the women?

11. The price of a scanner is Rs. 162,900 and the price of a laser printer is Rs. 96,880. Find:

a) the total price of both items

b) the total price of 15 scanners and 3 laser printers.

12. 35,288 blocks are to be packed in 28 boxes. Find:

a) how many blocks are there in each box?

b) how many blocks will be left?

13. Observe the given tables and find the rules of number the patterns.

a)

Position	Term
1	2
2	4
3	6
4	8

b)

Position	Term
1	10
2	25
3	40
4	50

Unit 2

HCF and LCM

Learning Outcomes

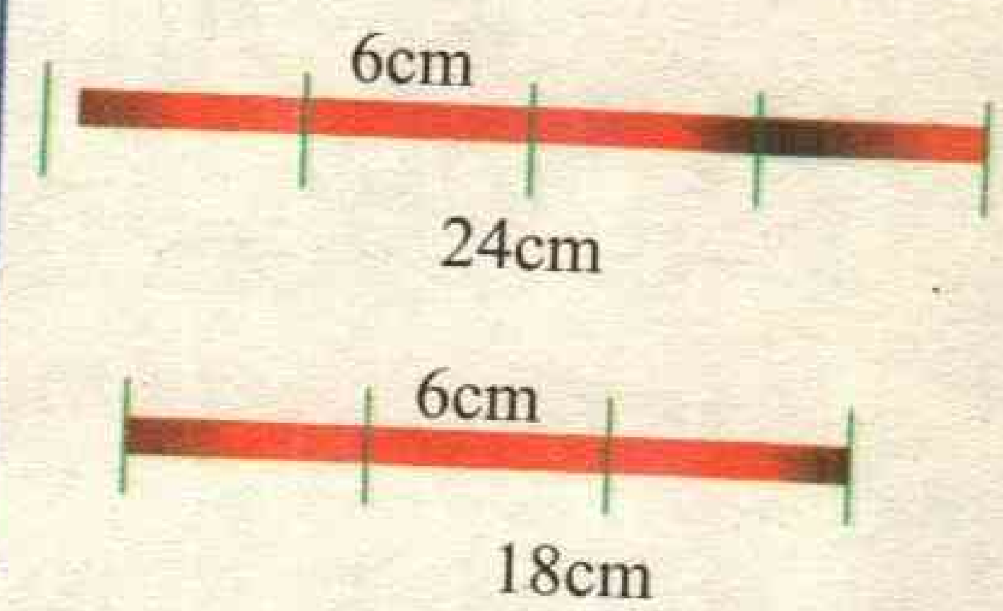
By the end of this unit you will be able to:

- find HCF of
  - two numbers up to 2 - digit numbers
  - three numbers up to 2 - digit numbers
- using prime factorization method and division method
- find LCM of
  - two numbers up to 2 - digit numbers
  - three numbers up to 2 - digit numbers
  - using prime factorization method and division method
- solve real life situations involving HCF and LCM.

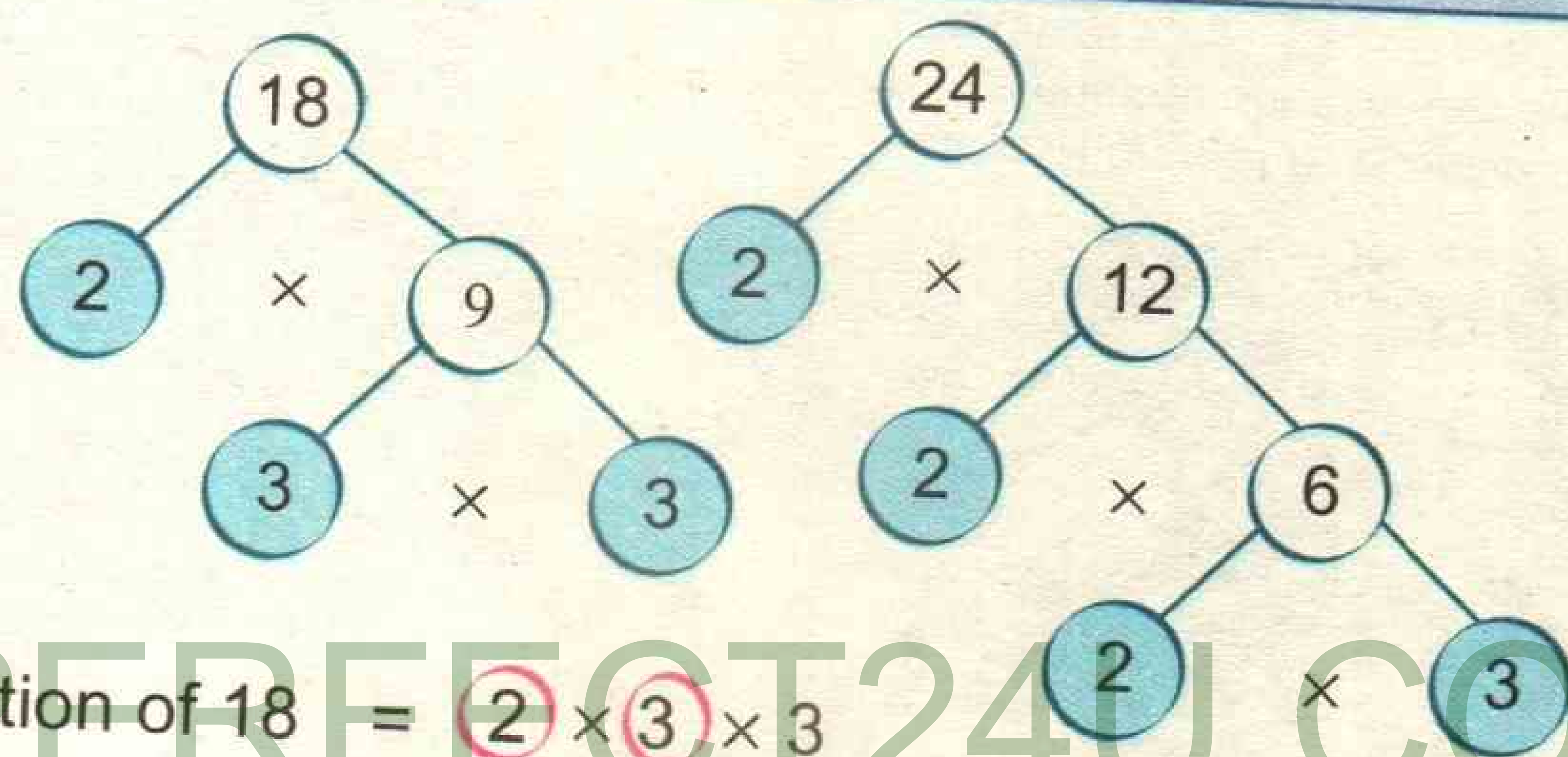
Nida wants to grow 12 Roses and 18 jasmine plants in rows in her home garden. If she wants to plant the same type of plants in one row, find the maximum number of plants that can be grown in one row.

Highest Common Factor HCF

Sara has two pieces of ribon with lengths of 18 cm and 24 cm. She wants to cut the ribon into smaller pieces of equel length with no remainder. What is the greatest possible length of each piece?



To cut both ribbons in equal lengths, we need to find the greatest number which can divide both 18 and 24 simultaneously.



Prime factorization of 18 $= 2 \times 3 \times 3$

Prime factorization of 24 $= 2 \times 3 \times 2 \times 2$

common prime factors of 18 and 24 $= 2, 3$

product of 2 and 3 $= 2 \times 3 = 6$

6 is the greatest factor which divides both 18 and 24 completely.

6 is called the HCF of 18 and 24

The greatest possible length of each piece is 6 cm.

Key Fact

The greatest number which divides 2 or more numbers simultaneously, is called their HCF.

Give ropes of different lengths to the students. Ask them to divide the pieces of ropes in equal lengths.

Let's find the HCF of 12 30 and 44 by using prime factorization.

$$\begin{array}{c|c} 2 & 12 \\ \hline 2 & 6 \\ \hline 3 & 3 \\ \hline & 1 \end{array} \qquad \begin{array}{c|c} 2 & 30 \\ \hline 3 & 15 \\ \hline 5 & 5 \\ \hline & 1 \end{array} \qquad \begin{array}{c|c} 2 & 44 \\ \hline 2 & 22 \\ \hline 11 & 11 \\ \hline & 1 \end{array}$$

Prime factorization of 12 = $2 \times 2 \times 3$

Prime factorization of 30 = $2 \times 3 \times 5$

Prime factorization of 44 = $2 \times 2 \times 11$

Common prime factors = 2

HCF = 2

Hammad has 36 red pencils and 54 blue pencils. He wants to put his pencils in boxes such that every box has equal pencils of the same colour. What will be the maximum number of pencils in each box?

For this we will find the HCF of 36 and 54 by using division.

1. Divide the greater number 54 by the smaller number 36 and find the remainder, Which is 18.
2. Divide 36 by the remainder 18.
3. We will get zero as the remainder.

$$\begin{array}{r|l} 36 & 54 \quad (1 \\ & -36 \\ \hline 18 & 36 \quad (2 \\ & -36 \\ \hline & 0 \end{array}$$

4. The last divisor is 18. So, it is the HCF of 36 and 54.

HCF of 36 and 54 = 18

Thus, the maximum number of pencils of same colour in each box is 18.

I want to find out the greatest number which completely divides 26, 48 and 60.

First divide the greatest number 60 by 48.

$$\begin{array}{r}
48\,)\,60\,(\,1 \\
-48 \\
\hline
12\,)\,48\,(\,4 \\
-48 \\
\hline
0
\end{array}$$

Key Fact

The HCF of two or more than two numbers, which have no common prime factor, is always 1.

HCF of 48 and 60 is 12.
Now, divide the number (remaining number) 26 by 12.

$$\begin{array}{r}
12\,)\,26\,(\,2 \\
-24 \\
\hline
2\,)\,12\,(\,6 \\
-12 \\
\hline
0
\end{array}$$

The number 2 is the last divisor. So, this is the greatest number which completely divides 26, 48 and 60.

Try It!

Find three 2 digit numbers whose sum is 152 and whose HCF is 8.

Exercise 1

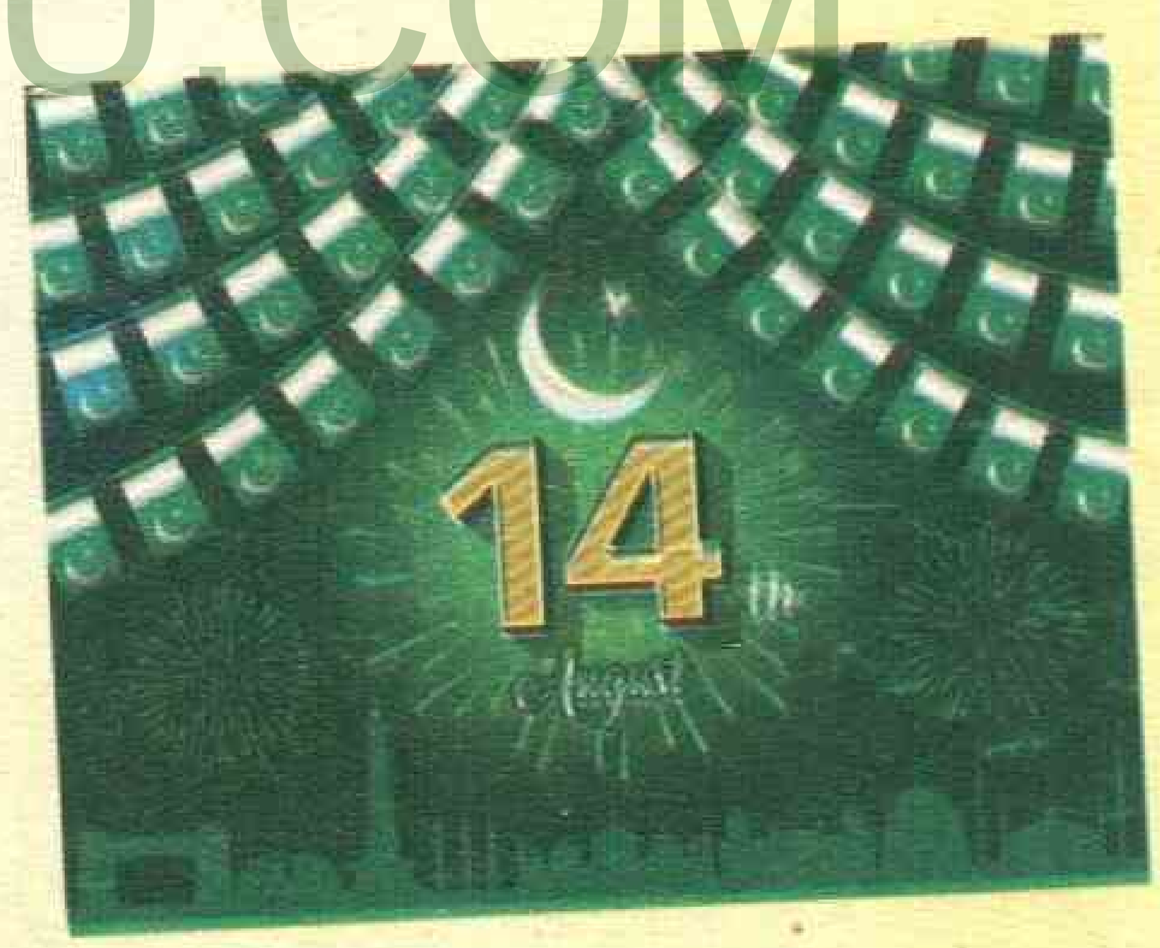
1. Find the HCF of the following numbers by using prime factorization method.

a) 58, 72	b) 21, 48	c) 56, 70	d) 45, 90
e) 42, 49	f) 15, 18, 56	g) 42, 54, 64	h) 18, 30, 90
i) 12, 24, 36	j) 18, 36, 76	k) 5, 35, 40	l) 13, 52, 78

2. Find the HCF of the following numbers by using division method.

a) 13, 65	b) 25, 75	c) 42, 98	d) 16, 20, 70
e) 56, 84, 88	f) 57, 76, 95	g) 16, 32, 96	h) 20, 40, 80
i) 48, 76, 96	j) 24, 48, 72	k) 51, 65, 75	l) 13, 39, 78

3. The lengths of the two ropes is 24 meters and 14 meters. If Ali wants to cut the ropes into pieces of equal length without any rope left. What will be the maximum length of each piece?



4. For the Independence Day celebrations, 52 students in white, 65 students in green and 39 students in blue dresses are to be arranged in equal rows in such a way that students of same colour dress are in each row. What is the greatest number of students that could be in each row?

5. Find the greatest number that divides 16, 24 and 48 completely.

6. Ibrahim and Marwa are preparing first aid kits for the students. They have 30 perforated adhesive bandages, 60 triangular bandages and 75 rectangular bandages. They must distribute these equally in the kits, with nothing left over. What is the greatest number of kits they can make with this quantity of bandages?

Least Common Multiple LCM

For a Science project preparation, grade 4 students visit the science laboratory after every 8 days. While grade 5 students visit laboratory after every 12 days. If students of both grades visited the lab today, find when will they visit the laboratory on the same day?

Methed-1

Multiples of 8 and 12 will be used to find the day when the students of both grade will visit the laboratory on the same day.

Multiple of 8 are: 8,16, 24, 32, 40, 48,...

Multiples of 12 are: 12, 24, 36, 48,...

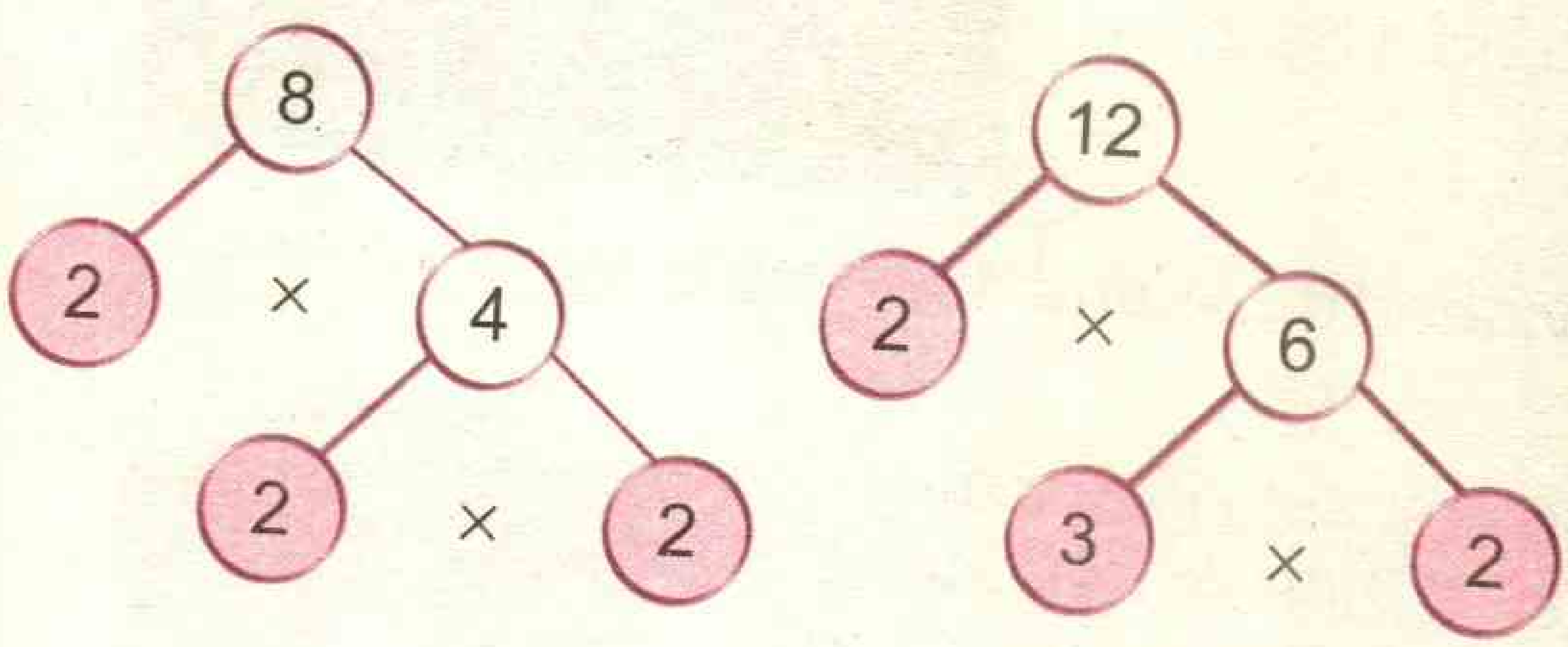
The first two common multiples of 8 and 12 are 24, 48.

The smallest of all common multiples of 8 and12 is 24.

24 is called least common multiple of 8 and 12.

Thus, students of both grade will visit the laboratory together after 24 days.

Methed-2



Key Fact

When we multiply any number by any other number, their product is called multiple of that number

TEACHING POINT

Write pairs of numbers on the board. Ask the students to find the first two common factors of these numbers.

Prime factorization of 8 $= 2 \times 2 \times 2$

Prime factorization of 12 $= 2 \times 2 \times 3$

Product Common prime factors of 8 and 12 $= 2 \times 2 = 4$.

Product of Non-common prime factors of 8 and 12 $= 2 \times 3 = 6$.

LCM= product of common prime factors x product of non-common prime factors

Key Fact

The LCM of two or more numbers is the smallest number which divides each of the given number completely.

LCM $= 4 \times 6$

LCM $= 24$

So, the next time students of both grades visit the laboratory together after 24 days.

Let's find out the LCM of 16,30 and 64 using prime factorization

$$\begin{array}{r|l} 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array} \qquad \begin{array}{r|l} 2 & 30 \\ \hline 5 & 15 \\ \hline 3 & 3 \\ \hline & 1 \end{array} \qquad \begin{array}{r|l} 2 & 64 \\ \hline 2 & 32 \\ \hline 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array}$$

Prime factorization of 16 $= 2 \times 2 \times 2 \times 2$

Prime factorization of 30 $= 2 \times 5 \times 3$

Prime factorization of 64 $= 2 \times 2 \times 2 \times 2 \times 2 \times 2$

Product of common prime factors of 16, 30 and 64 $= 2 \times 2 \times 2 \times 2 = 16$

TEACHING POINT

Ask the students to differentiate between HCF and LCM. Two three numbers on the board and ask them to find their LCM.

NOT FOR SALE

Non common prime factors of 16, 30 and 64 = $2 \times 2 \times 3 \times 5 = 60$

LCM= product of common prime factors $\times$ product of non-common prime factors

LCM $= 16 \times 60$

LCM $= 960$

The LCM of 16, 30 and 64 $= 960$

Ali, Ahmad and Umar exercise after every 10, 18 and 20 days respectively. If they all are exercising today, find out when will the next exercise on the same day again.

To find the days when they will the next exercise together again, we will find the LCM of 10, 18 and 20.

LCM = Product of all prime factors

LCM $= 2 \times 2 \times 3 \times 3 \times 5$

LCM $= 180$

2	18,	10,	20
2	9,	5,	10
3	9,	5,	5
3	3,	5,	5
5	1,	5,	5
	1,	1,	1

So, they will exercise together after 180 days.

Find the LCM of 12, 20 and 30 using the division method.

2	12, 20, 30
2	6, 10, 15
3	3, 5, 15
5	1, 5, 5
	1, 1, 1

LCM = $2 \times 2 \times 3 \times 5$

LCM = 60

So, the LCM of 12, 20 and 30 = 60

Try It!

A welfare organisation is distributing bundles of basic safety items among the people. If a packet of mask has 25 masks, a packet of gloves have 20 pairs of gloves and a packet of sanitizer has 5 sanitizer bottles in it, find the minimum number of packets of each item so that every bundle has one mask, one glove pair and one sanitizer bottle in it and no object is left over. (Hint : first find the LCM of 25,20 and 5)

Exercise 2

1. Find the LCM of the following numbers using prime factorization

a) 3, 21
b) 12, 80
c) 20, 15
d) 4, 10, 16
e) 9, 18, 27
f) 10, 20, 35
g) 20, 60, 75
h) 30, 45, 90
i) 16, 24, 36
j) 18, 60, 75
k) 49, 51, 56
l) 13, 65, 71

2. Find the LCM of the following numbers using division.

a) 14, 70	b) 15, 30	c) 45, 90	d) 35, 60, 75
e) 7, 21, 49	f) 25, 45, 95	g) 16, 32, 48	h) 28, 32, 40
i) 12, 14, 26	j) 10, 20, 25	k) 7, 14, 21	l) 8, 32, 42

3. Find the minimum length of the ribbon which can be completely cut into pieces of length 45 cm, 75 cm and 85 cm without any leftover.

4. Find the smallest number that can be completely divided by 42, 38 and 16.

5. The tour buses for Badshahi Masjid leaves the station every 25 minutes, for the interior city every 15 minutes and for the zoo every 30 minutes. If the three buses leave the station simultaneously at 11:05 am, find the time when the three buses will next leave the station simultaneously.

6. Boxes having 22 centimetre, 35 centimetre and 50 centimetre height respectively are to be stacked next to each other. What is the shortest possible height at which the three types of boxes will be at the same height?

7. Students of grade 5 have a mathematics test after every 3 days, English test after every 6 days and Science test after every 9 days. If all the three tests were conducted today, find, when will the three tests be conducted together again?

I Have Learnt

- finding HCF of
  - two numbers up to 2 - digit numbers
  - three numbers up to 2 - digit numbers

  using prime factorization method and division method

- finding LCM of
  - two numbers up to 2 - digit numbers
  - three numbers up to 2 - digit numbers using prime factorization method and division method
- solving real life situations involving HCF and LCM.

Vocabulary

HCF	prime factorization
prime	multiples
factors	
LCM	

Review Exercise

1. Encircle the correct option.

a) The HCF of 20, 48 and 56 is ________________

i) 4   ii) 3   iii) 5   iv) 1

b) The HCF of two or more than two numbers, which have no common prime factor, is always __________.

i) 1,000   ii) 100   iii) 10   iv) 1

c) Prime factorization of 16 is ____________.

i) 2×8 ii) 1×16 iii) $2 \times 2 \times 2 \times 2$ iv) $2 \times 4 \times 2$

d) The LCM of 33, 66 and 81 is ______________.

i) 1,770   ii) 1,872   iii) 1,782   iv) 1,287

e) The LCM of two or more prime numbers is always equal to their ________.

i) Prime factor   ii) Quotient   iii) LCM   iv) Product

2. Find the HCF of the following numbers using prime factorization.

a) 15, 18 b) 10,20 c) 25,40 d) 56, 88
e) 10,18,22 f) 20, 40, 82 g) 16, 38, 98 h) 39, 51, 75

3. Find the HCF of the following numbers by using the division method.

a) 20, 50 b) 15, 45 c) 60,70,80 d) 22, 28, 32
e) 44, 55, 99 f) 34, 48, 62 g) 30, 45, 70 h) 26, 52, 65

4. Find the LCM of the following numbers using prime factorization.

a) 2, 5 b) 3, 7 c) 5, 8 d) 4, 10, 16
e) 20, 25, 50 f) 45, 90, 95 g) 32, 70, 80 h) 33, 66

5. Find the LCM of the following numbers by using the division method.

a) 4, 9 b) 7, 11 c) 14, 26 d) 20, 40
e) 6, 24, 42 f) 10, 20, 30 g) 12, 18, 38 h) 6, 15, 21

6. 84 apples, 56 bananas and 21 oranges were distributed equally among some children. If the same combination of all kinds of fruits is distributed among all the children, find the maximum possible number of children who can receive the fruits?

7.Three water containers contain 12 litres, 24 litres and 42 litres of water.

a) Find the maximum capacity of a measuring container that can fully measure the amount of water in all three containers.

b) Find how many times the container needs to be filled to each empty container.

8.Find the smallest number that can be completely divided by 32 and 55 without leaving any remain.

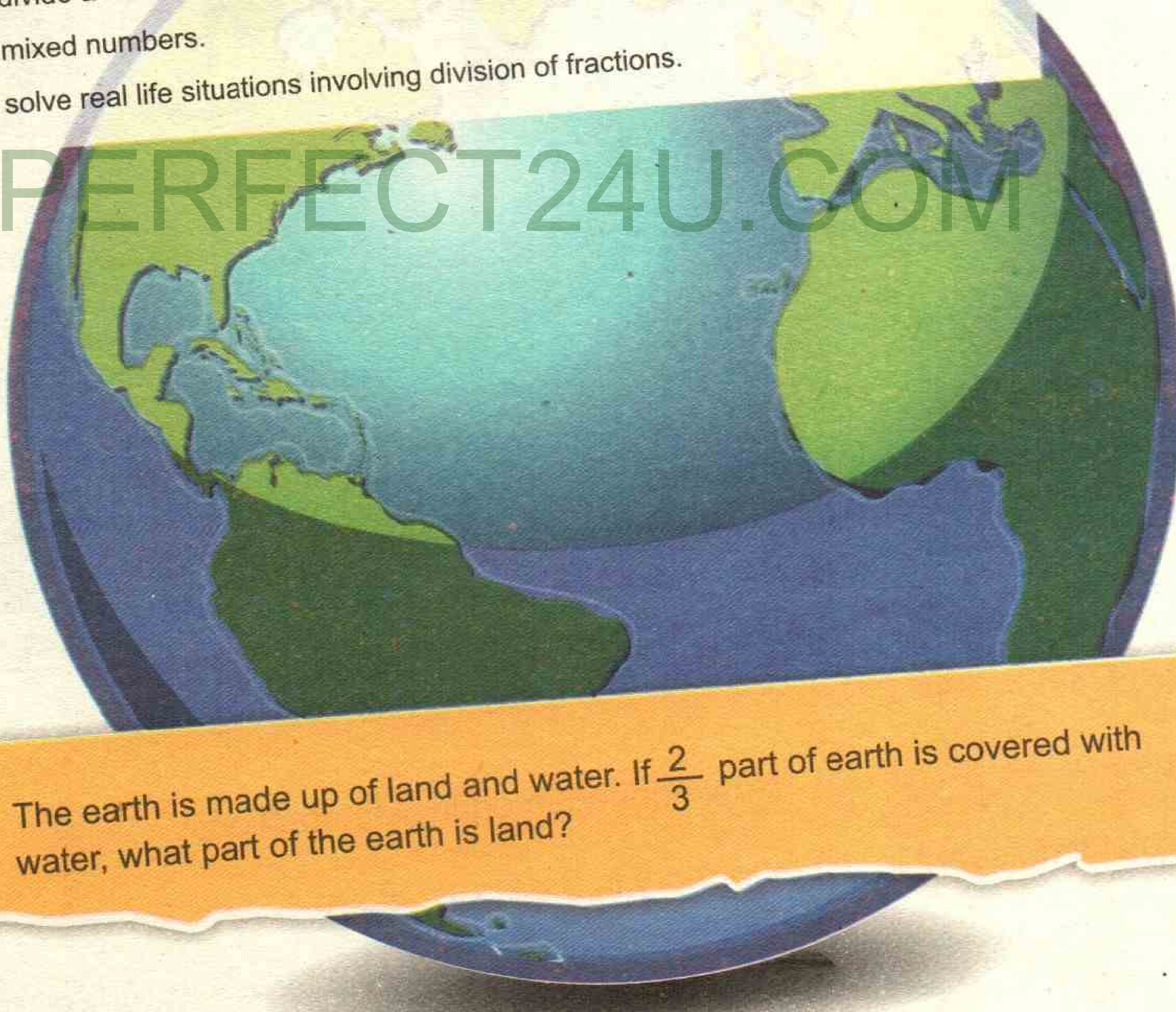
9. Find the least number of stickers which can be equally distributed among 15, 12 and 10 children.

Unit 3 Fractions

Learning Outcomes

By the end of this unit you will be able to:

- add and subtract two or three fractions with different denominators.
- multiply a fraction by a 1 - digit numbers and demonstrate with the help of diagram
- multiply two or three fractions involving proper, improper fractions, and mixed numbers.
- solve real life situations involving multiplication of fractions.
- divide a fraction by another fraction involving proper, improper fraction, and mixed numbers.
- solve real life situations involving division of fractions.

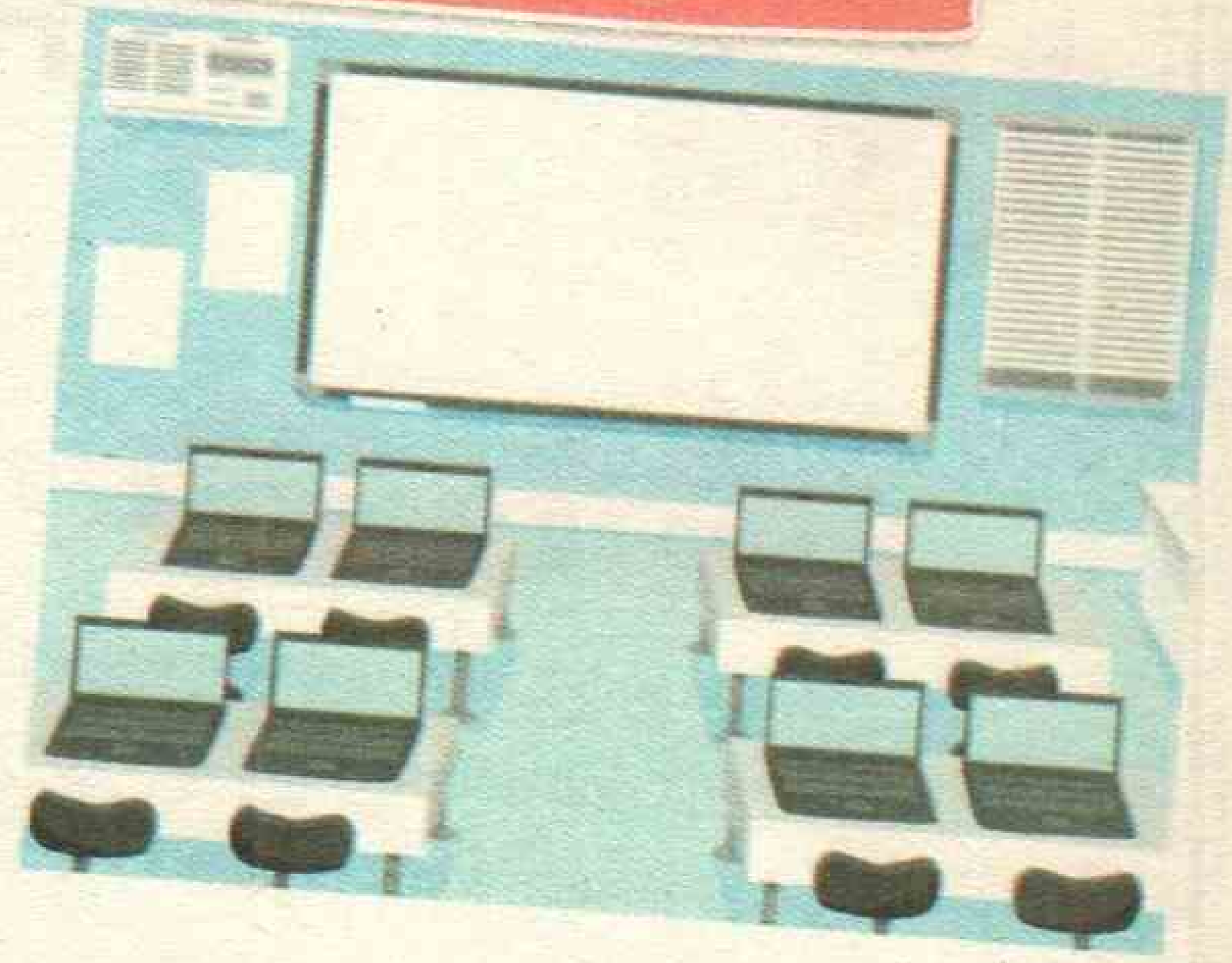


The earth is made up of land and water. If $\frac{2}{3}$ part of earth is covered with water, what part of the earth is land?

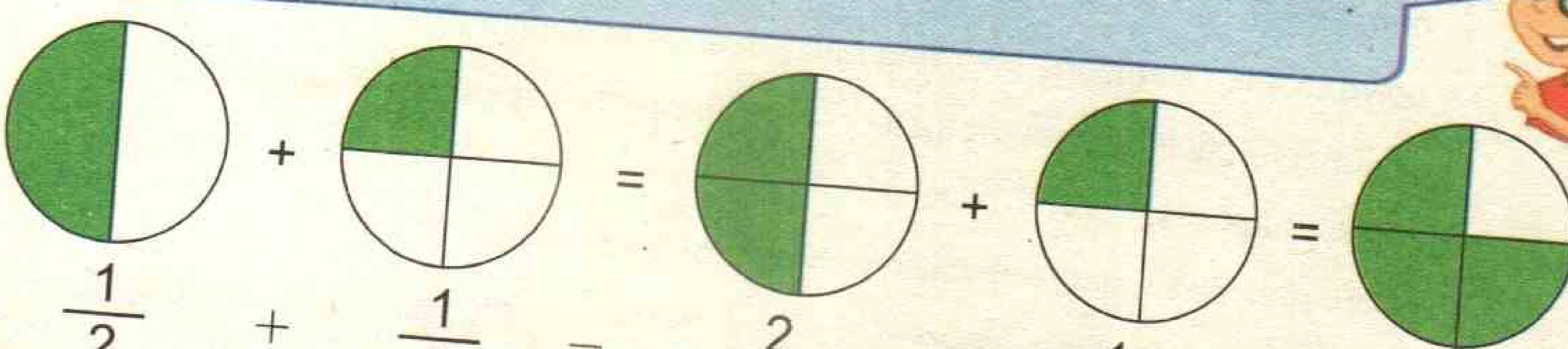
Addition and Subtraction of Fractions

Addition of Fractions

Yesterday we spent $\frac{1}{2}$ hour and today we spent $\frac{1}{4}$ hour in the computer lab. How much time have we spent in the lab altogether?



To find the total time spent in the laboratory, we need to add these fractions.



$$\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$

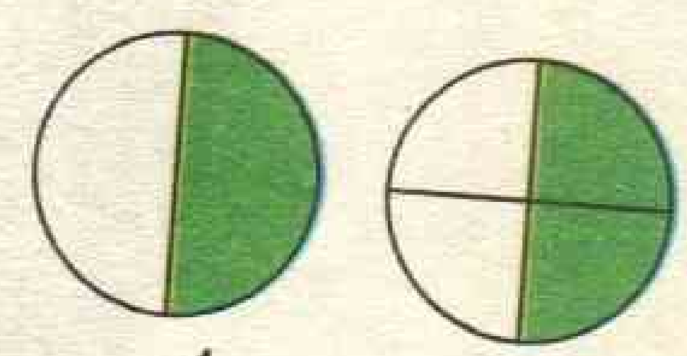
Time spent yesterday $= \frac{1}{2}$ h

Time spent today $= \frac{1}{4}$ h

Total time spent $= ?$

To make the denominator same,

$\frac{1}{2} = \frac{1 \times 2}{2 \times 2} = \frac{2}{4}$ Multiply the numerator and the denominator with 2 to make the denominator 4



$\frac{1}{2} = \frac{2}{4}$

$\frac{1}{4} = \frac{1 \times 1}{4 \times 1} = \frac{1}{4}$ Multiply the numerator and denominator with 1

$\frac{2}{4} + \frac{1}{4} = \frac{2 + 1}{4} = \frac{3}{4}$ Now add these equivalent fractions

The total time spent in the laboratory in 2 days is $\frac{3}{4}$ h.

TEACHING POINT: Use cut outs of different shapes and ask the students to represent equivalent fractions using the shapes.

Let's solve. $\frac{2}{5} + \frac{3}{10} + \frac{1}{20} = \boxed{}$

To convert the fraction into equivalent fraction.

Step I Find the L.C.M. of 5, 10, 20.

$$
\begin{array}{c|ccc}
2 & 5, & 10, & 20 \\ \hline
2 & 5, & 2, & 10 \\ \hline
5 & 5, & 1, & 5 \\ \hline
 & 1, & 1, & 1
\end{array}
$$

$$
\begin{aligned}
\text{L.C.M. of 5, 10, 20} &= 2 \times 2 \times 5 \\
&= 20
\end{aligned}
$$

Step II Multiply all the fractions with a number. So, that the denominators become equal to the L.C.M.

$$\frac{2}{5} = \frac{2 \times 4}{5 \times 4} = \frac{8}{20}$$

$$\frac{3}{10} = \frac{3 \times 2}{10 \times 2} = \frac{6}{20}$$

$$\frac{1}{20} = \frac{1 \times 1}{20 \times 1} = \frac{1}{20}$$

Try Yourself

What is the number of $\frac{2}{3}$ and $\frac{5}{6}$?

Step III Now add these equivalent fractions.

$$
\begin{aligned}
\frac{2}{5} + \frac{3}{10} + \frac{1}{20} &= \frac{8}{20} + \frac{6}{20} + \frac{1}{20} \\
&= \frac{8 + 6 + 1}{20} \\
&= \frac{15}{20} \\
&= \frac{3}{4}
\end{aligned}
$$

TEACHING POINT

Write different fractions on the board. Explain how to make their denominator same and and find their sum.

Sidra used $1\frac{3}{4}$ metre of red ribbon and $\frac{7}{8}$ meter of blue ribbon to decorate the gift boxes. Find the total length of the ribbon she used.

Convert the mixed fraction to improper fraction.

Red Ribbon $= 1\frac{3}{4}\text{ m} = \frac{7}{4}\text{ m}$

Blue Ribbon $= \frac{7}{8}\text{ m}$

total length of both ribbons $= \frac{7}{4} + \frac{7}{8}$

$= \frac{7 \times 2}{4 \times 2} + \frac{7 \times 1}{8 \times 1}$ (converted into equivalent fractions with denominator)

$= \frac{14}{8} + \frac{7}{8}$

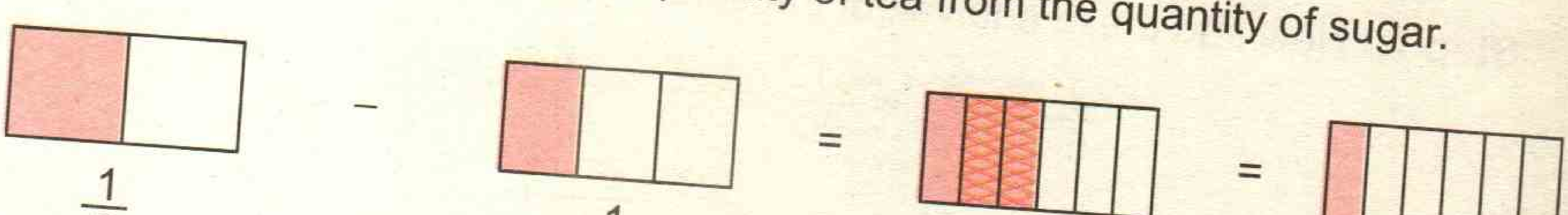
$= \frac{14 + 7}{8} = \frac{21}{8} = 2\frac{5}{8}$

The total length of the ribbon Sidra used $= 2\frac{5}{8}$ m

Subtraction of Fractions

Sara uses $\frac{1}{2}$ spoon of sugar and $\frac{1}{3}$ spoon of tea to make a cup of tea. Find how much more sugar she uses then the tea?

To find this, we will subtract the quantity of tea from the quantity of sugar.



$\frac{1}{2} - \frac{1}{3} = \frac{3-2}{6} = \frac{1}{6}$

Key Fact

The order of fractions does not matter while adding, however, when subtracting two fractions, always subtract the smaller fraction from the greater fraction.

Quantity of sugar $= \frac{1}{2}$

Quantity of tea $= \frac{1}{3}$

Difference $= \frac{1}{2} - \frac{1}{3}$

$$= \frac{1 \times 3}{2 \times 3} - \frac{1 \times 2}{3 \times 2}$$

$$= \frac{3}{6} - \frac{2}{6}$$

$$= \frac{3-2}{6}$$

$$= \frac{1}{6}$$

So, Sara used $\frac{1}{6}$ more spoons of sugar than tea.

Subtract $\frac{3}{4}$ from $2\frac{2}{3}$

1. Convert the mixed fraction into the improper fraction.
2. Find the LCM of 3 and 4.
3. Now multiply all the fractions by a number so that the denominator of all the fractions becomes equal to the LCM.4.
4. Subtract the fractions.

$$2\frac{2}{3} - \frac{3}{4} = \frac{8}{3} - \frac{3}{4}$$

$$= \frac{8 \times 4}{3 \times 4} - \frac{3 \times 3}{4 \times 3}$$

$$= \frac{32}{12} - \frac{9}{12} = \frac{32-9}{12}$$

$$= \frac{23}{12} = 1\frac{11}{12}$$

Try Yourself

- Subtract $\frac{6}{9}$ from $\frac{5}{6}$.
- Subtract $\frac{7}{12}$ from the sum of $\frac{5}{9}$ and $\frac{2}{3}$.

Try It!

Write three fractions with the sum greater than 1.Write two fractions with the difference of 1. Create and solve a real life situation involving addition of fractions with the answer 1.

NOT FOR SALE

Exercise 1

1. Add the following fractions.

a) $\frac{1}{2}+\frac{2}{4}$

b) $5\frac{2}{3}+2\frac{5}{7}$

c) $3\frac{4}{5}+\frac{5}{7}$

d) $4\frac{7}{10}+\frac{6}{8}$

e) $\frac{7}{9}+\frac{6}{8}+\frac{6}{3}$

f) $1\frac{3}{10}+6\frac{14}{20}+2\frac{15}{40}$

g) $\frac{24}{6}+\frac{31}{12}+\frac{43}{24}$

h) $\frac{7}{8}+4\frac{1}{4}+\frac{15}{16}$

2. Subtract the following fractions.

a) $\frac{3}{2}-\frac{2}{24}$

b) $2\frac{16}{18}-1\frac{4}{6}$

c) $3\frac{5}{14}-1\frac{2}{21}$

d) $\frac{5}{6}-\frac{6}{11}$

e) $4\frac{1}{6}-\frac{17}{18}$

f) $\frac{21}{12}-\frac{8}{10}$

g) $2\frac{13}{24}-\frac{4}{18}$

h) $5\frac{1}{8}-\frac{5}{15}$

3. To practice for a marathon race, Raheel ran $\frac{1}{4}$ kilometres on Monday, $\frac{7}{8}$ kilometres on Tuesday and $\frac{15}{6}$ kilometres on Wednesday. Find the total distance he covered in three days.

4. Saad spent $2\frac{1}{2}$ hours to prepare for his Mathematics test and $1\frac{1}{4}$ hours to prepare for his Urdu test. Calculate:

a) In which subject did he spend more time and by how much?

b) how much time did he spend studying altogether?

5. An electrician has $18\frac{8}{9}$ metres of wire. If he uses $\frac{2}{9}$ metres and $2\frac{1}{3}$ metres in two rooms, calculate:

a) How much wire did he use?

b) How much wire does he have left?

6. Write $\frac{10}{12}$ as the sum of three fractions and show this using figures.

7. Write $\frac{4}{7}$ as the difference of two fractions.

Multiplication and Division of Fractions

Multiplication of Fractions

Ibrahim takes $\frac{3}{4}$ hours daily to complete his homework.

How much time does he spend on his homework in a week?

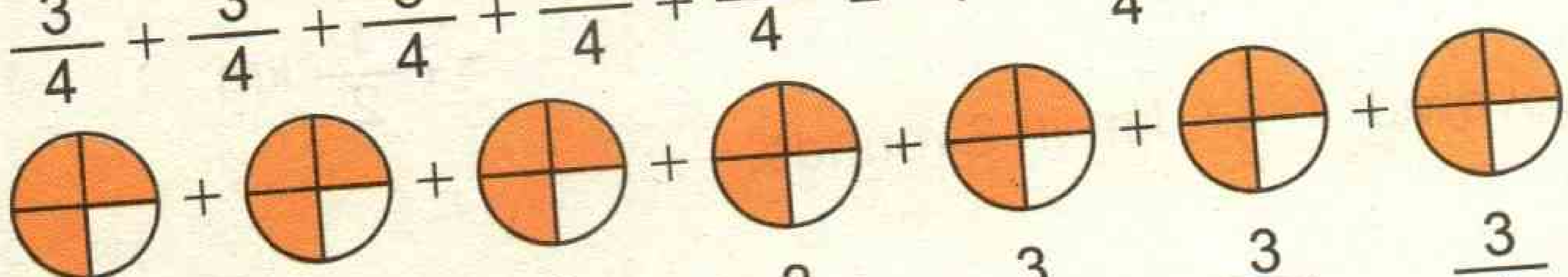
There are 7 days in a week. To find the required time, we will multiply $\frac{3}{4}$ hours with 7.

We can show the multiplication process by these figures.

As multiplication is repeated addition.

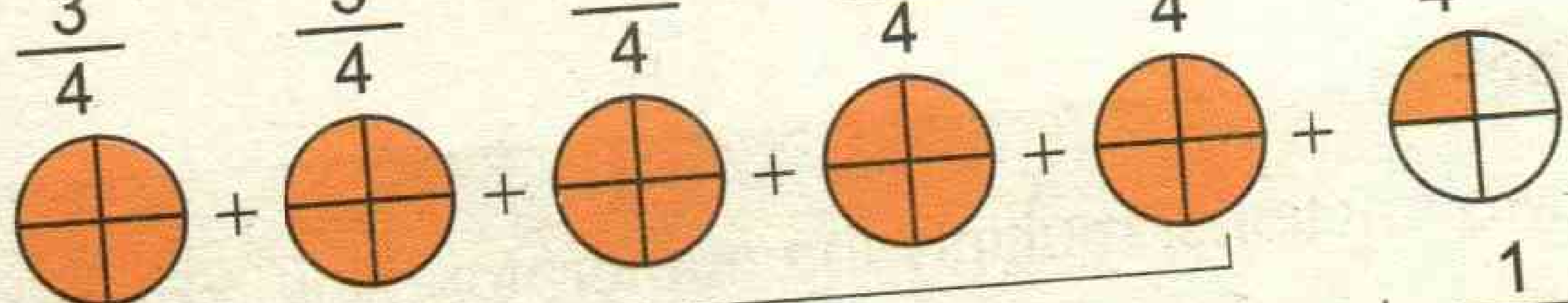
To multiply $\frac{3}{4}$ to 7 we will add $\frac{3}{4}$ seven times.

$$\frac{3}{4}+\frac{3}{4}+\frac{3}{4}+\frac{3}{4}+\frac{3}{4}+\frac{3}{4}+\frac{3}{4} = 7 \times \frac{3}{4}$$



$$7 \times \frac{3}{4} = \frac{3}{4} \quad \frac{3}{4} \quad \frac{3}{4} \quad \frac{3}{4} \quad \frac{3}{4} \quad \frac{3}{4} \quad \frac{3}{4}$$

=



$$1 + 1 + 1 + 1 + 1 + \frac{1}{4}$$

$$7 \times \frac{3}{4} = 5 + \frac{1}{4}$$

$$\frac{21}{4} = 5\frac{1}{4}$$

NOT FOR SALE

Alternatively

Time to do homework in one day $= \frac{3}{4}$ h

Time to do homework in whole week $= \frac{3}{4}$ h $\times 7$

$$7 \times \frac{3}{4} = \frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} = \frac{21}{4} = 5\frac{1}{4}$$

So, the time taken by Ibrahim to complete the homework in a week $5\frac{1}{4}$ h

Rabia completed one round of the park and covered a distance of $2\frac{1}{2}$ kilometres. If she takes 3 rounds of the park, how much distance will she cover?

Distance covered in 1 round $= 2\frac{1}{2}$ km $= \frac{5}{2}$ km

Distance covered in 3 rounds $= \frac{3}{1} \times \frac{5}{2}$ km $= \frac{15}{2}$ km

$= 7\frac{1}{2}$ km

Rabia covered $7\frac{1}{2}$ km in 3 rounds.

Key Fact

- To multiply two fractions, multiply the numerator by numerator and the denominator by the denominator.
- In multiplication, the order of the fractions does not affect the products.

Sania and Ali grew plants in pots. After a week, the height of Sania's plant is $3\frac{2}{5}$ cm while the height of Ali's plant is $1\frac{1}{4}$ times that of Sania's plant. Find the height of Ali's plant.

To find the height of Ali's plant, we will multiply the height of Sania's plant by $1\frac{1}{4}$.

Height of Sania's plant $= 3\frac{2}{5}$ cm $= \frac{17}{5}$

Height of Ali's plant $= \frac{17}{5} \times 1\frac{1}{4}$ cm

$= \frac{17}{\cancel{5}_1} \times \frac{\cancel{5}^1}{4}$ cm

$= \frac{17 \times 1}{1 \times 4}$

$= \frac{17}{4}$ cm

Height of Ali's plant $= 4\frac{1}{4}$ cm

Let's multiply $\frac{1}{5}$, $\frac{9}{4}$ and $\frac{2}{3}$.

$$\frac{1}{5} \times \frac{9}{4} \times \frac{2}{3}$$

$$= \frac{1 \times \overset{3}{\cancel{9}} \times \overset{1}{\cancel{2}}}{5 \times \underset{2}{\cancel{4}} \times \underset{1}{\cancel{3}}}$$

(Simplest form) $= \frac{3}{10}$

TEACHING POINT: Make groups of students and ask each group to create a real life problem involving multiplication of fractions. Then ask them to exchange their problems with other groups to solve.

Find the product of $\frac{1}{6}$ and $\frac{2}{3}$.

$$= \frac{1}{6} \times \frac{2}{3}$$

$$= \frac{1 \times \overset{1}{\cancel{2}}}{\underset{3}{\cancel{6}} \times 3}$$

$$= \frac{1 \times 1}{3 \times 3}$$

$$= \frac{1}{9}$$

Division of Fractions

For an experiment on cold and hot water, I have to pour $7\frac{1}{3}$ litres of water in glasses with a capacity of $\frac{1}{3}$ litres. How many glasses will I be able to fill?

To find this, we have to divide the total volume of water $7\frac{1}{3}$ litres by the capacity of one glass which is $\frac{1}{3}$ litres.

Total volume of water $= 7\frac{1}{3}\,\ell = \frac{22}{3}\,\ell$

Capacity of one glass $= \frac{1}{3}\,\ell$

Total number of Glasses $= \frac{22}{3} \div \frac{1}{3} = \frac{22}{3} \times \frac{3}{1}$

$$= \frac{22 \times \overset{1}{\cancel{3}}}{\underset{1}{\cancel{3}} \times 1} = \frac{22 \times 1}{1 \times 1} = 22$$

The number of glasses filled $\frac{1}{3}\,\ell$ by water $7\frac{1}{3}\,\ell = 22$ glasses

I will need 22 glasses to fill $7\frac{1}{3}\,\ell$ of water.

Try Yourself

Find the product of $\frac{7}{2}$ and $\frac{3}{8}$.

How many pieces of $\frac{4}{10}$ metres of wire can be cut from a wire which is $\frac{8}{5}$ metres long?

The number of pieces will be found by dividing $\frac{8}{5}$ by $\frac{4}{10}$.

Total length of wire $= \frac{8}{5}$

Length of 1 piece $= \frac{4}{10}$

Number of pieces $= \frac{8}{5} \div \frac{4}{10}$

Number of pieces $= \frac{{}^{2}\cancel{8}}{\cancel{5}_{1}} \times \frac{{}^{2}\cancel{10}}{\cancel{4}_{1}}$

$= \frac{2 \times 2}{1 \times 1}$

Thus, the number of pieces of wire is 4 metres.

Let's divide $3\frac{5}{8}$ by $2\frac{3}{10}$.

$$3\frac{5}{8} \div 2\frac{3}{10} = \frac{29}{8} \div \frac{23}{10}$$

$$= \frac{29}{8} \times \frac{10}{23}$$

$$= \frac{145}{92}$$

$$= 1\frac{53}{92}$$

Try Yourself

Find the product of $\frac{1}{6}$ and $\frac{9}{12}$ and divide it by $\frac{7}{8}$.

Exercise 2

1. Solve the following with help of figure.

a) $\frac{1}{2} \times 12$ b) $\frac{5}{9} \times 7$ c) $\frac{6}{7} \times 3$

d) $\frac{3}{4} \times 4$ e) $\frac{2}{3} \times 5$ f) $\frac{5}{6} \times 9$

2. Multiply the following.

a) $\frac{4}{5} \times \frac{1}{4}$ b) $\frac{3}{7} \times \frac{14}{18}$ c) $\frac{5}{3} \times \frac{75}{20}$

d) $\frac{58}{60} \times \frac{4}{20} \times \frac{10}{20}$ e) $\frac{2}{7} \times \frac{4}{5} \times \frac{3}{7}$ f) $\frac{30}{28} \times \frac{2}{8} \times \frac{6}{9}$

g) $1\frac{3}{5} \times 2\frac{3}{7} \times 3\frac{3}{4}$ h) $5\frac{10}{35} \times 8\frac{2}{5} \times 9\frac{3}{11}$ i) $9\frac{1}{9} \times 10\frac{1}{3} \times 5\frac{1}{2}$

3. Divide the following.

a) $\frac{4}{12} \div \frac{4}{18}$ b) $\frac{3}{25} \div \frac{9}{45}$ c) $\frac{5}{60} \div \frac{7}{20}$

d) $2\frac{58}{60} \div 4\frac{4}{20}$ e) $5\frac{5}{9} \div 9\frac{6}{7}$ f) $6\frac{30}{32} \div 7\frac{2}{4}$

g) $2\frac{5}{6} \div 4\frac{2}{9}$ h) $3\frac{1}{2} \div \frac{4}{9}$ i) $\frac{1}{7} \div 2\frac{6}{7}$

4. If $5\frac{1}{2}$ metres of cloth is used to stitch one dress, how much cloth will be used to stitch 7 dresses?

5. Hina ate $\frac{1}{2}$ of a cake. If there were 8 pieces of cake, how many pieces did Hina eat?

6. Nida had $\frac{3}{12}$ of a pizza. She gave $\frac{1}{8}$ of it to her friend, Madeeha. Find what part of the whole pizza did Madeeha get?

7. To decorate the classroom, Hassan used ribbons in two colours. The length of the blue ribbon is $5\frac{7}{8}$ metres. The length of red ribbon is $\frac{2}{3}$ of the length of the blue ribbon.

a) What is the length of red ribbon?

b) Find the total length of both ribbons.

8. Find the number which results in $4\frac{5}{9}$ when multiplied by $6\frac{1}{6}$.

9. $44\frac{1}{6}$ kilograms of sugar is to be packed in $4\frac{5}{12}$ kilograms packets. Find:

a) In how many packets sugar will be packed?

b) How much sugar will there be in 9 packets of mass $4\frac{5}{12}$ kilograms?

I Have Learnt

- adding and subtracting two or three fractions with different denominators.
- multiplying a fraction by a 1 - digit numbers and demonstrate with the help of diagram
- multiplying two or three fractions involving proper, improper fractions, and mixed numbers.
- solving real life situations involving multiplication of fractions.
- dividing a fraction by another fraction involving proper, improper fraction, and mixed numbers.
- solving real life situations involving division of fractions.

Vocabulary

fraction
fractions
numerator
denominator
equivalent fractions

Review Exercise

1. Encircle the correct option, and fill in the blanks, where appropriate.

a) $\frac{1}{3} + \frac{2}{5} =$ ___

i) $\frac{3}{5}$ ii) $\frac{11}{15}$ iii) $\frac{3}{8}$ iv) $\frac{2}{15}$

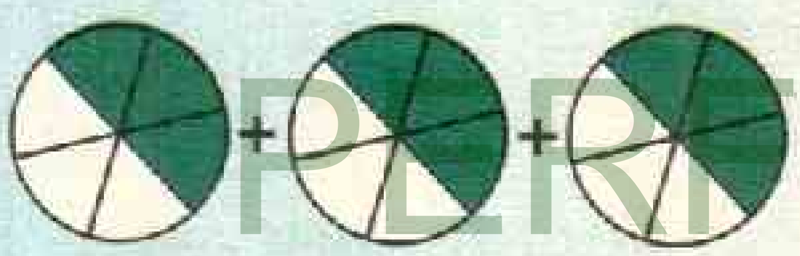
b) $\frac{5}{9} - \frac{2}{3} =$ ___

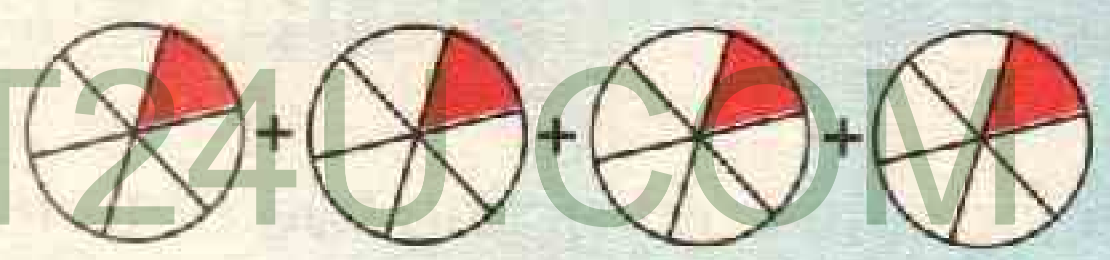
i) $\frac{3}{9}$ ii) $\frac{7}{3}$ iii) $\frac{1}{9}$ iv) $\frac{7}{9}$

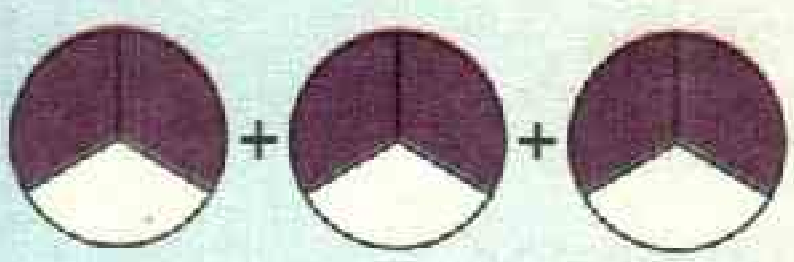
c) The product $\frac{3}{4}$ and $\frac{4}{3}$ is ________

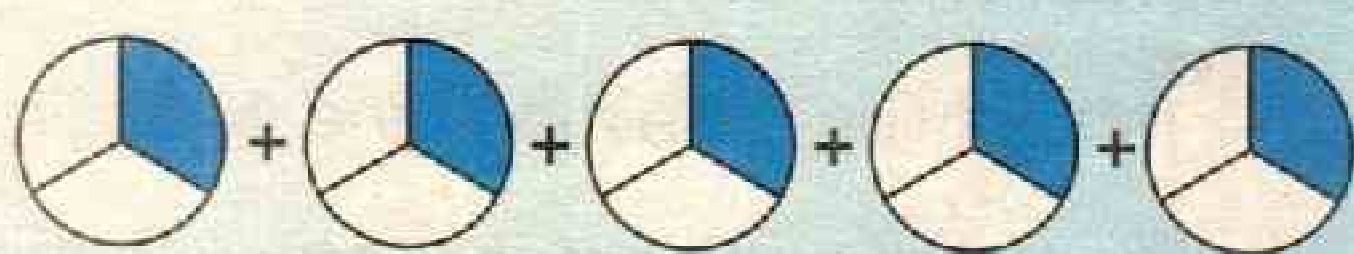
i) 1,000 ii) 10 iii) 1 iv) 111

d) Which figure is showing $5 \times \frac{1}{3}$?

i) 

iii) 

iii) 

iv) 

e) When _____________ changing the order of the fractions will not affect the result.

i) adding and subtracting ii) subtracting and dividing

iii) multiplying and dividing iv) adding and multiplying

2. Solve the following.

a) $\frac{7}{20} + 4\frac{3}{10}$ b) $\frac{8}{5} + \frac{19}{15} + 5\frac{4}{30}$ c) $3\frac{14}{50} - 2\frac{9}{25}$

d) $1\frac{16}{44} \div \frac{4}{11}$ e) $2\frac{6}{31} \times \frac{62}{24}$ f) $1\frac{4}{7} + 2\frac{13}{28} + \frac{3}{4}$

g) $3\frac{6}{8} + 3\frac{3}{4}$ h) $1\frac{3}{9} \times 25$ i) $6\frac{2}{3} \div 3\frac{1}{12}$

3. Find $2\frac{3}{4}$ of 36.

4. How many months will there be in $\frac{3}{4}$ of a year?

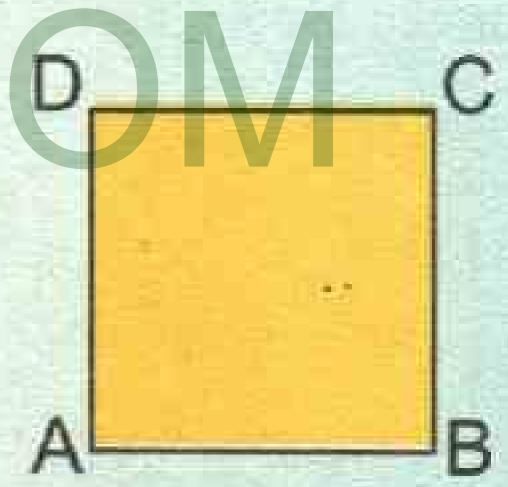
5. Add the product of $\frac{4}{5}$ and $\frac{12}{2}$ to the quotient of $\frac{4}{45} \div \frac{4}{5}$.

6. Marwa prepared $5\frac{6}{7}$ litres of apple juice. She served $3\frac{2}{5}$ litres of juice to the guests. Find out how much juice is left?

7. Ali's mother bought $3\frac{1}{2}$ kg of chicken, $1\frac{1}{2}$ kg of fish and $2\frac{1}{4}$ kg of mutton. Calculate, how many kilograms of meat she bought, altogether?

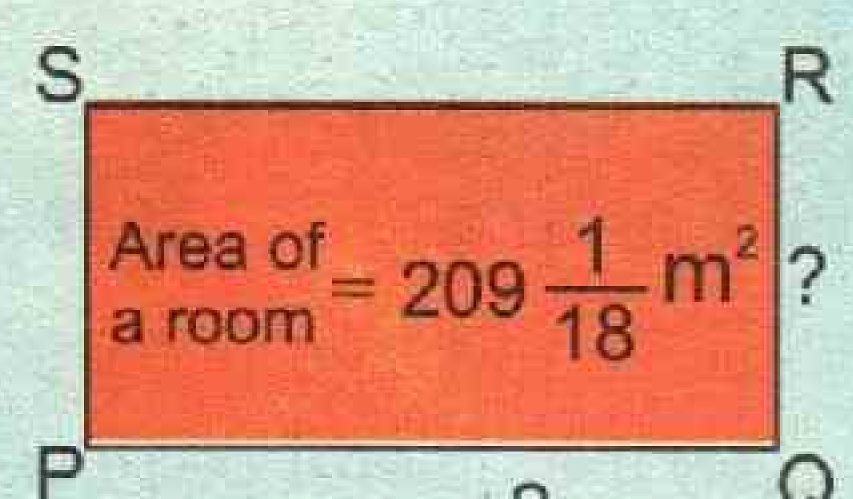
8. Omeir exercises for $2\frac{1}{5}$ hours daily. How many hours will he exercise in 30 days?

9. The length of a side of a square is $1\frac{7}{8}$ meters. If the perimeter of square is 4 × length of a side, calculate the perimeter of the square. Also, verify your answer by adding this length four times.



Length = $1\frac{7}{8}$ m

10. The area of a room is $209\frac{1}{18}$ m^2. If the length of the room is $17\frac{2}{3}$ m, find the width of the room.



Length = $17\frac{2}{3}$ m

Hint

The area of the room is calculated by multiplying its length and width.

Unit 4 Decimals and Percentages

Learning Outcomes

By the end of this unit you will be able to:

- compare numbers up to 3 - digit with 2 decimal places using signs <, > or =.
- arrange numbers up to 3 - digit numbers with 2 decimal places in ascending and descending order.
- add and subtract 4 - digit numbers up to 3 - decimal places.
- multiply a 3 - digit number up to 2 decimal places by 10, 100, and 1,000.
- multiply a 3 - digit number up to 2 decimal places by a whole number up to 2 - digit.
- multiply a 3 - digit number up to 2 decimal places by a 3 - digit number up to 2 decimal places.
- divide a 3 - digit number up to 2 decimal places by 10, 100,and 1,000.
- divide a 3 - digit numbers up to 2 decimal places by a whole number up to 2 - digit.
- divide a 3 - digit number up to 2 decimal places by a 2 - digit number up to 1 decimal place.
- convert fractions to decimals using division.
- solve real life situations involving division of 3 - digit numbers up to 2 decimal places.
- round off a 4 - digit number up to 3 - decimal places to the nearest tenth or hundredth.
- estimate sum or difference of the numbers (up to 4 - digit).
- recognize percentage as a special kind of fraction.
- convert percentage to fraction and to decimal number and vice versa (only for numbers without decimal part i.e. 35%, 75% etc.).
- solve real life situations involving percentages.

Nadiya has geometry box of length 10.4 cm and a pencil of length 6.8 cm. Find the difference between the lenghts.

Comparing and Ordering Decimals

For a science project, Nida used 2.53 metre rope while Noor used 2.58 metres rope. Who used the longer

Ones	·	tenths	hundredths
2	·	5	3
2	·	4	8

1. Start comparing the digits from left to right.
2. Here the digits at ones and tenths place are equal.
3. At hundredths place, digit 8 is greater than digit 3.
   $\boxed{8 > 3}$
4. Therefore 2.58 is greater than 2.53
   $\boxed{2.58 > 2.53}$

Thus, Noor used the longer rope.

Find which decimal is smaller; 7.1 or 7.09?

Let's compar and 7.09.

1. 7.1 and 7.09 both have the same ones place digits.
2. At tenths place, digit 0 is smaller than digit 1.
3. So, $7.09 < 7.1$

Ones	·	Tenths	Hundredths
7	·	0	9
7	·	1	

Try Yourself

Compare by using correct symbol.

i) 0.30 ☐ 0.3 ii) 1.02 ☐ 1.22 iii) 1.31 ☐ 1.3 iv) 5.13 ☐ 5.03

TEACHING POINT: Write some decimals on the board and ask the students to tell the place value of each digit.

Sara bought some fruits and their masses are shown below. Compare their masses and write them in order.

Fruit	Mass (kg)
Apples	2.75
Guavas	3.5
Grapes	1.25
Peaches	2.00

Ones	.	tenths	hundredths
2	.	7	5
3	.	5	
1	.	2	5
2	.	0	0

1. Start comparing the digits from left to right.
2. The digit at ones place of 3.5 is the greatest. Therefore, the guava has the greatest mass.
3. Next 2.75 and 2.00 have same digit at ones place.
4. The digit at tenth place of 2.75 is greater than the digit at tenth place of 2.00.
5. After the guavas, apples have the greatest mass i.e 2.75 kg.
6. After guavas and apples, peaches have the greater mass which is 2 kg.
7. The grapes have the least mass which is 1.25 kg.

TEACHING POINT: Divide the students in groups. Ask them to write at least four decimals having 3 digits and then arrange them in ascending and descending order.

By using symbols. We can write the masses as:

Decending order: **3.5kg > 2.75kg > 2.00kg > 1.25kg**

and

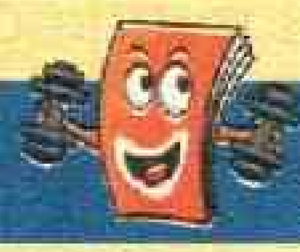
Ascending order: **1.25kg < 2.00kg < 2.75kg < 3.5kg**

Try It!

Put decimals points at diffterent places in the given number and arrange the decimals in order.

999, 463, 208, 175

Exercise 1



1- Compare the following decimals using the correct symbol (>, < or =).

a) 0.4_____ (b) 1.3_____ 1.6 c) 34.56_____ 35.66

d) 6.67_____ [illegible] e) 0.45_____ 0.45 f) 23.12_____ 51.31

g) 71.2_____ 71.02 h) 6.06_____ 6.1 i) 4.8_____ 4.80

2. Write the following decimals in descending order.

a) 2.51, 3.31, 2.47, 3.81, 3.01 b) 4.32, 4.68, 0.31, 4.23, 4.31

c) 6.21, 6.77, 6.31, 6.33, 6.60 d) 1.62, 1.03, 1.60, 1.66, 1.61

3. Write the following decimals in ascending order.

a) 7.2,12.4, 10.8, 9.4, 18.2 b) 8.56, 8.06, 8.5, 8.52, 8.51, 8.05

c) 3.4, 3.54, 3.55, 3.45, 3.14, 3.04 d) 9.5, 9.05, 9.52, 9.55, 9.09, 9.45

Addition and Subtraction of Decimals

Hassan ran 2.62 kilometers in the morning and 1.06 kilometers in the evening. How many kilometers did he cover altogether?

To find the total distance in kilometers, we need to add both the distances.

	Ones	decimal Point	tenths	hundredths
Distance covered in the morning =	2	.	6	2
Distance Covered in the evening =	1	.	0	6
Total distance covered =	3	.	6	8

Thus, Hassan covered 3.68 km altogether

Add 4.463 and 3.24.

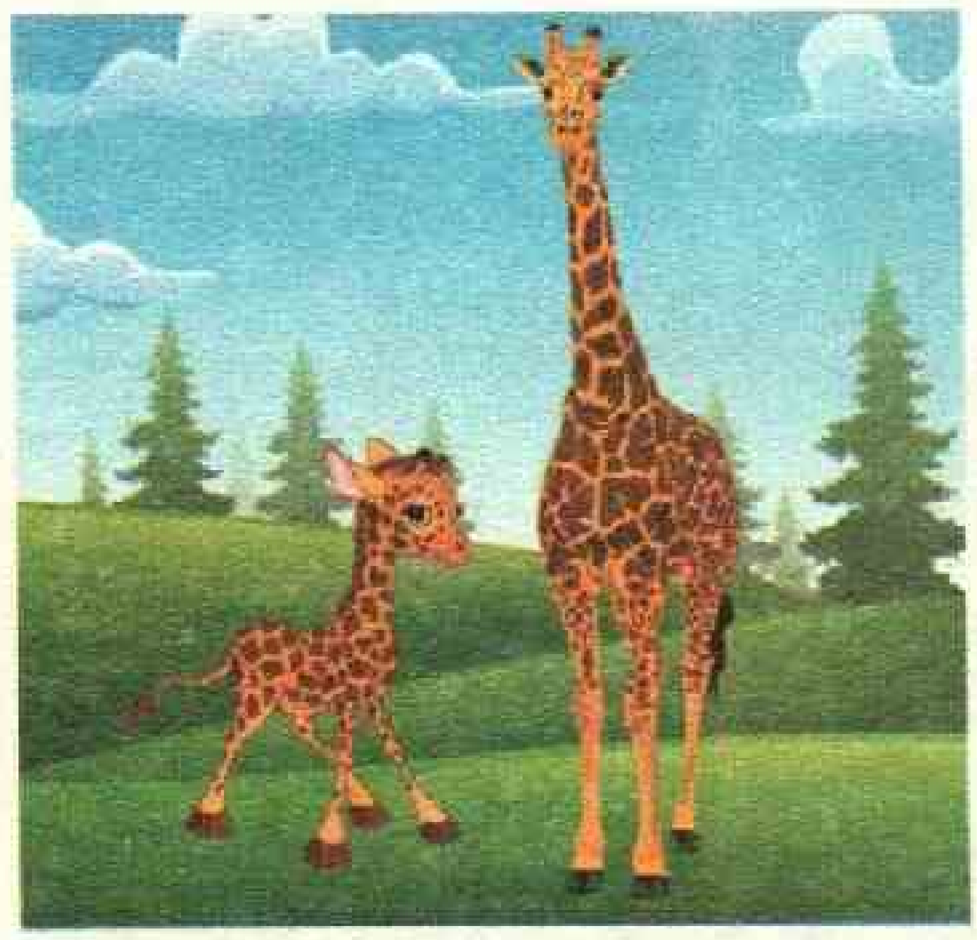
To make the decimal places same in 3.24 and 4.463, we will put 0 at the thousandths place in 3.24.

3.24 = 3.240

Ones	decimal Point	tenths	hundredths	thousandths
4	.	1 4	6	3
+ 3	.	2	4	0
7	.	7	0	3

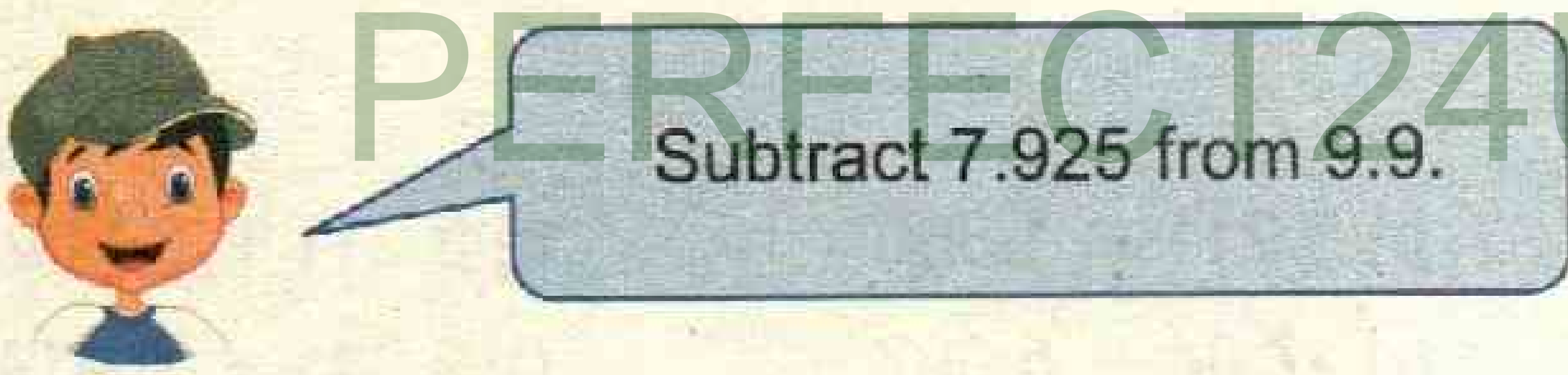
TEACHING POINT: Write a few decimals on the board and explain the method of addition.

A newborn giraffe is about 1.8 metres tall and an adult giraffe is about 5.5 metres tall. Find the difference in their heights.



	Ones		Tenths
Height of adult giraffe =	4	.	$^{1}5$
Height of newborn giraffe =	– 1	.	8
Difference in their heights =	3	.	7

Thus, the difference between their heights is 3.7m



To make two decimal places equal, we put zero at a place holder at the hundredths and thousandths places.

9.9 = 9.900

Ones	decimal Point	tenths	hundredths	thousandths
$\cancel{9}^{8}$	.	1 $\cancel{9}^{8}$	1 $\cancel{0}^{9}$	1 0^{10}
– 7	.	9	2	5
1	.	9	7	5

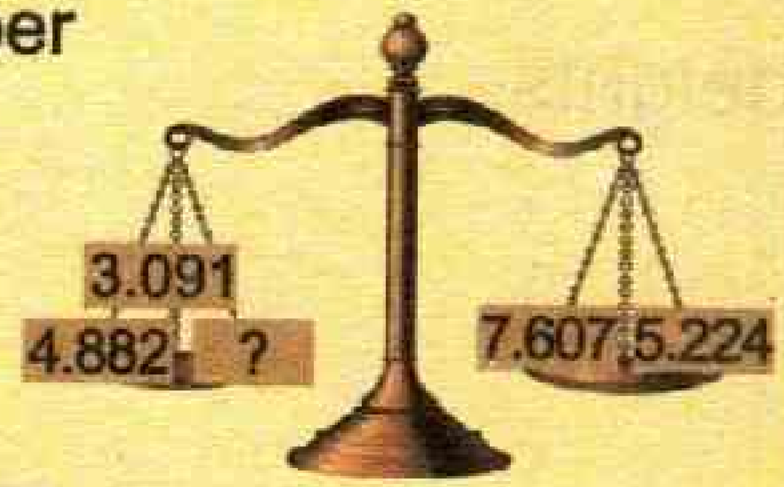
TEACHING POINT: Write a few decimal numbers on the board and explain the method of their subtraction.

Key Fact

If the number of digits after the decimal point are not equal, we put required number of zeros as a place holder in the decimals to be added or subtracted.

Try It!

Write a decimal number in the given box such that the sum of both sides of the scale becomes equal and the scale remains balanced.



Exercise 2

1. Solve the following.

a) 4.131 + 8.3
b) 3.211 + 1.860
c) 3.211 + 89.02
d) 2.001 + 75.46
e) 47.04 + 5.007
f) 2.341 + 5.914
g) 1.781 + 9.111
h) 1.194 + 3.876
i) 3.562 + 1.210
j) 1.831 + 21.24
k) 5.008 + 30.44
l) 69.25 + 3.100

2. Solve the following.

a) 9.410 – 2.392
b) 11.45 – 2.86
c) 3.238 – 2.376
d) 6.188 – 2.109
e) 3.80 – 3.09
f) 5.341 – 2.864
g) 6.554 – 1.309
h) 5.555 – 4.201
i) 1.999 – 1.088
j) 2.018 – 1.740
k) 4.99 – 3.400
l) 12.34 – 11.90

3. Rohan spent Rs. 65.33 on Monday and Rs. 97.29 on Tuesday. What amount did he spend in two days?

4. Muaaz covered a distance of 76.36 km in a car and 55.45 km in train to meet his grandmother. How mach more distance did he cover in train?
5. Saad ran 5.13 kilometres on first day and 2.33 km on the second day. Find the total distance he covered in both days.
6. A tailor had 15.25 metres cloth. He used 11.55 metres cloth in stitching two dresses. How much cloth is left with him?
7. Nida needs 50.55 gram sugar for a cake and 28.5 gram sugar for a few cupcakes.
a) How much sugar does she need altogether?
b) which item requires more sugar and how much more?

Multiplication of Decimals

Multiplication of Decimals by 10, 100 and 1,000

A piece of wood is 0.85 centimetre thick. If 10, 100 and 1,000 such pieces are piled, what will be their total thickness?

We will multiply the thickness of one piece by 10, 100 and 1,000 respectively and add all the quantities.

TEACHING POINT Solve different examples on the board to explain multiplication of decimals.

Thickness of 10 pieces	$= 0.85 \times 10 = 8.5$ cm
Thickness of 100 pieces	$= 0.85 \times 100 = 85$ cm
Thickness of 1,000 pieces	$= 0.85 \times 1{,}000 = 850$ cm
Thickness of all the pieces together	$= 8.5 + 85 + 850 = 943.5$ cm

Key Fact

- When multiplying a decimal by 10, 100 and 1,000, we move decimal points 1, 2 and 3 places to the right side respectively.

Multiplication of Decimals by Whole Numbers

The capacity of a juice pack is 1.5 litres. What will be the capacity of 7 such packs?

To find the capacity of 7 such packs, we will multiply the capacity of 1.5 *l* pack with 7.

	Ones	point	Tenths	
Capacity of one pack =	1	.	5	1 dp (decimal point)
Number of packs =	×		7	
Total capacity =	1 0	.	5	1 dp

The capacity of 7 packs is 10.5 *l*.

A bus covers a distance of 9.85 kilometres going from one town to another and then coming back. If it takes 56 such rounds in a week, find the total distance it covers.

To find this, we will multiply 9.85 with 56.

Ones, Point, Tenths, Hundredths

$$\begin{array}{lcrrrrrl}
\text{Distance between the towns} & = & & 9 & . & 8 & 5 & \rightarrow \text{2 dp (decimal point)} \\
\text{Number of rounds} & = & & \times & & 5 & 6 & \\
\hline
 & & & 5 & 9 & 1 & 0 & (985 \times 6) \\
 & & + & 4 & 9 & 2 & 5 & 0 \quad (985 \times 50) \\
\hline
\text{Total distance covered} & = & 5 & 5 & 1 & . & 6 & 0 \leftarrow \text{2 dp} \\
\hline
\end{array}$$

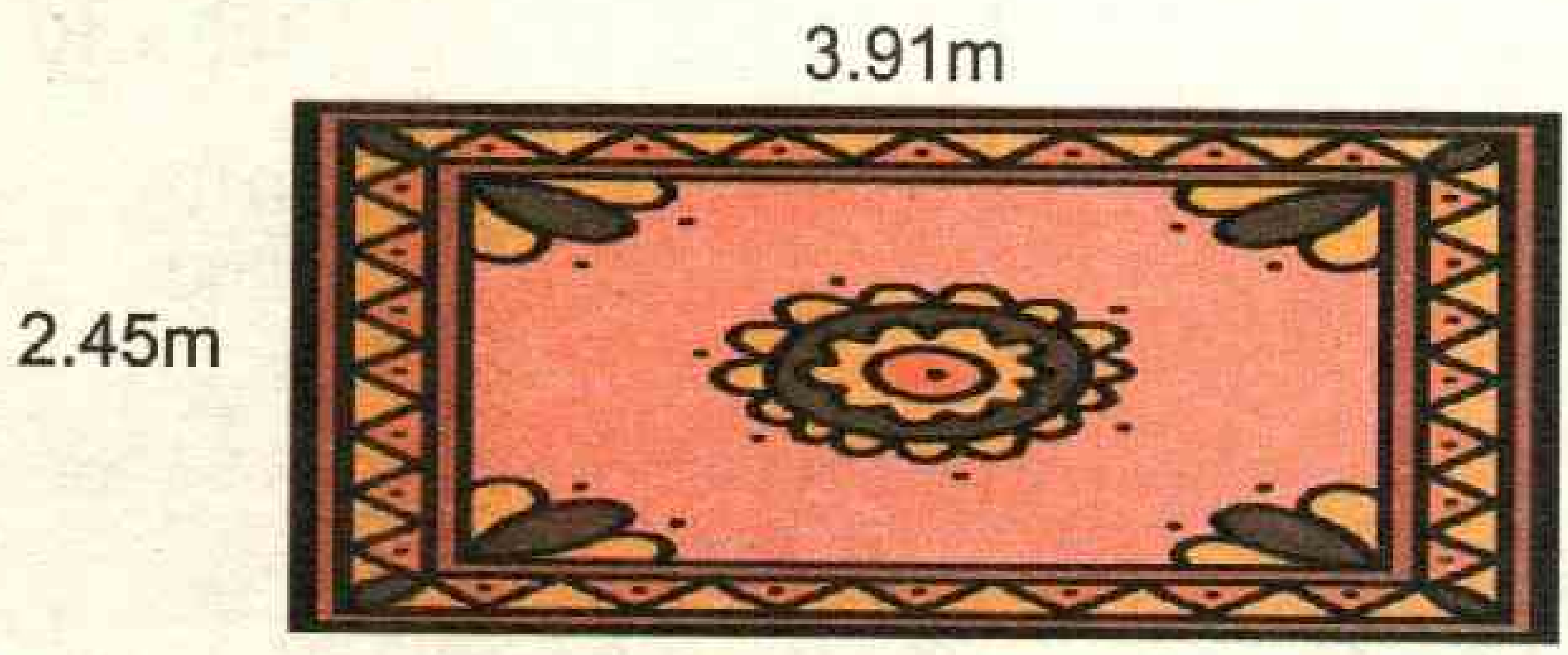
So, the total distance covered by bus in a week is 551.60 km.

Key Fact

The number of decimal places in the product of two decimals is equal to the sum of the digits after decimal point in both the numbers multiplicand and the multiplier.

Multiplication of Decimals by Decimals

Asma measured the length and width of the carpet in her room. She wants to find area covered by carpet.



By multiplying the length and width of the carpet, we can find the area covered by the carpet.

Try Yourself

What is the product of 12.9, 6.32 and 0.06?

Ones, Point, Tenths, Hundredths

$$
\begin{array}{lrcccccl}
\text{Length of the carpet} = & & 3 & . & 9 & 1 & \rightarrow & 2 \text{ dp} \\
 & & & & & & & + \\
\text{Width of the carpet} = & \times & 2 & . & 4 & 5 & \rightarrow & 2 \text{ dp} \\
\hline
 & & 1 & 9 & 5 & 5 & & (391 \times 5) \\
 & 1 & 5 & 6 & 4 & 0 & & (391 \times 40) \\
 & + 7 & 8 & 2 & 0 & 0 & & (391 \times 200) \\
\hline
\text{Area of the carpet} = & 9 & . & 5 & 7 & 9\ 5 & \rightarrow & 4 \text{ dp}
\end{array}
$$

Thus, the area covered by the carpet is 9.5795 m^2

The product of decimals can also be found by converting the decimal into fractions.

$$4.02 \times 0.5 = \frac{402}{100} \times \frac{5}{10}$$

$$= \frac{402 \times 5}{100 \times 10}$$

$$= \frac{2010}{1000} = 2.010$$

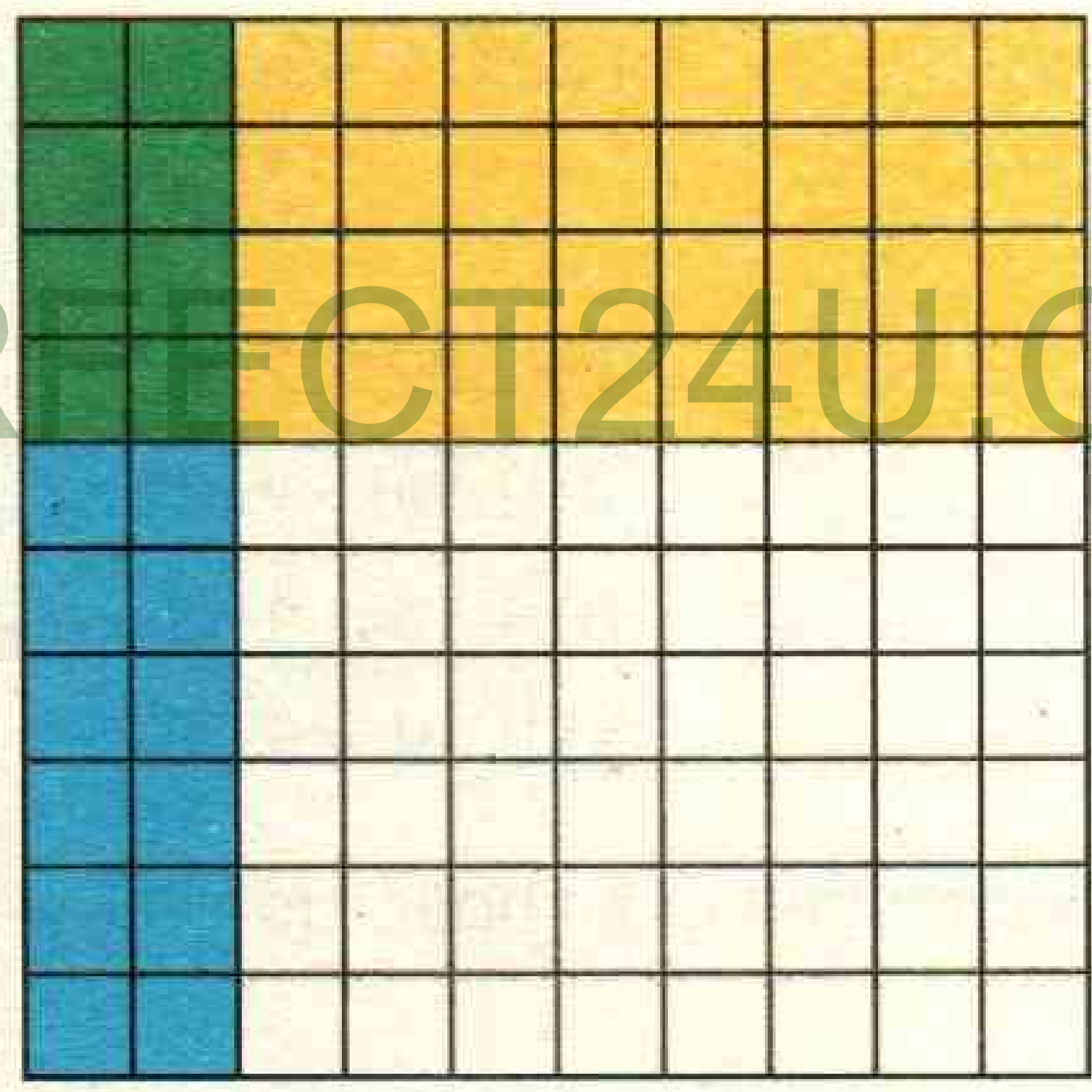
TEACHING POINT: Solve different examples on the board by converting decimals into fractions and explain this method of multiplication of decimals.

We can also multiply two decimals on the square grid. Let's multiply 0.2 by 0.4 on a square grid.

1. First colour 0.2 blue, vertically. It means we have coloured two tenths or 2 out of 10 columns in blue.
2. Next colour 0.4 horizontally, yellow. It means we have coloured four tenths or 4 out of 10 rows yellow.
3. Now the portion of the grid covered by both yellow and blue colours represents the product of 0.2 and 0.4. We have represented this portion in green .

We can see that it out of hundred squares are green, so the product of 0.4 and 0.2 is 0.08.

0.08



0.4

0.2

$0.2 \times 0.4 = 0.08$

Try It!

Make at least three pairs of 3-digit decimals with two decimal places that give product, with 1, 2 and 3 decimal places, respectively. Verify your answer.

Exercise 3

1. Solve the following.

a) 1.59×10 b) 2.48×100 c) $4.37 \times 1{,}000$

d) 5.43×100 e) 3.03×100 f) $3.06 \times 1{,}000$

g) 3.54×100 h) 8.73×10 i) 3.103×100

j) 4.72×10 k) $3.42 \times 1{,}000$ l) 2.44×100

2. Solve the following.

a) 5.36×82 b) 1.71×12 c) 4.91×34

d) 3.54×18 e) 1.23×2 f) 5.49×23

g) 2.51×89 h) 3.05×80 i) 1.46×61

j) 9.17×11 k) 2.50×43 l) 4.13×86

3. Solve the following.

a) 5.36×2.5 b) 2.82×2.3 c) 5.82×5.34

d) 4.65×39.7 e) 2.66×5.02 f) 6.38×2.12

g) 1.42×8.89 h) 4.16×1.87 i) 2.57×2.54

j) 9.28×2.22 k) 3.19×6.98 l) 5.24×7.23

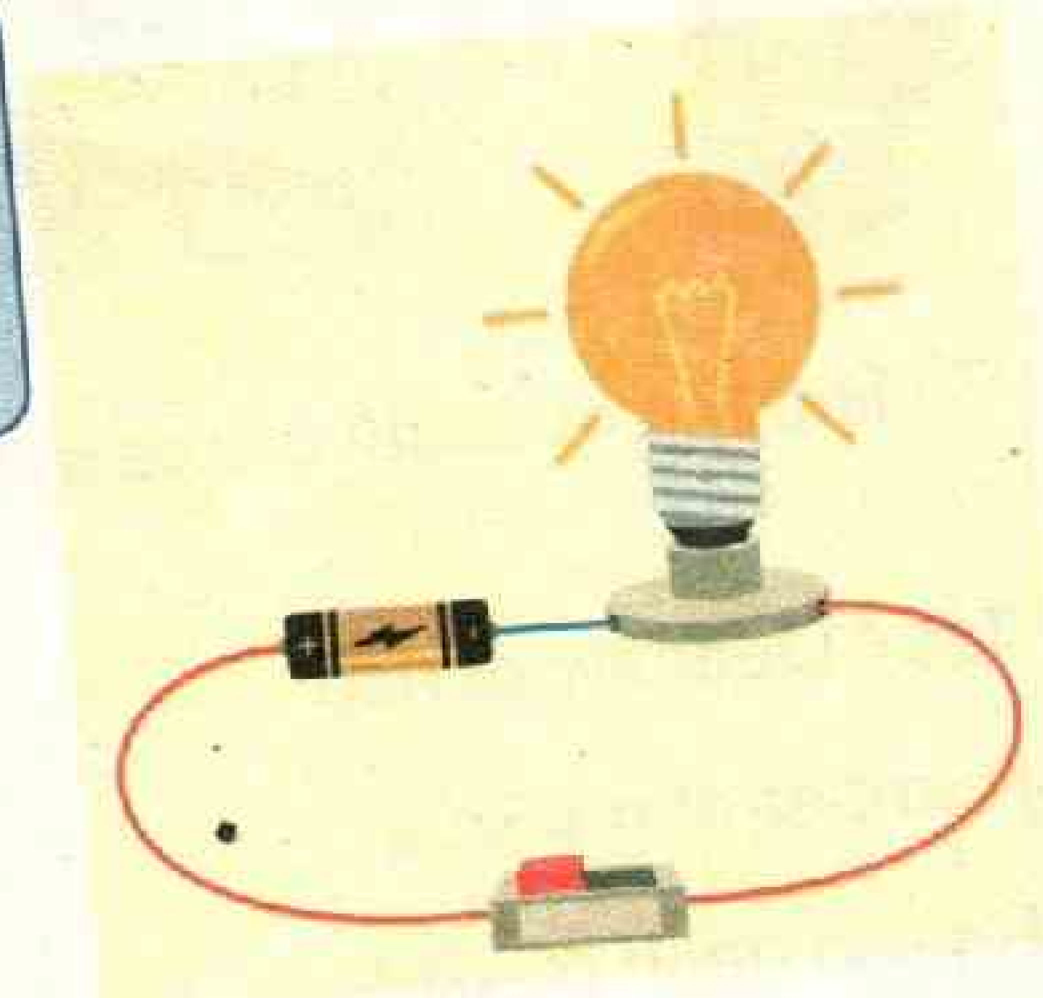
4. A train travels 96.5 kilometers in an hour. How far will the train travel in 25 hours?
5. 25.5 meters of fabric is required to make a sofa cover. How many meters of fabric is needed to make:
   a) 10 covers
   b) 100 covers
   c) 1,000 covers
6. A cement block weighs 4.23 kg. What will be the weight of 12 blocks?
7. The price of one liter of petrol is Rs. 103.8. What will be the price of 35 liters of petrol?

Division of Decimals

Division of Decimals by 10, 100 and 1,000

For an experiment, Hina wants to cut 82.8 cm wire in 10 equal pieces. What will be the length of each piece of wire?

To find the length of each piece we will divide the total length of the wire by 10.



Key Fact

- When dividing a decimal by 10, 100 and 1,000, we move decimal points 1, 2 and 3 places to the left respectively.

Length of the wire = 82.8 cm

Number of pieces to be cut = 10

Length of the wire = 82.8 ÷ 10

Length of each piece = 82.8 ÷ 10

= 8.28 cm

So, the length of each piece of wire is 8.28 cm

Divide 4.73 by 10, 100 and 1,000.

$4.73 \div 10 = 0.473$

$4.73 \div 100 = 0.0473$

$4.73 \div 1{,}000 = 0.00473$

TEACHING POINT: Explain the method of division of decimals by 10, 100 and 1,000 by solving different examples on the board.

Division of Decimals by Whole Numbers

Saba wants to put 7.75 kilogram of rice in 5 packets equally. How can be find the quantity of rice in each packet?

To find the quantity of rice in each packet, we will divide 7.75 by 5.

Total Quantity of rice = 7.75kg

Number of packets = 5

Rice in each packet = 7.75 ÷ 5

The quantity of rice in each packet is 1.55 kg

$$
\begin{array}{r|l}
 & 1.55 \\
\hline
5 & 7.75 \\
 & -5 \\
\hline
 & 27 \\
 & -25 \\
\hline
 & 25 \\
 & -25 \\
\hline
 & 0
\end{array}
$$

Faraz read 49.5 pages of a book in 11 hours. Find the number of pages he read in 1 hour.

Number of pages = 49.5

Number of hours = 11

Pages read in each hour = 49.5 ÷ 11 = 4.5

Faraz read 4.5 pages in an hour

$$
\begin{array}{r|l}
 & 4.5 \\
\hline
11 & 49.5 \\
 & -44 \\
\hline
 & 55 \\
 & -55 \\
\hline
 & 0
\end{array}
$$

Try Yourself

Divide 6.24 by 3.

TEACHING POINT: Solve various examples on the board and explain the method of division of decimals.

Division of Decimals by Decimals

Each box of sugar contains 1.5 kilograms. If 13.5 kilogram of sugar is to be packed in the boxes, find the number of boxes required.

To find the number of boxes required, we will divide 13.5 by 1.5. We will convert the decimals into fractions and divide it.

Quantity of sugar = 13.5kg

Quantity of sugar in each box = 1.5kg

$$\text{Number of boxes} = 13.5 \div 1.5 = \frac{135}{10} \div \frac{15}{10} = \frac{135}{\cancel{10}_{1}} \times \frac{\cancel{10}^{1}}{15} = \frac{135}{15} = 9$$

Thus, 9 boxes are required to pack this sugar.

Divide 3.12 by 2.6.

$$3.12 \div 2.6 = \frac{312}{100} \div \frac{26}{10} = \frac{312}{100} \times \frac{10}{26} = \frac{12}{10} = 1.2$$

Without converting into fractions.

$$\begin{array}{r} 12.5 \\ 5\overline{)\,62.5} \\ -5 \\ \hline 12 \\ -10 \\ \hline 25 \\ -25 \\ \hline 0 \end{array}$$

$$6.25 \div 0.5 = \frac{6.25}{0.5} \times \frac{10}{10} = \frac{62.5}{5} = 12.5$$

Try Yourself

- Without converting into fractions, divide 18.3 by 6.3.
- Divide 24.5 by 3.5 by converting decimal into fractions.

TEACHING POINT: Explain the method of division of decimals, by solving various examples on the board, using the above methods.

Exercise 4

1. Solve the following.

a) $41.8 \div 10$ b) $4.59 \div 100$ c) $5.48 \div 1000$

d) $6.430 \div 100$ e) $4.14 \div 10$ f) $6.17 \div 1000$

g) $2.43 \div 100$ h) $71.4 \div 10$ i) $4.24 \div 100$

2. Solve the following.

a) $3.40 \div 2$ b) $5.73 \div 3$ c) $5.05 \div 5$

d) $2.2 \div 55$ e) $3.66 \div 3$ f) $57.8 \div 34$

g) $80.6 \div 4$ h) $8.19 \div 18$ i) $62.4 \div 52$

3. Solve the following.

a) $2.92 \div 1.6$ b) $7.7 \div 3.5$ c) $4.37 \div 1.9$

d) $6.24 \div 7.8$ e) $2.73 \div 1.3$ f) $8.91 \div 3.3$

g) $16.1 \div 4.6$ h) $3.68 \div 0.4$ i) $9.24 \div 1.1$

4. In 5 bags, 3.75 kilograms of flour is to be packed. How much flour will be in each bag?

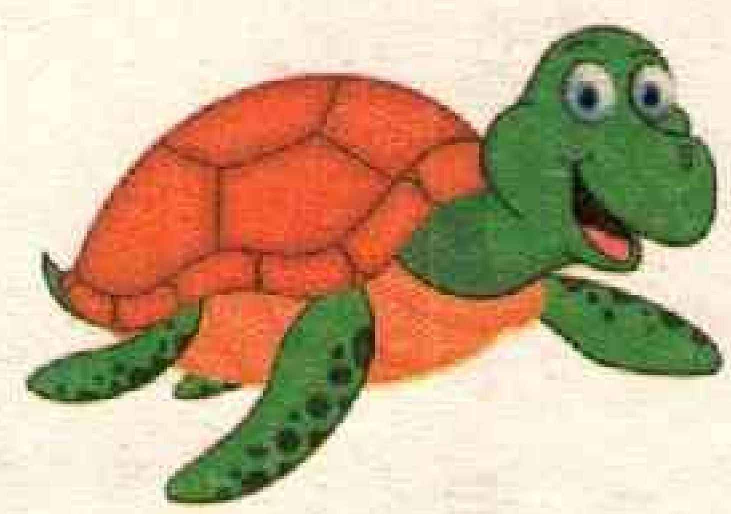
5. Sana wants to poured 67.5 litres of oil in bottles. Find the number of bottles if:

   a) The capacity of the bottle is 4.5 litres.

   b) The capacity of the bottle is 2.5 litres.

Conversion of Fractions to Decimals

The swimming speed of a sea-turtle is $\frac{7}{5}$ km per hour. How can we write this speed in decimals form?



To convert $\frac{7}{5}$ to decimals, we will divide 7 by 5.

To make division easier, here we will write 7 as 7.0. Thus swimming speed of a sea-turtle is 1.4 km per hour.

$$
\begin{array}{r|l}
 & 1.4 \\ \hline
5 & 7.0 \\
 & -5 \\ \hline
 & 2\,0 \\
 & -2\,0 \\ \hline
\end{array}
$$

Grass has been grown on $\frac{3}{4}$ part of a park. How can we write this as a decimal?

$$
\begin{array}{r|l}
 & 0.75 \\ \hline
4 & 3.00 \\
 & -2\,8 \\ \hline
 & \;\;2\,0 \\
 & -\;2\,0 \\ \hline
 & \;\;\;\;0 \\
\end{array}
$$

So, the part of the park on which grass has been grown is 0.75.

Key Fact

A whole number can be written as a decimal by putting zero to the right of the decimal. It means 5 can be written as 5.0.

TEACHING POINT

Write some fractions on the board and explain the method of converting them into decimals.

Exercise 5

1. Convert the following fractions into decimals.

a) $\frac{45}{2}$ b) $\frac{19}{25}$ c) $\frac{7}{40}$ d) $\frac{33}{100}$ e) $\frac{97}{8}$ f) $\frac{78}{8}$

g) $\frac{34}{25}$ h) $\frac{2}{5}$ i) $\frac{55}{16}$ j) $\frac{69}{30}$ k) $\frac{72}{45}$ l) $\frac{99}{55}$

2. Noman ate $\frac{1}{8}$ of a pizza. How can we write this in decimal form?

Rounding-off Decimals

The school library is at the distance of 1.47 kilometres from the laboratory. Write this distance in kilometers to the nearest tenths.

Find the distance to the nearest tenth, we need to round-off this distance to one decimal place.

$1 . 4 \ 7 = 1 . 5$

Circle the digit at the tenths place,

Look at the digit next to the tenths place(i.e. hundredths place). If this digit is 5 or greater than 5, we will add 1 to the tenths digit and remove all the next digits towards its right.
If this digit is smaller than 5, we will write the tenths place digit as it is and remove all the digits towards its right.

In 1.47, the digit next to 4 is 7 which is greater than 5, so:
$1.47 \approx 1.5$

decimal	rounded off to the nearest tenth	rounded off to the nearest hundredth
a) 2.513	2.5	2.51
b) 0.674	0.7	0.67
c) 8.230	8.2	8.23
d) 6.267	6.3	6.27

Estimating Sum and Difference of Decimals

Umar's house is at a distance of 12.8 km from his office. The distance from the office to the bank is 20.3 km. If Umar goes to office from home and then to the bank, how much distance will he cover altogether? First estimate the total distance and then verify your answer.

$12.8 \approx 13$

$20.3 \approx 20$

$.8 + 20.3 \approx 13 + 20 = 33$

Tens	Ones
1	3
+ 2	0
3	3

So, the total distance Umar covered is 33 km.

Now actually add the distances and check if our estimation is correct or not.

$\boxed{12.8 + 20.3 = 33.1}$

Tens	Ones	decimal Point	tenths
1	2^{1}	.	8
+ 2	0	.	3
3	3	.	1

So, our estimation is correct.

TEACHING POINT

Write some decimals on the board and explain the method of rounding off them to one and two decimal places. Use this concept to explain the method of estimating the sum and the difference of the decimals.

Estimate the difference of 25.3 and 7.9.

$$\begin{array}{r} 25 \\ -\ \ 8 \\ \hline 17 \end{array}$$

7.9 ≈ 8

25.3 ≈ 25

25.3 – 7.9 ≈ 25 – 8 = 17

$\boxed{\mathbf{25.3 - 7.9 = 17.4}}$

So, our estimation is correct.

Try Yourself

Estimate the sum and difference of the given numbers and then verify your answer.

a) 3.7, 11.4 b) 30.8, 4.2

Key Fact

Estimation is to find an answer which is closest to the actual answer but is not the actual one. We can estimate the sum and difference of decimals by rounding off them to the nearest whole numbers.

Exercise 6

1. Round-off the following decimals to one and two decimal places.

a) 47.125 b) 4.732 c) 2.322 d) 0.942 e) 45.675 f) 2.150

g) 91.547 h) 94.172 i) 5.183 j) 3.767 k) 4.172 l) 90.267

2. Estimate the sum of the given numbers.

a) 52.90 + 17.98 b) 630.1 + 280.9 c) 41.01 + 36.87 d) 307.2 + 357.6

e) 741.2 + 30.10 f) 845.1 + 396.9 g) 63.81 + 25.91 h) 21.35 + 83.05

i) 99.99 + 87.91 j) 943.6 + 834.6 k) 123.4 + 567.8 l) 737.8 + 721.2

3. Estimate the difference of the given numbers.

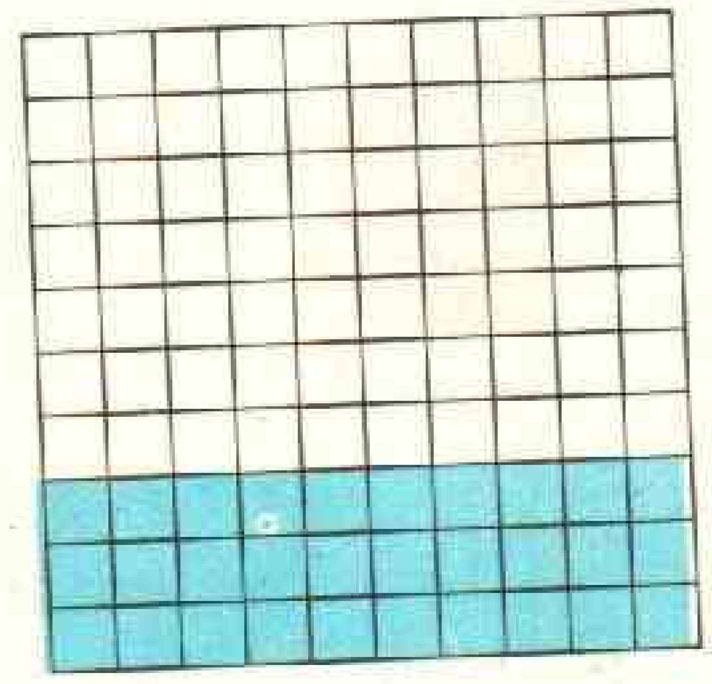
a) 22.30 – 17.99 b) 78.92 – 69.11 c) 56.23 – 11.26 d) 234.6 – 159.8

e) 587.6 – 320.9 f) 402.3 – 292.1 g) 995.5 – 747.1 h) 673.1 – 430.5

i) 53.25 – 25.62 j) 544.1 – 41.45 k) 3.5 – 2.1 l) 9.355 – 7.316

Percentages

There are 100 pieces of a picture puzzle. Out of these 30 pieces are blue (30 out of 100). We can write it in fraction form as: $\frac{30}{100}$



This fraction can also be written in a special way called percentage.
30 out of 100 can be written as 30%.

$$\frac{30}{100} = 30\%$$

Key Fact

The percentage is a special kind of fraction with 100 as denominator. The symbol to represent percentage is "%".

So, 30% pieces of the puzzle are blue.

Conversion of Fractions into Percentage

Mariam got 23 marks out of 25. (i.e. $\frac{23}{25}$). Calculate the percentage of her marks?

To write this number in percentage form, first we will convert the denominator of this fraction into 100, so that we can easily find its percentage.

$$\frac{23}{25} = \frac{23 \times 4}{25 \times 4}$$

$$= \frac{92}{100}$$

$$= 92\%$$

Thus, Mariam's percentage is 92%.

Try Yourself

Write the following in percentage.

- 22 out of 100
- 1 out of 100
- 76 out of 100
- 100 out of 100

Conversion of Percentage into Fractions

42% of students of our school wear glasses. How can we write it in fraction form?

Students who wear glasses = 42%

Fraction of students who wear glasses $= \frac{42}{100}$

$= \frac{21}{50}$ (simplest form)

So, the students who wear glasses are $\frac{21}{50}$.

Try Yourself

Write the following in percentage form.

a) One half b) One tenth c) One Hundredth

Conversion of Decimals to Percentage

Amir got 83 out of 100 marks in a mathematics test. What is the percentage of his marks? How can we write in decimals.

Total marks = 100

Marks obtained = 83

Percentage of marks $= \frac{83}{100} = 83\%$

Marks in decimal = 0.83

TEACHING POINT

Use hundred's charts and colour different number of squares. Find their percentage and explain how each square is representing 1%.

Convert 0.2 into percentage.

$$0.2 = \frac{2}{10} = \frac{2 \times 10}{10 \times 10} = \frac{20}{100} = 20\%$$

Conversion of Percentage to Decimals

Portion of water on earth $= 71\% = \frac{71}{100} = 0.71$

Similarly:

$$2\% = \frac{2}{100} = 0.02$$

$$40\% = \frac{40}{100} = 0.4$$

In an annual examination of Social Studies, 30% questions are based on mapping skills. If there are 20 question altogether, find the number of questions based on mapping skills.

Total questions $= 20$

Question based on map skills $= 30\%$ of 20

$$= \frac{30}{100} \times 20 = 6$$

So, the number of questions based on map skills are 6.

Key Fact

To find the required percentage of a quantity or a number, divide the given percentage by 100 and multiply by the total quantity or number.

Try Yourself

What percentage of earth is land?

TEACHING POINT: Ask the students to visit the nearby market, guide them about the percentage discount on various items. Ask them to find the discounted price of those items.

A factory produced 850 masks in a day. 72% masks are blue. Find the number of blue masks produced by the factory in a day.

Total number of masks = 850

Number of blue masks = 72% of 850

$$= \frac{72}{100} \times 850 = 612$$

The factory produces 612 blue masks in a day.

Try Yourself

What i 62% of 62?

What is 5% of 50?

Try It! Challenge

20% of an amount is 350 rupees. Find:

A) 1% of the amount.

B) 100 % of the amount.

C) 1,000 % of the amount.

Exercise 7

1. Express the following in percentage.

a) $\frac{4}{100}$ b) $\frac{35}{100}$ c) $\frac{76}{100}$ d) $\frac{12}{100}$ e) $\frac{28}{100}$

f) $\frac{47}{100}$ g) $\frac{45}{100}$ h) $\frac{66}{100}$ i) $\frac{89}{100}$ j) $\frac{1}{100}$

2. Convert the following percentages into fractions.

a) 13% b) 24% c) 46% d) 55% e) 68%

f) 72% g) 87% h) 98% i) 11% j) 10%

3. Convert the following percentages into decimals.

a) 15% b) 26% c) 47% d) 52% e) 63%

f) 74% g) 85% h) 96% i) 17% j) 18%

4. Convert the following fractions into percentage.

a) $\frac{1}{10}$ b) $\frac{2}{5}$ c) $\frac{4}{10}$ d) $\frac{9}{25}$ e) $\frac{3}{20}$

f) $\frac{21}{50}$ g) $\frac{1}{5}$ h) $\frac{7}{20}$ i) $\frac{9}{10}$ j) $\frac{6}{25}$

5. Convert the following decimals into percentage form.

a) 0.06 b) 0.14 c) 0.23 d) 0.34 e) 0.43

f) 0.55 g) 0.63 h) 0.71 i) 0.98 j) 0.3

6. Sajid scored 365 marks out of 500. What percentage did he score?
7. There are 40 students in a class. If 5% are absent on Monday, calculate:
   a) the number of absent students
   b) the number of present students
8. In an exam, 450 students appeared. 25% got first division, 55% got second division and the rest just passed the exam. Find the number of students who just passed the exam.
9. 12% of apples in a basket are red. Write this percentage in fraction and decimal.
10. A tank can hold 85 liters of water. It's 40% filled. What percentage of the tank is empty? Write the answer in decimal and fraction.

I Have Learnt

- comparing numbers up to 3 - digit with 2 decimal places using signs <, > or =.
- arranging numbers up to 3 - digit numbers with 2 decimal places in ascending and descending order.
- adding and subtracting in 4 - digit numbers up to 3 - decimal places.
- multiplying a 3 - digit number up to 2 decimal places by 10, 100, and 1000

Vocabulary

decimal
fraction
decimal Point
percentage
decimal place
estimation
round-off

- multiplying a 3 - digit number up to 2 decimal places by a whole number up to 2 - digit
- multiplying a 3 - digit number up to 2 decimal places by a 3 - digit number up to 2 decimal places.
- dividing a 3 - digit number up to 2 decimal places by 10, 100,and 1,000
- dividing a 3 - digit numbers up to 2 decimal places by a whole number up to 2 - digit.
- dividing a 3 - digit number up to 2 decimal places by a 2 - digit number up to 1 decimal place
- converting fractions to decimals using division.
- solving real life situations involving division of 3 - digit numbers up to 2 decimal places.
- rounding off a 4 - digit number up to 3 - decimal places to the nearest tenth or hundredth.
- estimating sum or difference of the numbers (up to 4 - digit).
- recognizing percentage as a special kind of fraction.
- converting percentage to fraction and to decimal number and vice versa (only for numbers without decimal part i.e. 35%, 75% etc.).
- solving real life situations involving percentages.

Review Exercise

1. Encircle the correct option.

a) Putting _____ at the right of a decimal does not effect its value.

i) 100 ii) 0 iii) 1 iv) 10

b) When multiplying a decimal by 100, we move decimal point 2 places to the _____

i) left ii) down iii) up iv) right

c) We represent percentage by the symbol ________.

i) $\leq$ ii) ϕ iii) $\div$ iv) %

d) 20% of 540 is ______.

i) 37 ii) 108 iii) 27 iv) 270

e) Percentage is a special kind of fraction whose denominator is always _____.

i) 1 ii) 10 iii) 100 iv) 1,000

2. Compare the following decimals using the correct symbol (>, < or =).

a) 0.5_____ 0.8 b) 1.8_____ 1.4 c) 45.67_____ 45.77

d) 7.78_____ 7.70 e) 1.56_____ 1.56 f) 34.23_____ 62.42

3. Solve the following.

a) 5.242 + 9.003 b) 3.622 + 22.971 c) 4.32 + 90.16

d) 13.12 + 86.57 e) 58.57 + 6.118 f) 04.561 + 27.16

g) 92.93 - 31.33 h) 8.25 - 4.97 i) 4.63 - 1.21

j) 22.92 - 2.001 k) 6.119 - 1.55 l) 20.36 - 6.211

4. Ahmed wants to buy a chocolate which costs Rs. 98.46. He has Rs. 52.25. How much more money does he need to buy chocolate?

5. Omar bought two rolls of tape. The first roll has 16.38 meters of tape and the second roll has 56.82 meters of tape. Find:

a) How much tape was there in both of the rolls altogether?

b) Which roll has more tape and how much?

6. In a fabric warehouse, there was 43.5 meters of colored cloth. If it is cut into equal pieces of 1.5 metres.

a) How many pieces of cloth will be obtained?

b) What will be the total length of 12 pieces of cloth of length 1.5 metres?

7. Solve the following.

a) 32.855×10 b) 4.39×100 c) 5.98×1000

d) 6.54×21 e) 4.14×43 f) 7.17×6.5

g) 69.7×2.31 h) 2.19×4.87 i) 4.13×6.12

j) $82.6 \div 100$ k) $3.12 \div 1.3$ l) $4.21 \div 2.5$

8. Estimate the sum and difference of the given numbers.

a) 63.11 + 2.809 b) 74.1 + 3.9 c) 521.2 + 479.8

d) 74.92 – 36.02 e) 324.6 – 241.6 f) 888.8 – 479.2

9. Round-off the following decimals to the nearest tenths and hundredths.

Decimals	Rounded-off upto 1 decimal place (nearest tenths)	Rounded-off upto 2 decimal places (nearest hundredths)
a) 2.2342		
b) 3.1723		
c) 5.3671		
d) 9.5191		

10. Complete the table.

fractions	decimals	percent
a) $\frac{21}{50}$		
b)		82%
c) $\frac{7}{25}$		
d)	0.65	
e)		25%

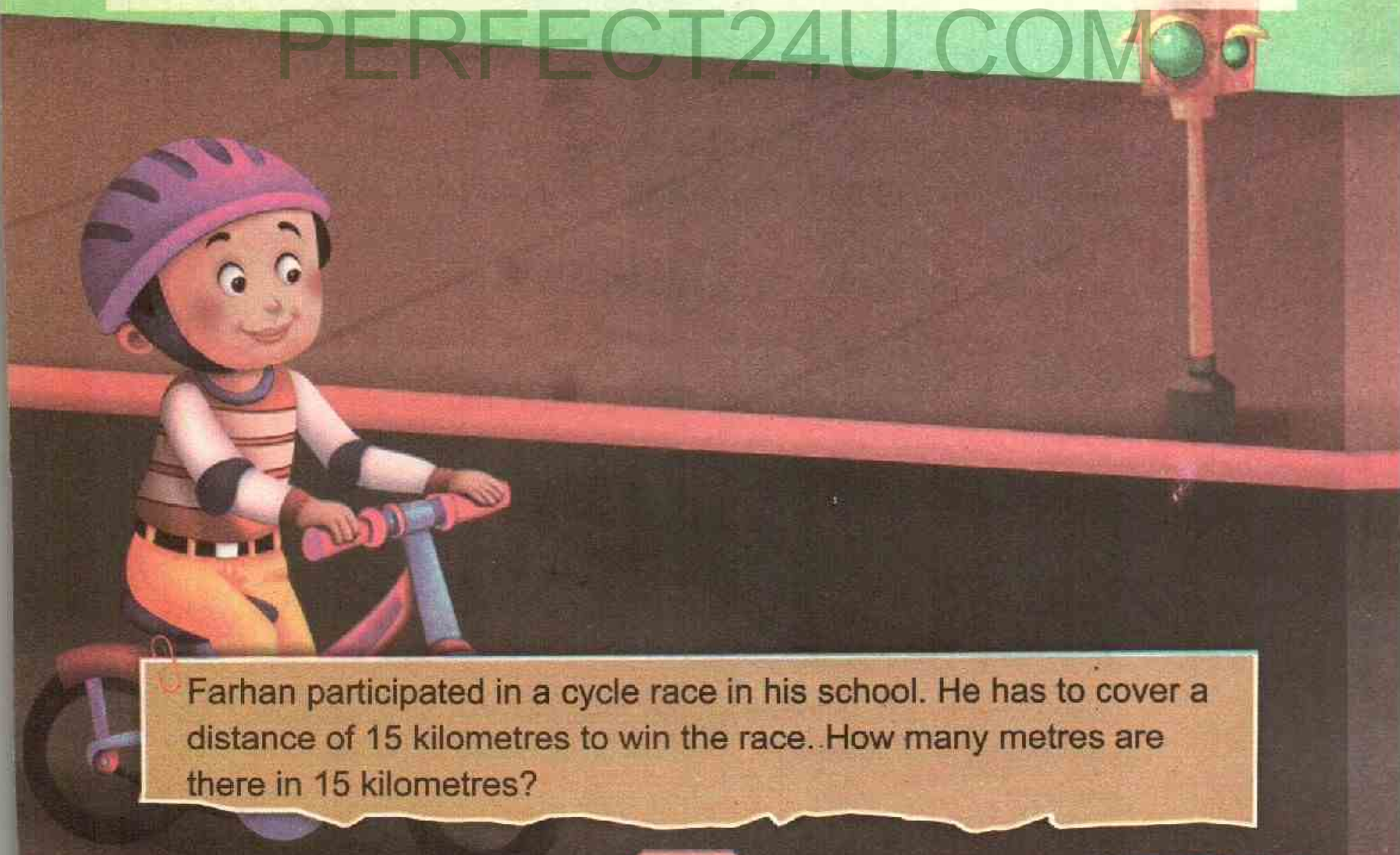
11. Junaid spent Rs 432 out of Rs 600. What is the percentage of the total amount spent by Junaid? Write the answer in fraction and decimal form.
12. There are 32 students in a class. If 25% students wear glasses.
    a) the number of students who wear glasses?
    b) how many students do not wear glasses?
13. A mathematics paper has 20 questions out of which 60% are based on "Numbers and Operations".
    a) How many questions are based on "Numbers and Operations"?
    b) Write the number of remaining questions in fraction and decimal.

Unit 5 Distance and Time

Learning Outcomes

By the end of this unit, you will be able to:

- convert measures given in
  - kilometers to meters and vice versa
  - meters to centimeters and vice versa
  - Centimeters to millimeters and vice versa.
- solve real life situations involving conversion, addition and subtraction of measures of distance
- convert
  - hours to minutes and vice versa
  - minutes to seconds and vice versa
- convert
  - years to months and vice versa
  - months to days and vice versa
  - weeks to days and vice versa
- add and subtract intervals of time in hours and minutes with carrying and borrowing.
- solve real life situations involving conversion, addition and subtraction of intervals of time.



Farhan participated in a cycle race in his school. He has to cover a distance of 15 kilometres to win the race. How many metres are there in 15 kilometres?

Conversion of Units of Distance

Conversion of Kilometres to Metres

Two families are travelling to Murree from Islamabad, for a recreational trip. They have to cover a distance of 55 kilometres. How many metres do they have to cover?

As 1 km= 1,000 m

So, to find the distance in metres we will multiply 55 km by 1,000.

$$55 \text{ km} = 55 \times 1{,}000 \text{ m}$$
$$= 55{,}000 \text{ m}$$

We convert 56 kilometres 450 metres to metres.

First convert 56 kilometres to metres and then add 450 in it.

$$\begin{aligned} 56 \text{ km } 450 \text{ m} &= 56 \text{ km} + 450 \text{ m} \\ &= 56 \times 1000 \text{ m} + 450\text{m} \\ &= 56{,}000 \text{ m} + 450 \text{ m} \\ &= 56{,}450 \text{ m} \end{aligned}$$

Try Yourself

Nangaparbat is the fifth highest mountain in the world. Its height is 8 kilometres 126 metres. What will be its height in metres?

Conversion of Metres to Kilometres

I go for a walk daily. The distance of my house to the park is 2000 metres. I want to find this distance in kilometres.

To find this distance in kilometres, we will divide 2,000 by 1,000.

$$2{,}000 \text{ m} = 2{,}000 \div 1{,}000 \text{ km}$$
$$= 2 \text{ km}$$

So, the distance between my house and the park is 2 km

Key Fact

- To convert kilometres into metre, multiply by 1,000.
- To convert metres into kilometres, divide by 1,000.

Convert 9800 metres to kilometres and metres.

$$9{,}800 \text{ m} = 9{,}000\text{m} + 800\text{m}$$
$$= \frac{9{,}000}{1{,}000} \text{ km} + 800\text{m}$$
$$= 9 \text{ km} + 800\text{m}$$
$$= 9 \text{ km } 800\text{m}$$

Try Yourself

Convert the following distances into kilometres.

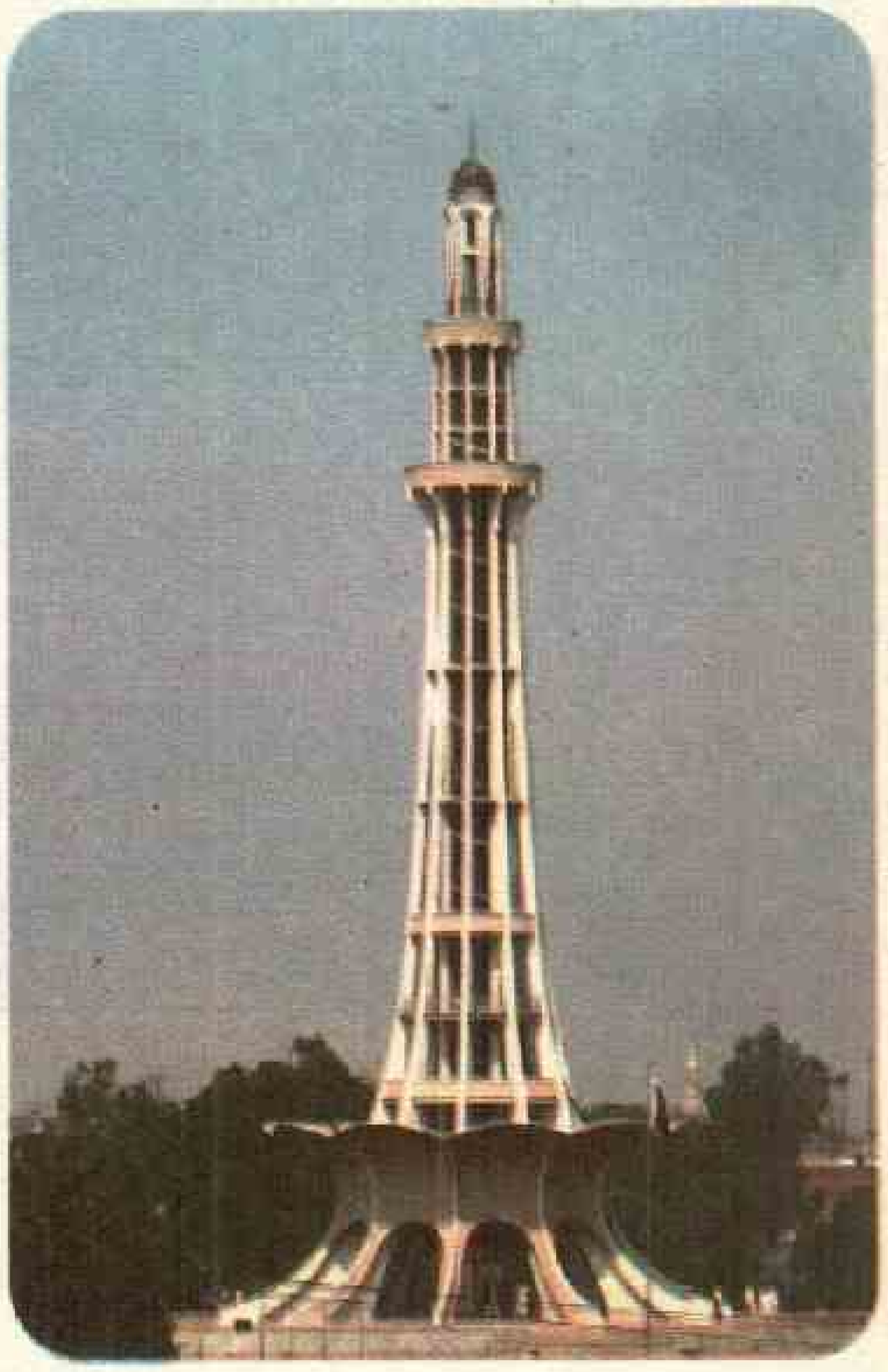
i) 5,000 m ii) 2,002 m iii) 8,976 m

TEACHING POINT

Make groups of students. Give one group the flashcards of kilometres and ask them to convert it into metres. Give other groups the flashcards of metres and asked them to convert into kilometres.

Conversion of Metres into Centimetres

The height of Minar-e-Pakistan is 70m. What will be its height in centimetres?



To find the height of Minar-e-Pakistan in centimetres, multiply 70 m by 100.

$$70 \text{ m} = 70 \times 100 \text{ cm}$$
$$= 7{,}000 \text{ cm}$$

So, the height of Minar e Pakistan is 7,000 cm

Convert 38 cm 78cm in centimetres only.

To convert 38m 78 cm to centimetres, first convert 38 metres to centimetres and then add 78 in it.

$$\begin{aligned} 38 \text{ m } 78 \text{ cm} &= 38 \text{ m} + 78 \text{ cm} \\ &= 38 \times 100 \text{ cm} + 78 \text{ cm} \\ &= 3{,}800 \text{ cm} + 78 \text{ cm} \\ &= 3{,}878 \text{ cm} \end{aligned}$$

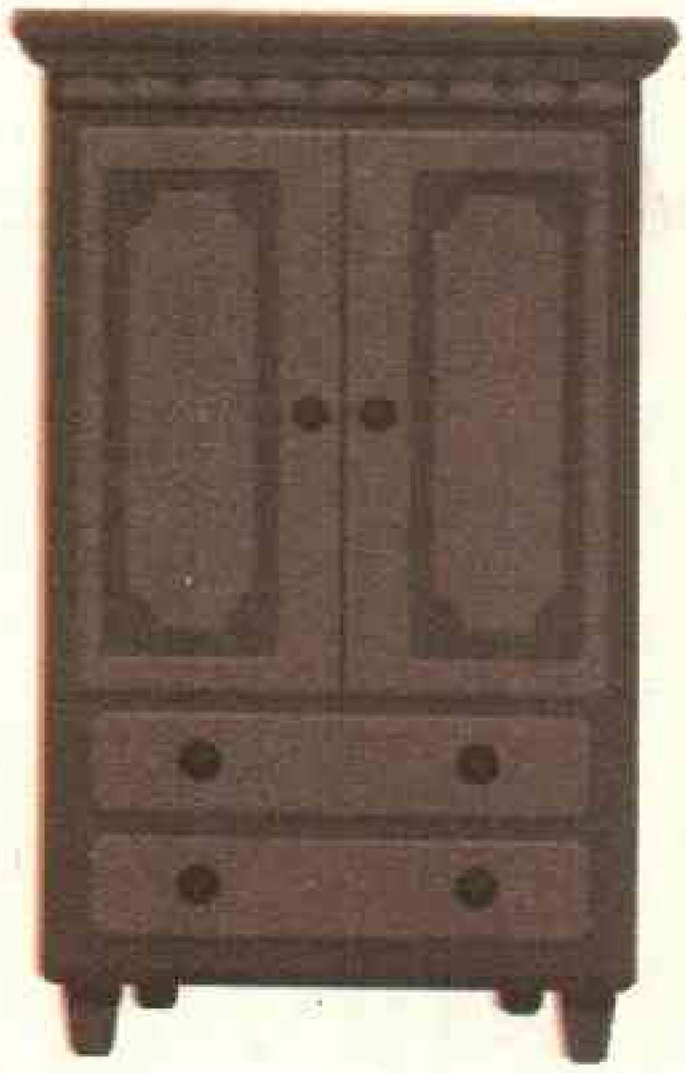
Try Yourself

A tree is 7.5 metres high. What will be its height in centimetres?

Conversion of Centimetres into Metres

The height of a cupboard is 200 centimetres. What will be its height in metres?

To find the height of the cupboard in metres, we will divide 200 cm by 100.



$$200 \text{ cm} = 200 \div 100 \text{ m}$$
$$= 200 \times \frac{1}{100} \text{ m}$$
$$200 \text{ cm} = 2 \text{ m}$$

Key Fact

- To convert metres into centimetres, multiply by 100.
- To convert centimetres into metres, divide by 100.

Let's convert 585 cm into metres and centimetres.

$$585 \text{ cm} = 500\text{cm} + 85\text{cm}$$
$$= \frac{500}{100} \text{ m} + 85\text{cm}$$
$$= 5 \text{ m} + 85\text{cm}$$
$$= 5 \text{ m } 85\text{cm}$$

Try Yourself

Convert the following distances into metres.

i) 670 cm ii) 409 cm iii) 900 cm

TEACHING POINT

Make groups of students. Give one group the flashcards of metres and ask them to convert it into centimetres. Give the other groups the flashcards of centimetres and asked them to convert into metres.

Conversion of Centimetres to into Millimetres

The length of Ahmer's lunch box is 15 cm. What is this length in millimetres?

To find the length of lunch box in millimetres, we will multiply 15 cm by 10.

$$15 \text{ cm} = 15 \times 10$$
$$= 150 \text{ mm}$$

The length of the lunch box is 150 mm

Convert 89 centimetres 44 millimetres into millimetres.

To convert 89 centimetres 44 millimetres into millimetres, first convert 89 centimetres to millimetres and then add 44 millimetres.

$$89 \text{ cm } 44 \text{ mm} = 89 \times 10 \text{ mm} + 44 \text{ mm}$$
$$= 890 \text{ mm} + 44 \text{ mm}$$
$$= 934 \text{ mm}$$

Try Yourself

Ahmed buys a toy car which is 24 cm long. What will be its length in millimetres?

Conversion of Millimetres into Centimetres

I bought a picture frame. Its length is 60 millimetre. If I want to find it length in centimetres what will I do?

To find the length of the picture frame in cm, i will divide its length by 10.

$$60 \text{ mm} = 60 \div 10 \text{ cm}$$
$$= 60 \times \frac{1}{10} \text{ cm}$$
$$60 \text{ mm} = 6 \text{ cm}$$

Key Fact

- To convert centimetres into millimetres, multiply with 10.
- To convert millimetres into centimetres, divide by 10.

Convert 18 millimetres to centimetres and millimetres.

$$18\text{mm} = 10\text{mm} + 8\text{mm}$$
$$= \frac{10}{10} \text{ cm} + 8\text{mm}$$
$$= 1 \text{ cm} + 8\text{mm}$$
$$= 1 \text{ cm} \ \ 8\text{mm}$$

Try Yourself

Convert the following distances into metres.

i) 20 mm ii) 78 mm iii) 98 mm

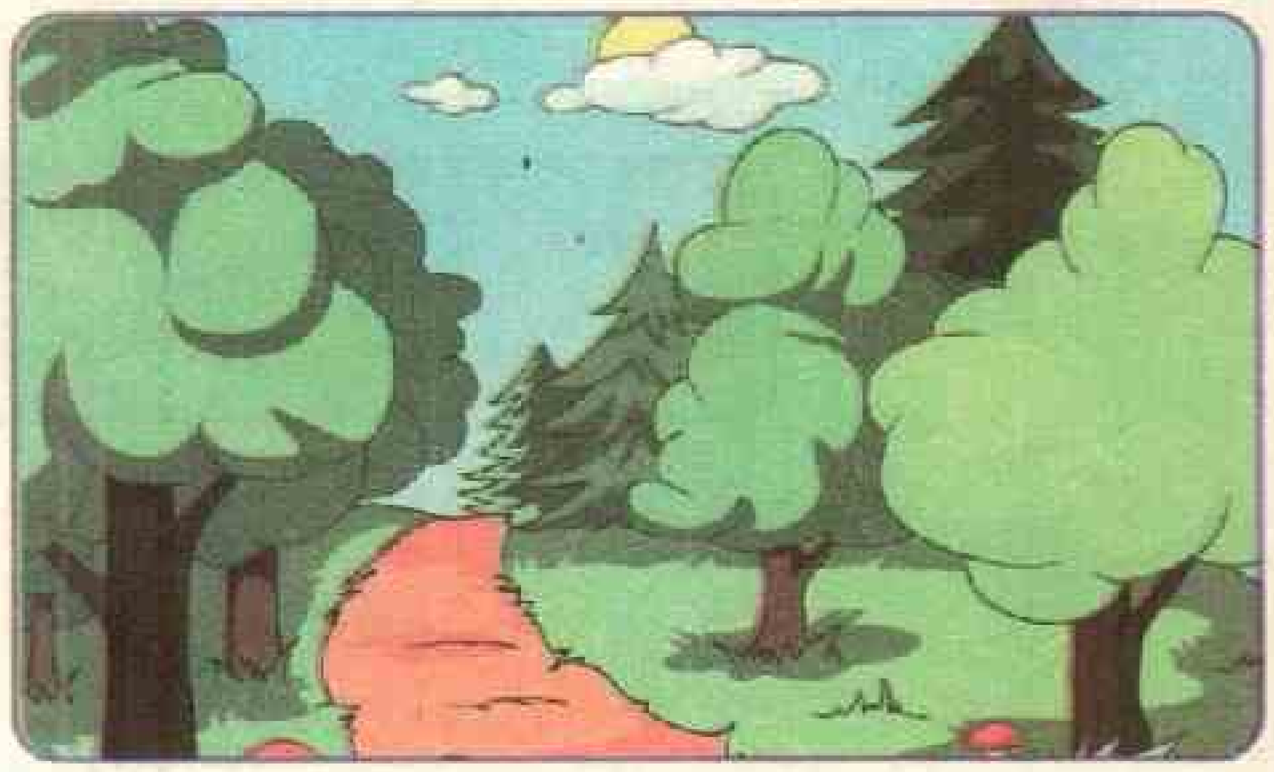
TEACHING POINT

Make groups of students. Give one group the flashcards of centimetres and ask them to convert it into millimeters. Give the other groups flashcards of millimeters and asked them to convert into centimetres.

Addition and Subtraction of Distance/length

Subhan walks for 2 kilometres 670 metres on Saturday and 3 kilometres 490 metres on Sunday. What is the total distance he covers in two days?

To find the distance covered in 2 days first we will add both the distances and then convert it into metres.



Distance covered on Saturday	=	2 km 670 m
distance covered on Sunday	=	+ 3 km 490 m
Total distance covered in 2 days	=	6 km 160 m

Key Fact

To add or subtract units of distance, always add same units. Add km in km, m in m, cm in cm and mm in mm.

To convert distance 6km 160m to meters.

Convert kilometres to metres and then add 160 metres in it.

$$
\begin{aligned}
6 \text{ km } 160 \text{ m} &= 6 \text{ km} + 160 \text{ m} \\
&= 6 \times 1000\text{m} + 160 \text{ m} \\
&= 6000 \text{ m} + 160 \text{ m} \\
&= 6160 \text{ m}
\end{aligned}
$$

TEACHING POINT

Make two groups of students and give ask them to create real life situations involving addition and subtraction of units of distance. Then ask the other group to solve them.

Petronas twin towers in Malysia is 452m high. While Burj Khalifa in dubai is 828 metres high. What is the difference between their heights?

To find this difference, we will subtract their heights.

Height of Burj Khalifa	=	828 m
Height of Petronas	=	– 452 m
Difference	=	376 m

Thus, the difference between the heights of Petronas twin tower and Burj Khalifa is 376 m

Try Yourself

Subtract the following distances

i) 670 m – 450 m

ii) 83 km 219 m – 51 km 340 m

iii) 32 cm 3 mm – 9 cm 4 mm

Exercise 1

1. Convert the following units of distance as directed.

a) 34 km to m

b) 930 m 74 km to m

c) 970 m to km

d) 5890 m to km and m

e) 67 m to cm

f) 46 cm 650 m to cm

g) 840 cm to m

h) 107 cm to mm

i) 6 mm 99 cm to mm

j) 70 mm to cm

k) 485 mm to cm and mm

l) 900 m to cm

2. To celebrate the independence day, Madeeha bought 4m 35 cm of green cloth to stitch a green shirt. For shawl and trouser, she bought 6m 79 cm white cloth. How many centimetres of cloth did she buy altogether?

3. Ahmad bought 140 cm ribbon to pack the gift box. How many millimetre ribbon he bought?

4. The lengths of the two ropes is 17 cm 9 mm and 80 cm 6 mm.

   a) What is the difference between the length of two ropes?

   b) What is the total length of the two ropes in millimetres?

5. In a hospital, two halls are constructed for patients, where medical aid will be given to them. The length of one hall is 276 m 20 cm and the length of the other hall is 689 m 98 cm. what is the total length of both halls?

6. The distance between Ahmer's house to Masjid is 4 km 196 m the distance Ali's house to Masjid is 5 km 298 m. Whose house is nearer to the Masjid and by how much?

7. The park near Waleed's house is 2 km 117 m long and the park near Maheen's house is 3 km 214 m long. What is the difference between the length of the two parks in metres?

Conversion of Units of Time

Conversion of Hours into Minutes

Farhan complete a science project in 4 hours. In how many minutes does he complete the project?

To find the time duration of the project in minutes, we will multiply 4 hours by 60.

$$4\text{ h} = 4 \times 60\text{min} = 240\text{ min}$$

Convert 12 hours 45 minutes into minutes.

To convert 12 hours 45 minutes to minutes, first we will convert 12 hours to minutes and then add 45 minutes to it.

$$
\begin{aligned}
12 \text{ h } 45 \text{ min} &= 12 \text{ h} + 45 \text{ min} \\
&= 12 \times 60 \text{ min} + 45 \text{ min} \\
&= 720 \text{ min} + 45 \text{ min} \\
&= 765 \text{ min}
\end{aligned}
$$

Conversion of Minutes to Hours

A doctor performs his duty for 480 minutes daily. How many hours does he work daily?

To find this time in hours, we will divide the minutes by 60.

$$
\begin{aligned}
480 \text{ min} &= 480 \div 60 \text{ hr} \\
&= \frac{480}{60} \text{ h}
\end{aligned}
$$

The number of daily hours = 8 h

Key Fact

- To convert hours into minutes, multiply by 60.
- To convert minutes into hours, divided by 60.

TEACHING POINT

Divide the groups of students. Give into two groups the flashcards of minutes to one group and ask them to convert into hours. Give the flashcards of hours to other groups and ask them to convert into minutes.

NOT FOR SALE

Convert 5,280 minutes into hours.

$$5{,}280 \text{ min} = 5{,}280 \div 60 \text{ h}$$
$$= 5{,}280 \times \frac{1}{60} \text{ h}$$
$$= 88 \text{ h}$$

Try Yourself

Convert the following minutes into hours.

i) 380 min
ii) 720 min
iii) 440 min

Conversion of Minutes to Seconds

Aadil finishes his lunch in 25 minutes. In how many seconds does he finish his lunch?

To convert 25 minutes into seconds, multiply minutes by 60.

$$25 \text{ min} = 25 \times 60 \text{ sec}$$
$$= 1500 \text{ sec}$$

Aadil finishes his lunch in 1500 seconds.

Key Fact

- To convert minutes into seconds multiply by 60.
- To convert seconds into minutes, divide by 60.

Convert 120 minutes 59 seconds into seconds.

$$\begin{aligned} 120 \text{ min } 59 \text{ sec} &= 120 \text{ min} + 59 \text{ sec} \\ &= 120 \times 60 \text{ sec} + 59 \text{ sec} \\ &= 7{,}200 \text{ sec} + 59 \text{ sec} \\ &= 7{,}259 \text{ sec} \end{aligned}$$

Try Yourself

Convert 120 minutes 59 seconds into seconds.

Conversion of Seconds to Minutes

To avoid the coronavirus, hands must be washed for at least 20 seconds. For how many minutes the hands must be washed?

To convert seconds into minutes, divide seconds by 60.

$$\begin{aligned} 20 \text{ sec} &= 20 \div 60 \text{ min} \\ &= 20 \times \frac{1}{60} \text{ min} \\ 20 \text{ sec} &= 0.33 \text{ min} \end{aligned}$$

The required time to wash hands is 0.33 min

Convert 300 seconds to minutes.

$$\begin{aligned} 300 \text{ sec} &= 300 \div 60 \text{ min} \\ &= 300 \times \frac{1}{60} \text{ min} \\ &= 5 \text{ min} \end{aligned}$$

Thus, there are 5 minutes in 300 seconds.

Try Yourself

Convert the following into seconds.

i) 220 min ii) 540 min

iii) 720 min

TEACHING POINT

Divide students. Give in two groups flashcards of minutes to one group and ask them to convert it into seconds. Give the flashcards of seconds to other group and asked them to convert into minutes.

Conversion of Hours into Days

Convert 240 hours into days.

$$240 \text{ h} = 240 \div 24$$
$$= 10 \text{ days}$$

Conversion of Days into Hours

Convert 5 days to hours.
To convert days into hours, multiply 5 days by 24.

$$5 \text{ days} = 5 \times 24 \text{ h}$$
$$= 120 \text{ h}$$

Conversion of Weeks to Days

A gardener plants the seed. After 2 weeks, a small plant comes out. Find, in how many days the plant came out?

Two convert weeks to days with 7
We multiply number of weeks with 7 days

$$2 \text{ weeks} = 2 \times 7 \text{ days}$$
$$= 14 \text{ days}$$

It takes 14 days for the plant to grow.

Convert 6 weeks 3 days into days.

To convert 6 weeks 3 days into days, first convert 6 weeks into days and then add 3 days.

$$6 \text{ weeks } 3 \text{ days} = 6 \text{ weeks} + 3 \text{ days}$$
$$= 6 \times 7 \text{ days} + 3 \text{ days}$$
$$= 42 \text{ days} + 3 \text{ days}$$
$$= 45 \text{ days}$$

Try Yourself

A toy factory manufactures 4568 toys in 12 weeks and 6 days. In how many days does it manufacture these toys?

Conversion of Days into Weeks

Hamid goes to Islamabad for 21 days. How many weeks does he spend in Islamabad?

For this, we will multiply 21 by 7.

$$21 \text{ days} = 21 \div 7 \text{ weeks}$$
$$= 21 \times \frac{1}{7} \text{ weeks}$$
$$= 3 \text{ weeks}$$

Hamid spent 3 weeks in Islamabad.

Key Fact

- To convert weeks into days, multiply by 7.
- To convert days into weeks, divide by 7.

Convert 420 days into weeks.

$$420 \text{ days} = 420 \div 7 \text{ weeks}$$
$$= 420 \times \frac{1}{7} \text{ weeks}$$
$$= 60 \text{ weeks}$$

Try Yourself

February has 28 days except in the leap year. How many weeks are there in February?

TEACHING POINT

Divide the students into two groups. Give flashcards of weeks to one group and ask them to convert into days. Give flashcards of days to the other group and ask them to convert into weeks.

Months to Days

Mubeen needs 11 months to construct a house. How many days will be required to for it's construction

To convert months into days, multiply 11 months with 30.

11 months = 11 days × 30 days

= 330 days

The days required to construct the house is 330 days.

Convert 12 months and 17 days into days.

To convert 12 months 17 days to days, first convert 12 months into days and then add 17 to it.

12 months 17 days = 12 months+ 17 days

= 12 × 30 days + 17 days

= 360 days + 17 days

= 377 days

Try Yourself

Imran completes a storybook in 2 months. In how many days does he complete the book?

Conversion of Days into Months

An author writes a book in 90 days. In how many months does he write the book?

Divide 90 days by 30.

90 days = 90 ÷ 30 months

$$= 90 \times \frac{1}{30}$$

90 days = 3 months

The author writes the book in 3 months.

Key Fact

- To convert months into days, multiply with 30.
- To convert days into months, divide by 30.

Convert 660 days into months.

660 days = 660 ÷ 30 months

$$= 660 \times \frac{1}{30}$$

= 22 months

Try Yourself

Convert the following into months.

i) 520 days ii) 15 days iii) 30 days

Conversion of Years to Months

Ahmad completes a project in 3 years. In how many months does he complete this project?

To convert 3 years into months, we will multiply 3 years with 12.

Divide the students into two groups. Give flashcards of months to one group and ask them to convert into days. Give flashcards of days to other group and ask them to convert into months.

Convert 3 years to months by multiplying 3 with 12.

$$3 \text{ years} = 3 \times 12 \text{ months}$$
$$= 36 \text{ months}$$

He completes the project in 36 months

Convert 15 years 7 months into months.

To convert 15 years 7 months into months, first convert 15 years to months and then add 7 months to it.

$$15 \text{ years } 7 \text{ months} = 15 \text{ years} + 7 \text{ months}$$
$$= 15 \times 12 \text{ months} + 7 \text{ months}$$
$$= 180 \text{ months} + 7 \text{ months}$$
$$= 187 \text{ months}$$

Try Yourself

Tahir works in a factory for 5 years. For how many months does he work in the factory?

Conversion of Months into Years

The government is constructing homes for people and this project will be completed in 18 months. In how many years will the government completes the project?

Divide 18 months by 12 to convert it into years.

$$18 \text{ months} = 18 \div 12 \text{ years}$$
$$= 18 \times \frac{1}{12}$$
$$= 1.5 \text{ years}$$

The government will complete this project in 1.5 years

TEACHING POINT: Divide the students into two groups. Give flashcards of months to one group and ask them to convert into years. Give flashcards of years to other group and ask them to convert into months.

Key Fact

- To convert years into months, multiply by 12.
- To convert months into years, divide by 12.

Convert 120 months to years.

120 months = 120 ÷12 years

$= 120 \times \frac{1}{12}$

120 months = 10 years

So, the number of years in 120 months is 10 years

Try Yourself

Ahmed is 18 years old. Find his age in months.

Exercise 2

1. Convert the given units of time as directed.
   a) 45 h to min
   b) 240 h 56 min to min
   c) 960 min to h
   d) 440 min to h and min
   e) 64 min to sec
   f) 180 min to sec
   g) 544 sec to min and sec
   h) 600 sec to min
2. Convert the following as directed.
   a) 56 years into months
   b) 34 years 10 months into months
   c) 48 months into years
   d) 56 months into years and months
   e) 78 weeks into days
   f) 12 weeks 6 days into days
   g) 49 days into weeks
   h) 180 days into months
   i) 67 months into days
   j) 44 months 29 days into days

Addition and Subtraction of Units of Time

Addition of Units of Time

Hadia bakes a cake in 45 minutes 28 seconds and a Pizza in 55 minutes 34 seconds. In how many seconds does she bake both the items?

Add the time she takes for baking the two items.

Time to bake the cake	=	(1) 45 min	28 sec
Time to bake the pizza	=	+ 55 min	34 sec
Total time	=	101 min	02 sec

Key Fact

1 minute = 60 seconds, if the sum of the seconds is 60 or more than 60, we add one minute in minutes column for every 60 seconds and write the remaining seconds in the seconds column.

Hadia bakes both items in 101 minutes and 2 seconds. Now to convert this time duration into seconds, first we will convert 101 minutes to seconds and then adds 2 seconds to it.

101 min 2 sec = 101 min + 2 sec

= 101 × 60 sec + 2 sec

= 6060 sec + 2 sec

= 6062 sec

Key Fact

To add the units of time, always add the same units together.

The time taken in baking both the items = 6062 seconds

Subtraction of Units of Time

Ahmad spends 15 weeks 5 days in her grandmother's home and 6 weeks 6 days in her aunt's home. How many more days does he spend in his grandmother's home?

To find how much more time he spends in her grandmother's home, we will subtract the two quantities.

Days spent in grandmother's home	=	15 weeks 5 days
Days spent in Aunt's home	=	− 6 weeks 6 days
Difference	=	8 weeks 6 days

Ahmed spends 8 weeks 6 days more in his grandmother's home than in his aunt's home.

To convert 8 weeks 6 days into days, first we will convert weeks into days and add 6 days.

8 weeks 6 days = 8 weeks + 6 days

= 8 × 7 days + 6 days

= 56 days + 6 days

= 62 days

Key Fact

1 week = 7 days when we borrow one a week to days, we add 7 in days column.

Key Fact

To subtract the units of time, always subtract the same units.

Try Yourself

Subtract the given units of time

I) 3 years, 12 years 6 months

Ii) 8 hours 56 minutes, 7 hours 12 minutes

Exercise 3

1. Solve the following.
   a) 3 h 20 min + 5 h 43 min
   b) 13 min 12 sec + 15 min 19 sec
   c) 33 years 8 months + 40 years 11 months
   d) 2 weeks 3 days + 8 weeks 1 day
   e) 117 months + 7 months
   f) 8 months 12 days + 2 months 14 days

2. Solve the following.
   a) 16 h 49 – 3 h 53 min
   b) 44 min 44 sec – 36 min 16 sec
   c) 8 weeks 1 day – 2 weeks 3 days
   d) 17 months – 10 months 12 days
   e) 40 months 28 days – 38 months 17 days

TEACHING POINT

Give flashcards of units of time to the students and ask them to add and subtract. Also ask them to convert the units.

3) A train takes 5 hours 56 minutes to travel from Multan to Lahore and 6 hours 22 minutes to travel from Lahore to Rawalpindi. How much time does it take to travel from Multan to Rawalpindi?
4. To complete one Science project Hammad takes 2 weeks and 5 days and to complete Math project he takes 1 week and 6 days. Which project takes more time and how much?
5. Kamal's age is 10 years 5 months old and his friend's age is 11 year and 8 months. What is the difference between their ages in months?
6. Umer takes 3 hours 12 minutes to solve complete Maths homework sums and 1 hour 50 minutes to complete English homework.
   a) How much time does he take to complete both tasks in minutes?
   b) In which subject, does he spend more time and how much more?

Conversion Table	
1 km	1000 m
1 m	100 cm
1 cm	10 mm
1 h	60 min
1 min	60 sec
1 week	7 days
1 month	30 days
1 year	12 months

Conversion Table	
1 m	$\frac{1}{1000}$ km
1 cm	$\frac{1}{100}$ m
1 mm	$\frac{1}{10}$ cm
1 min	$\frac{1}{60}$ h
1 sec	$\frac{1}{60}$ min
1 day	$\frac{1}{7}$ weeks
1 day	$\frac{1}{30}$ months
1 month	$\frac{1}{12}$ years

I Have Learnt

- converting measures given in
  - kilometers to meters and vice versa
  - meters to centimeters and vice versa
  - centimeters to millimeters and vice versa.
- solving real life situations involving conversion, addition and subtraction of measures of distance.

Vocabulary

seconds	distance
days	metre
years	months
time	weeks

- converting
  - hours to minutes and vice versa
  - minutes to seconds and vice versa
- converting
  - years to months and vice versa
  - months to days and vice versa
  - weeks to days and vice versa
- adding and subtracting intervals of time in hours and minutes with carrying and borrowing.
- solving real life situations involving conversion, addition and subtraction of intervals of time.

Vocabulary

conversions	centimetre
addition	millimetre
subtraction	hours
kilometre	minutes

Review Exercise

1. Encircle the correct option.

a) There are __________ metres in 2 kilometres.

i) 500 ii) 1000 iii) 200 iv) 2000

b) To measure _______ hours, minutes and seconds are used.

i) Time ii) Distance iii) Area iv) Length

c) There are _______ months in $\frac{1}{2}$ year.

i) 6 ii) 12 iii) 9 iv) 5

d) There are ______ days in 10 months.

i) 300 ii) 30 iii) 15 iv) 45

e) There are ______ minutes in 5 hours.

i) 60 ii) 300 iii) 200 iv) 50

f) There are _______ days in 7 weeks.

i) 49 ii) 42 iii) 7 iv) 14

2. Convert the following.

a) 52 km to m
b) 21 km 103 metres to m
c) 1050 m to km
d) 6000 m to km and m
e) 198 m to cm
f) 500 m 66 cm into cm
g) 640 cm into m
h) 98 cm into mm

3. Convert the following.

a) 22 h 66 min to min
b) 360 min to h
c) 580 min into h and min
d) 64 min into sec
e) 795 sec into min and sec
f) 198 sec into min

4. Convert the following.

a) 78 years into months
b) 14 years 6 months into months
c) 26 months to years and months
d) 9 weeks 2 days into days
e) 35 days into weeks
f) 420 days into months

5. solve the following

a) 6 h 52 min + 9 h 12 min
b) 46 min 46 sec + 11 min 10 sec

c) 66 years 9 months + 22 years 7 months
d) 34 min 20 sec – 12 min 55 sec
e) 6 weeks 5 days + 11 weeks 5 days
f) 49 months 19 days + 55 months
g) 33 months 15 days – 22 months 18 days
h) 20 weeks 5 days – 15 weeks 6 days

6. The length of two ropes are 15m 13 cm and 12 m 42 cm respectively.

a) What is the total length of two ropes?
b) What is the difference between their lengths?

7. To stitch shirt A, a tailor takes 3 hours 45 minutes and to stitch the shirt B, he takes 2 hours and 21 minutes.

a) For which shirt he takes more time?
b) How much time does he take to stich both the shirts altogether?

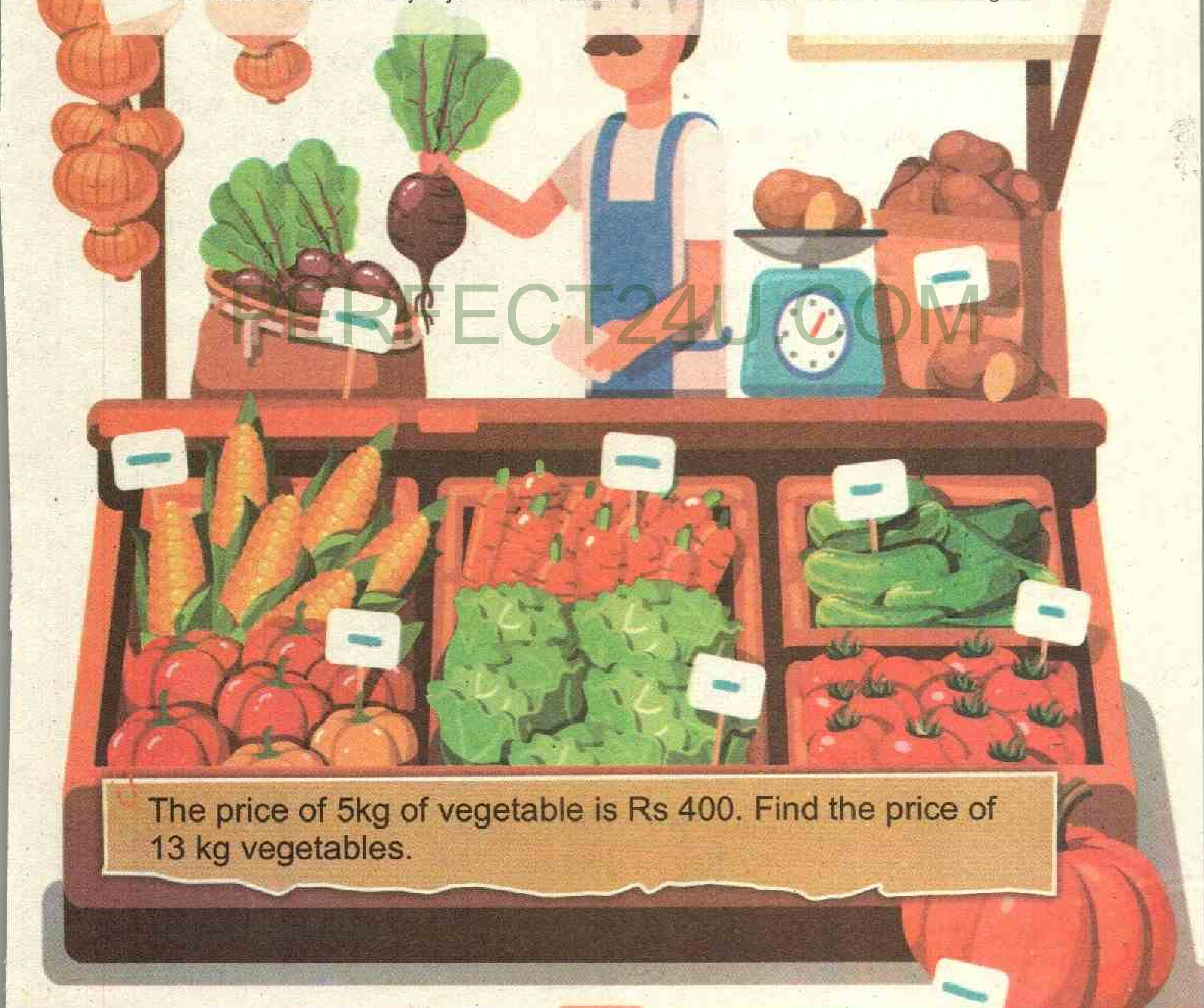
Unit 6

Unitary Method

Learning Outcomes

By the end of this unit, you will be able to:

- calculate the value of many objects of the same kind when the value of one of these objects is given
- calculate the value of one object of the same kind when value of many of these objects are given
- calculate the value of many objects of the same kind when the value of some of these is given



The price of 5kg of vegetable is Rs 400. Find the price of 13 kg vegetables.

Unitary Method

For a science experiment, the students were divided into 8 groups and each group was given one magnifying glass. If the price of 1 magnifying glass is Rs 245, find the cost of 8 such glasses.

We can find price of 8 magnifying glasses by multiplying price of one magnifying glass with 8.

Price of 1 magnifying glass = Rs 245

Price of 8 magnifying glass = Rs 245×8

= Rs 1960

The price of 8 magnifying glasses is Rs 1960.

Key Fact

To find the price or value of multiple items by the price of one item, we multiply the price of one item by the number of required items.

If the price of a pencil is Rs 10. What will be the price of 15 pencils?

Price of 1 pencil = Rs 10

Price of 15 pencils = Rs 10×15

= Rs 150

The price of 15 pencils is Rs 150.

The cost of 20 chairs is Rs. 7240. How can we find the cost of 1 such chair?

We can find the price of 1 chair, by dividing the total price by 20.

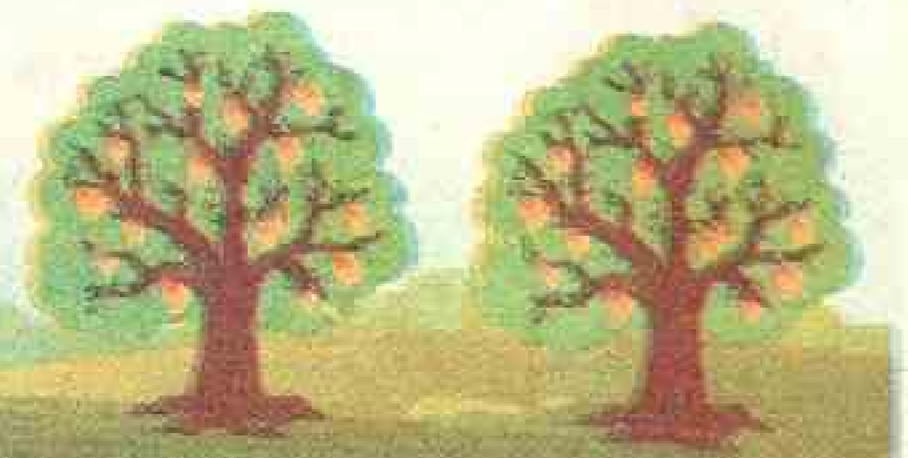
Total price of 20 chairs = Rs. 7240

Price of 1 chair = Rs. $7240 \div 20$

= Rs. 362

The price of 1 chair is Rs. 362.

In a mango orchard, there are 576 trees in 32 identical rows. How many trees will be there in 1 row?



Total number of trees = 576

Number of rows = 32

Number trees in 1 row = 576 ÷ 32

So, the total numbers of trees in one row is 18.

Key Fact

- When the value of one item is known, the value of many items of the same kind can be found by multiplication.
- When the value of many items of the same kind is known, then the price of one item can be found by division..

Try It!

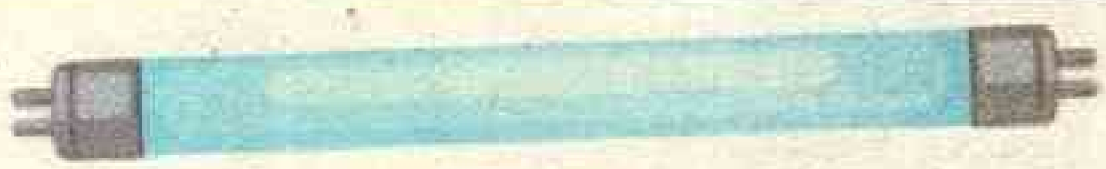
Visit the nearby market with your parents. Make a list of price of 5 or more items. Then by the help of these prices, find the price of multiple items of the same kind.

Exercise 1

1. The price of 1 geometry box is Rs. 76. Find the price of 26 geometry boxes.
2. If the price of one ice cream is Rs. 55, find the price of 17 ice creams.
3. If the price of a popcorn pack is Rs. 37, find the price of 71 popcorn packs.
4. A bag weighs 21 kg. What will be the weight of 15 bags?
5. The capacity of 15 identical buses is 555 passengers. What will be the capacity of 1 bus?
6. The price of 26 kg of sugar is Rs. 1170. What will be the price of 1 kg of sugar?
7. If the rent of a house for 8 months is Rs. 145,680, what will be the rent of the house for 1 month.
8. The cost of 35 registers is Rs. 5075. Find the cost of 1 register.

Unitary Method

Father bought 12 tube lights for the home which cost Rs. 6,900 altogether. What will be the price of 7 such tube lights?



Find the price of 1 tube light by division. Multiply price of tube light with to find the price of 7 tube lights.

Price of 12 tube lights = Rs. 6,900

Price of 1 tube light = Rs. 6,900 ÷ 12

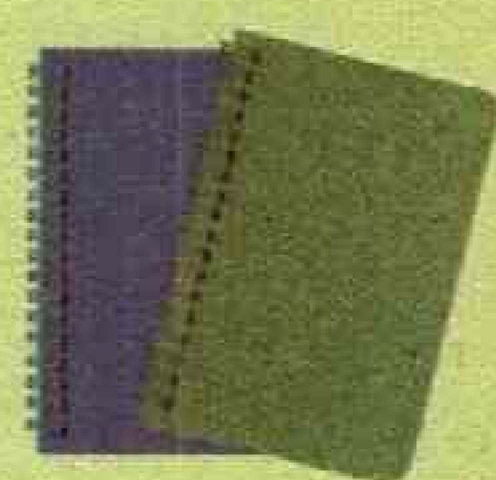
= Rs. 575

Price of 7 tube lights = Rs. 575 × 7

= Rs. 4,025

The price of 7 tube lights is Rs 4,025.

There are 2940 pages in 30 notebooks. How many pages will be there in 14 such notebooks?



Number of pages in 30 notebooks = 2940

Number of pages in one notebook = 2940 ÷ 30

Number of pages in 14 notebooks = 98

= 98 × 14

= 1,372

There are 1,372 in 14 notebooks.

Key Fact

Using unitary method, we find out the value of one unit and use it to find the value of multiple units.

TEACHING POINT Explain the concept of the unitary method, by using the prices of objects of daily use.

Exercise 2

1. There are 4,900 markers in 50 boxes. How many markers will be there in 75 such boxes?
2. The price of 10 mobile phones is Rs. 348,290. What will be the price of 29 mobile phones of the same model?
3. 40 books weigh 88 kg. What is the weight of 6 such books?
4. A train travels 6,136 km in 52 hours. What distance will cover at the same speed in 45 hours?
5. Amir buys 3 computers for Rs. 838,155. What will be the cost of 52 such computers?
6. If the fare for 34 km is Rs. 1,190, what will be the fare for 48 km?
7. 19 pairs of shoes cost Rs. 23,750. What will be the price of 65 such pairs?

I Have Learnt

- calculating the value of many objects of the same kind when the value of some of the objects given.
- calculating the value of one object when the value of many objects is given

Vocabulary

unitary method
price
items
value

Review Exercise

1. Encircle the correct option.

a) The price of a book is Rs 250, the price of 5 books will be Rs_____.

i) 50　　ii) 1,000　　iii) 1,250　　iv) 2,500

b) The price of 11 carpets is Rs 35805, the price of carpet is ______.

i) 3,855　　ii) 3,055　　iii) 2,355　　iv) 3,255

c) The price of a book is Rs 555. The price of 10 books will be Rs_____.

i) 2,550 ii) 5,050 iii) 3,250 iv) 5,550

d) Price of 6 oranges is Rs 48. The price of 72 oranges will be Rs ______.

i) 567 ii) 96 iii) 112 iv) 576

e) The price of 3 chairs is Rs 645. The price of 16 chairs will be Rs ______.

i) 3,040 ii) 3,004 iii) 3,440 iv) 3,404

2. A story book of stories costs Rs. 440. Find out the price of 15 story books.

3. If the price of 16 school bags is Rs. 24,000, find out the price of 1 such bag.

4. 425 pearls were used to make a necklace,

a) How many pearls will be used to make 25 necklaces?

b) How many pearls will be used to make 100 necklaces?

5) If the price of 5 washing machines is Rs. 92,465, find:

a) The price of 24 such washing machines.

b) The price of 10 such washing machines.

Unit 7

Geometry

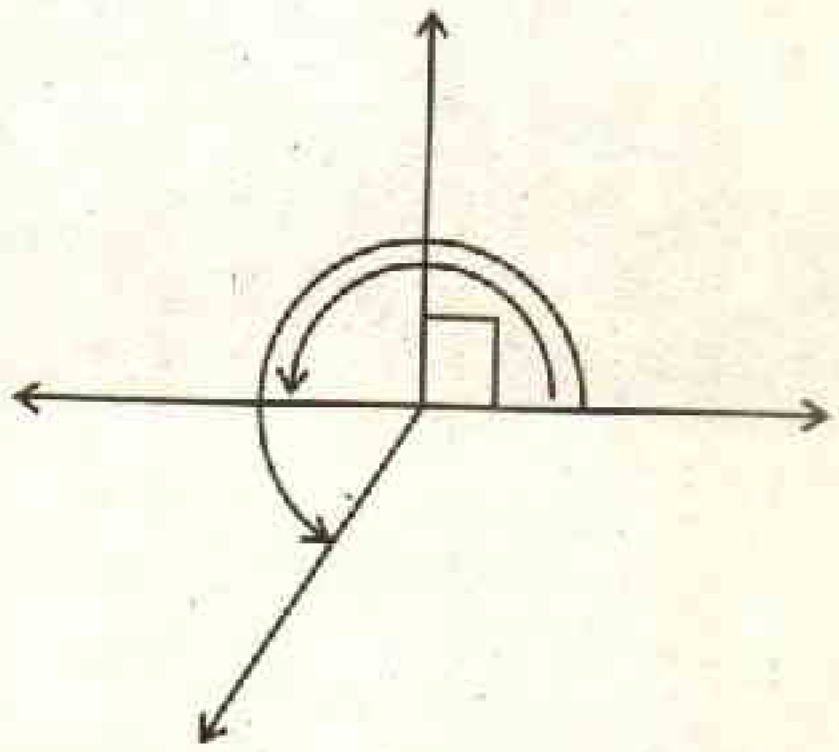
Learning Outcomes

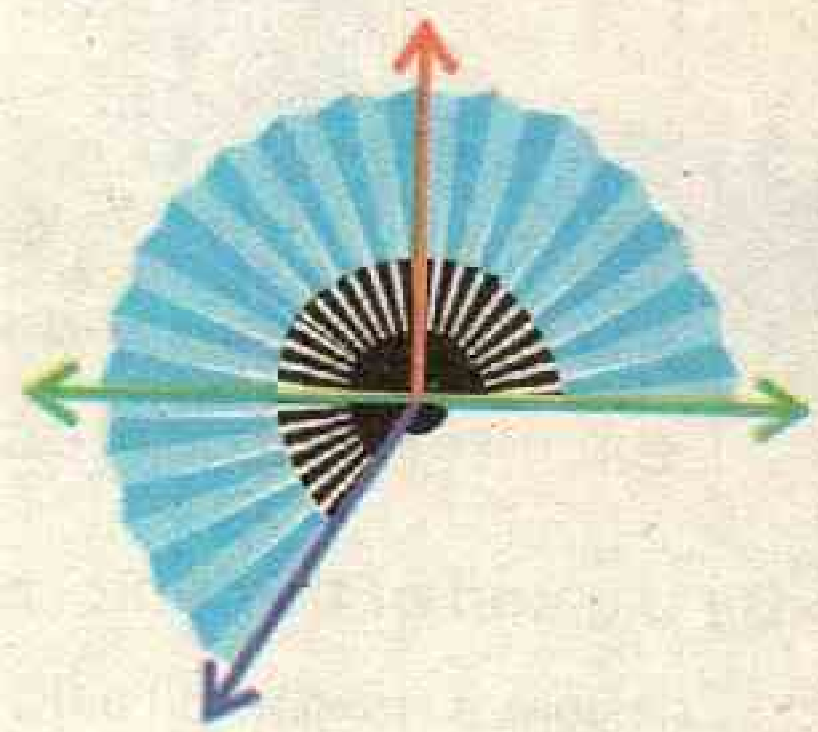
By the end of this unit, you will be able to:

- recognize straight and reflex angles.
- recognize the standard units for measuring angles is 1°, which is defined as $\frac{1}{360}$ of a complete revolution.
- identify, describe and estimate the size of angles.
- classify angles as acute, right or obtuse.
- compare angles with right the angles and recognize that a straight line is equivalent to two right angles.
- use protractor and ruler to construct
  - A right angle
  - A straight angle
  - Reflex angles of different measures
- describe adjacent, complementary and supplementary angles.
- identify and describe triangles with respect to their sides. (isosceles, equilateral, and scalene)
- identify and describe triangles with respect to their angles. (Acute angled triangle, Obtuse angled triangle and right-angled triangles)
- use protractor and ruler to construct a triangle when
  - two angles and their included side is given.
  - two sides and included angle is given.
- measure the lengths of the remaining sides and angles of the triangle.
- recognize different kinds of quadrilaterals (square, rectangle, parallelogram, rhombus, trapezium, and kite).
- identify and describe properties of quadrilaterals including square, rectangle, parallelogram, rhombus, trapezium, and kite, and classify those using parallel sides, equal sides and equal angles.
- use protractor and ruler to construct square and rectangle when lengths of sides are given.
- recognize different types of symmetry (Reflective and Rotational) in 2-D figures.
- identify lines of symmetry for given 2-D figures.
- find point of rotation and order of rotational symmetry of given 2-D figures.
- identify cubes, cuboids and pyramids from their nets.
- describe and make 3-D objects (cubes, cuboids, cylinder, cone, sphere, pyramids).

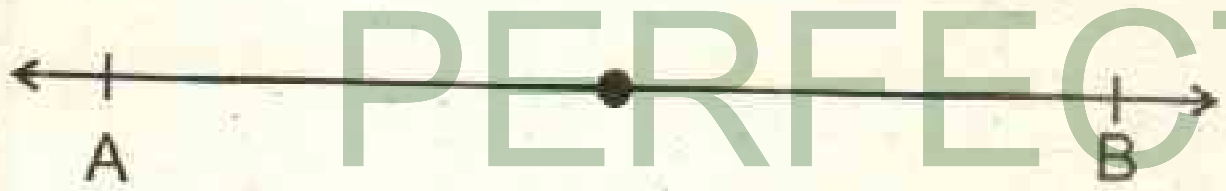
Hammad visited Murree. There, he saw the reflection of a mountain in the water, which looked the same as the mountain.
Can you tell the relation between the mountain and its reflection?

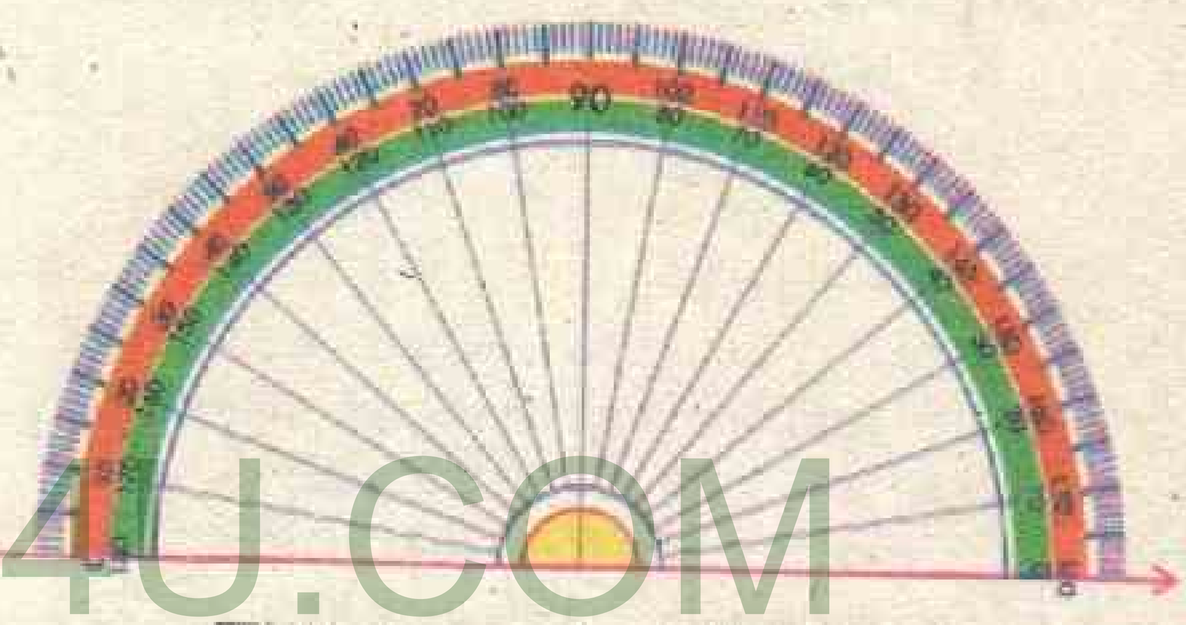
Angles





We know that there are different angles around us. Can you find how many angles are there in the above figure.

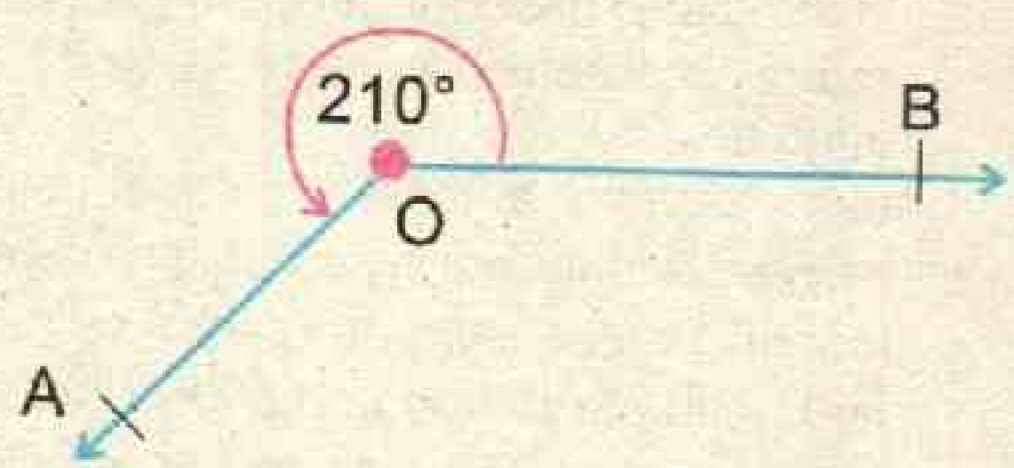




This is a straight angle.

∠AOB = 180° an angle of measure 180° is called straight angle.

This angle m∠AOB is greater than 180° but smaller than a complete rotation which is 360°. Such angles are called reflex angles.



Key Fact

The standard unit of measuring angle is degree written as "°".

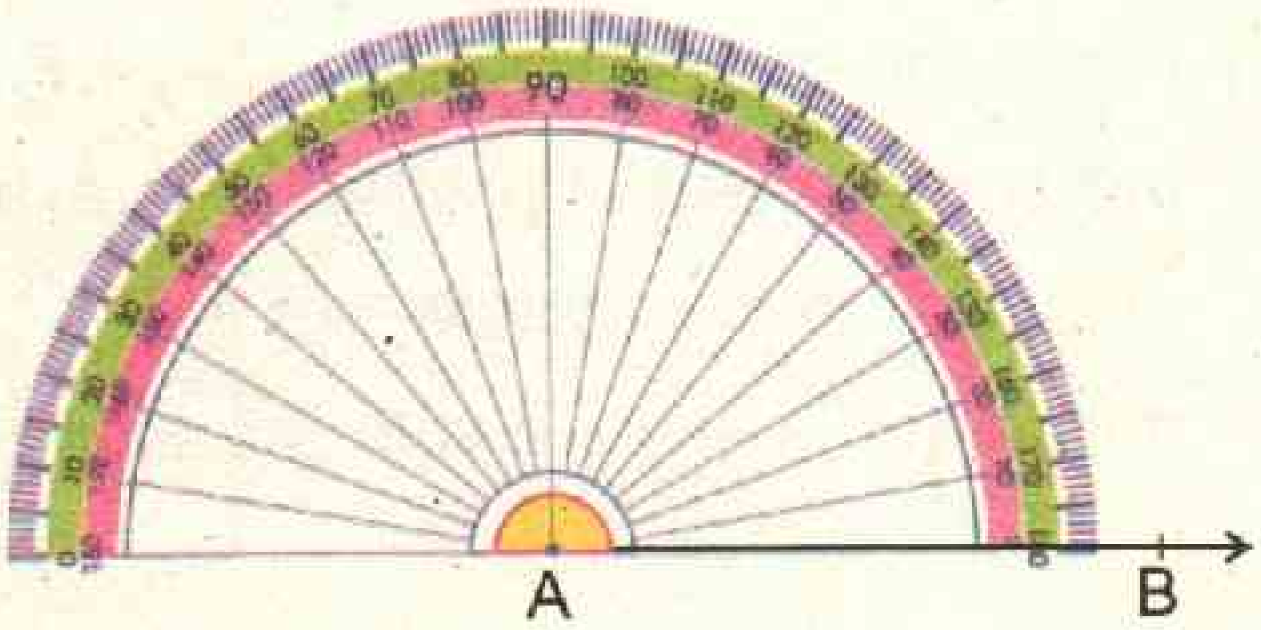
TEACHING POINT: Make a right angle using cardboard and then use it as a model angle to compare with the other angles.

Construction of Angles by Using Protractor

We construct an angle BAC = 90° using protractor.

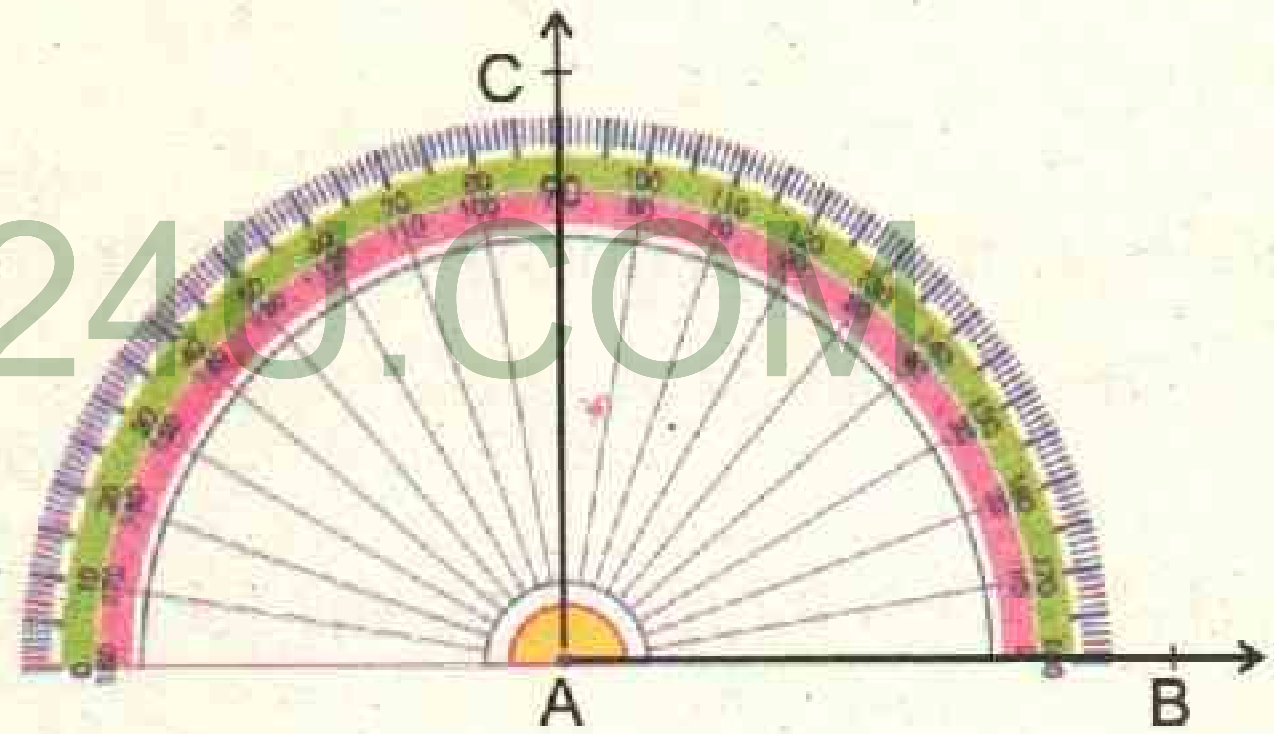
i) Draw a ray AB.

ii) Place the protractor on the ray AB such that the center point of protractor is exactly at point A and the baseline of the protractor is aligned with the arm AB.

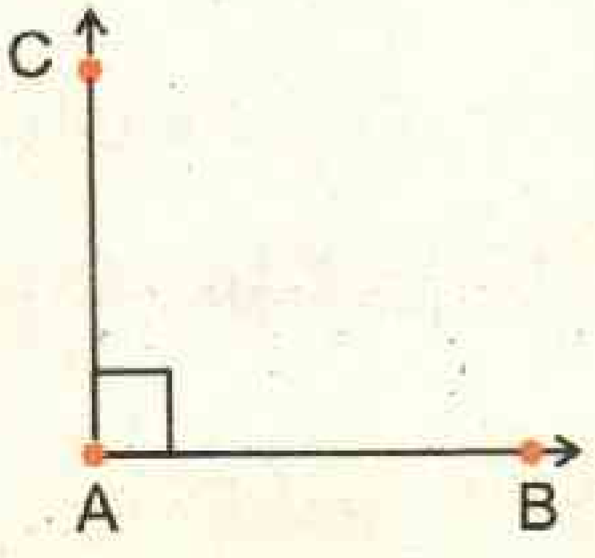


iii) Read the inner scale on the protractor and mark a point C at 90°.

iv) Remove the protractor and join A to C.

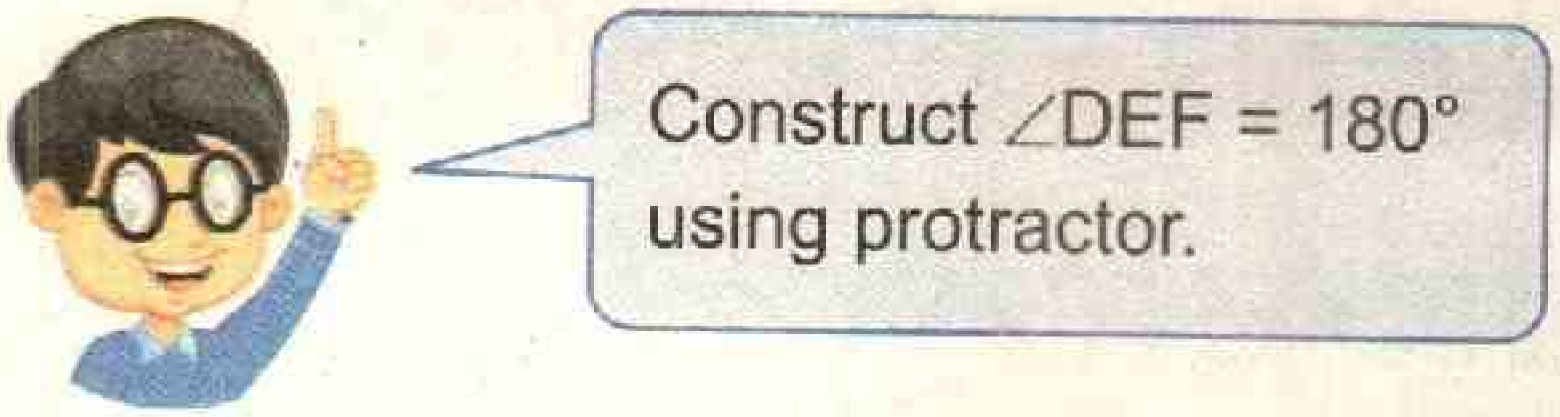


v) $\angle BAC = 90°$ is the required right-angle.



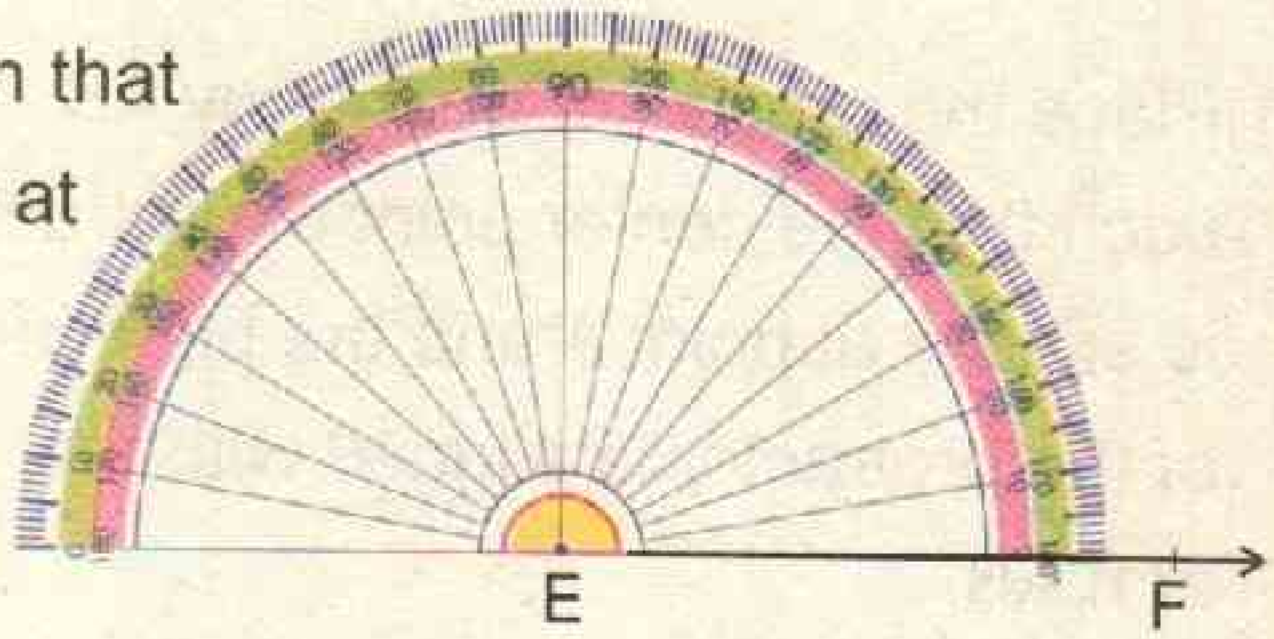
Try Yourself

How many 30° angles are there in a right angle?



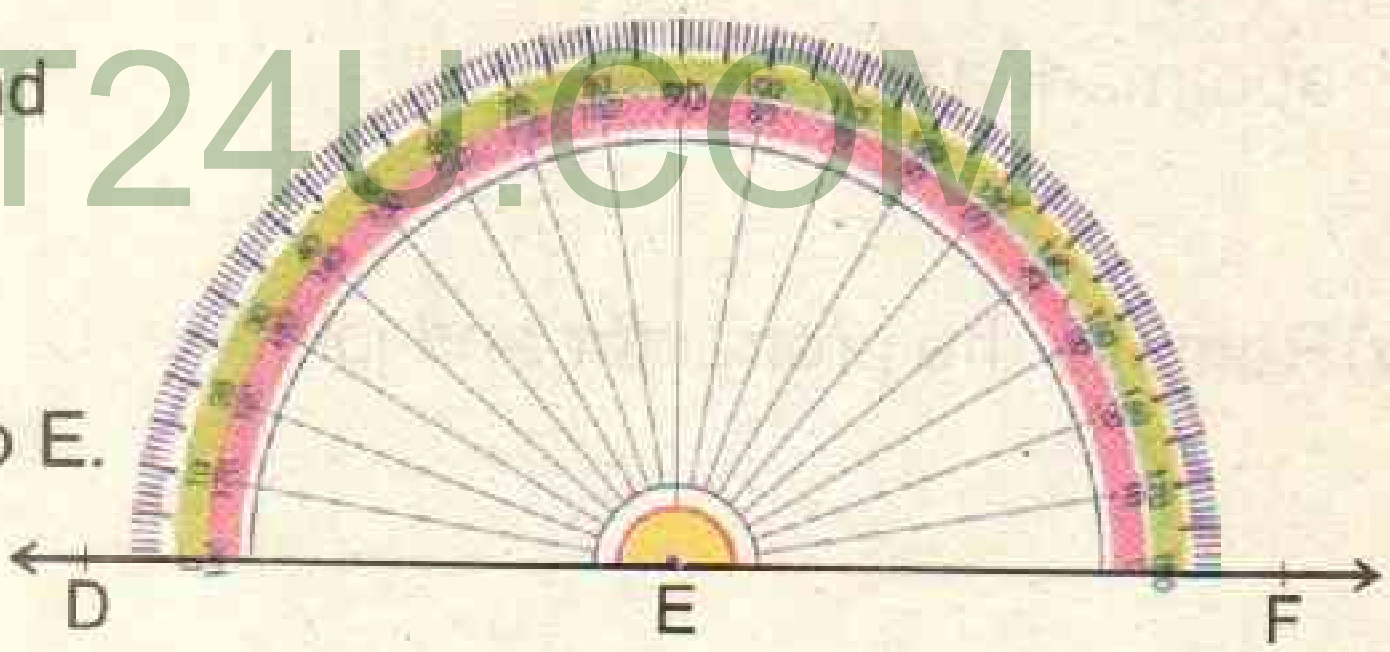
i) Draw a ray EF.

ii) Place the protractor on the ray EF such that the center point of protractor is exactly at point E and the baseline of the protractor is aligned with the arm EF.



iii) Read the scale on the protractor and mark a point D at 180°.

iv) Remove the protractor and join D to E.



v) ∠DEF = 180° is the required straight-angle.

Try Yourself

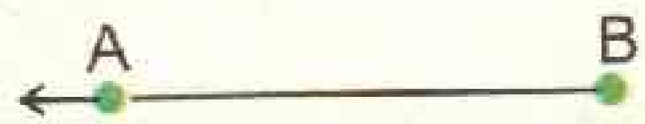
1. How many right angles are there in a straight angle?
2. How many straight angles are there in a complete rotation?

Construct $\angle ABC = 285°$ using protractor.

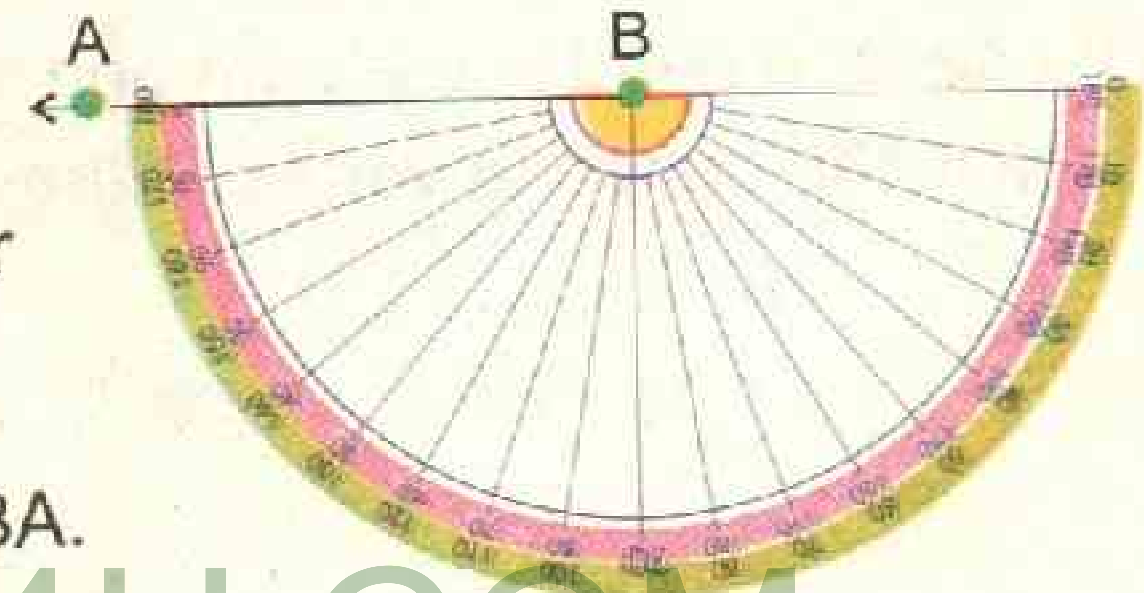
To construct a reflex angle of 285°, first we subtract the reflex angle from 360° and then draw the resulting angle, below the ray

$$360° - 285° = 75°$$

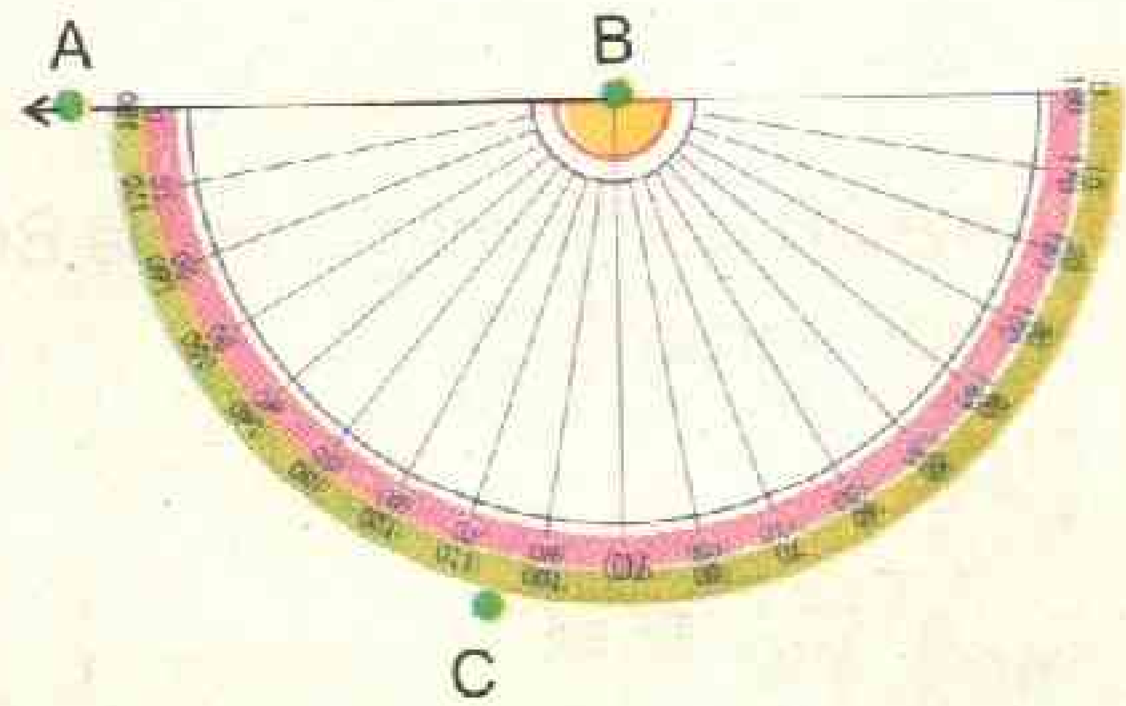
i) Draw a ray BA.



ii) Place the protractor upside down on ray BA so that the centre of the protractor is exactly on point B and the baseline of the protractor is aligned with the arm BA.

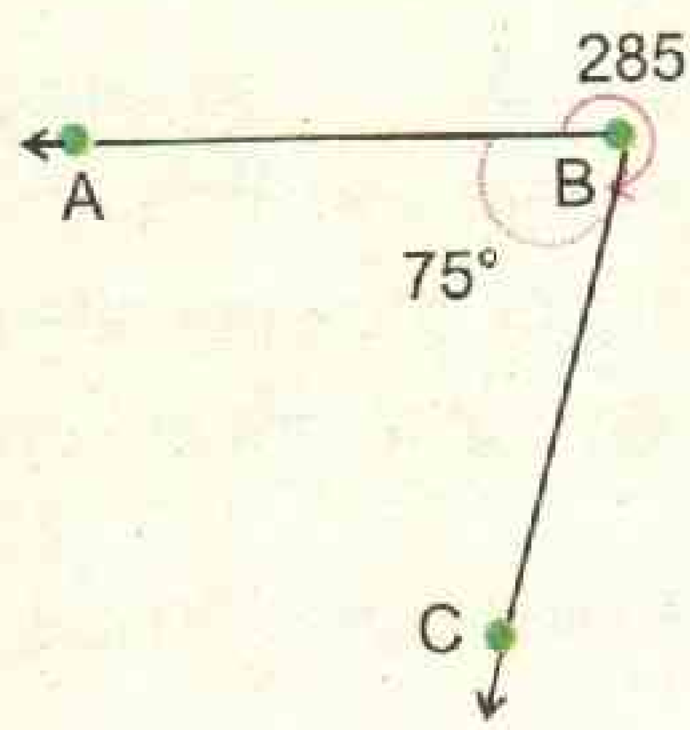


iii) Read the scale on the protractor and mark a point C at 75°.



iv) Remove the protractor and join B to C.

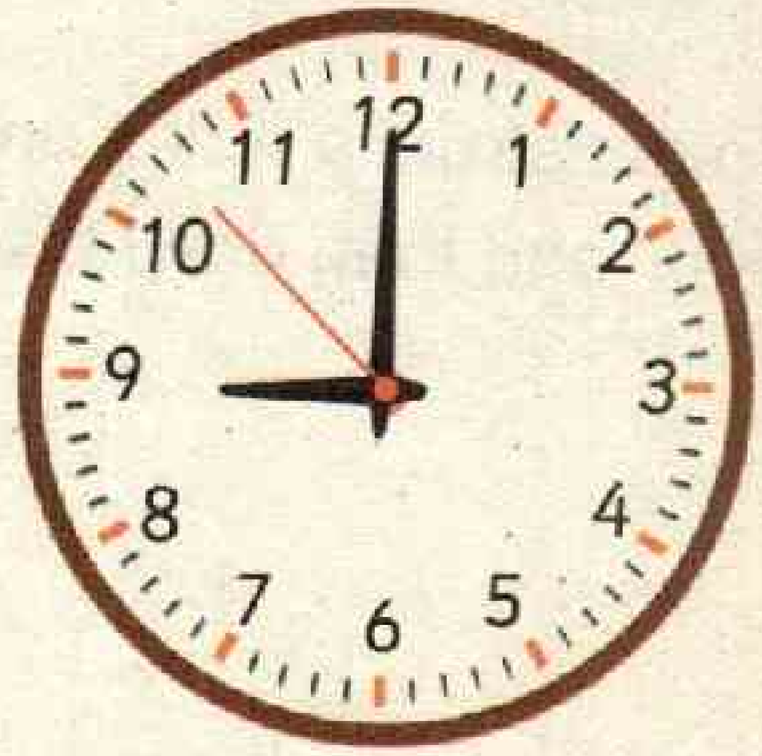
v) $\angle ABC = 285°$ is the required reflex angle.



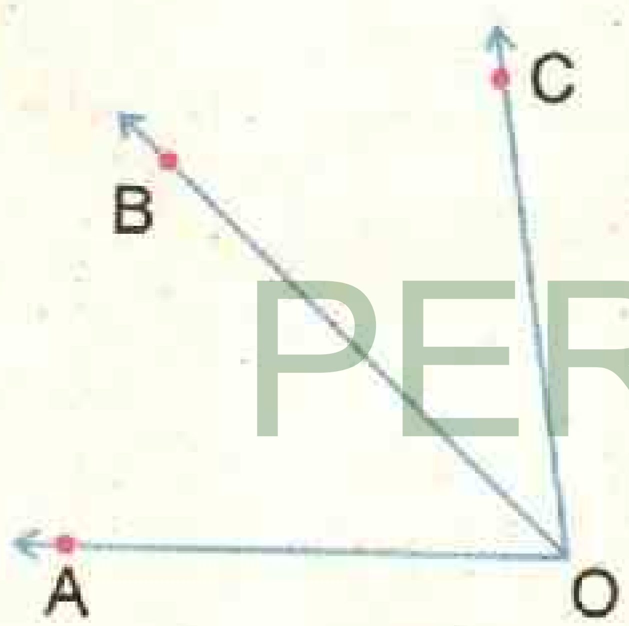
Pairs of Angles

Adjacent angles

Observe the hands of the given clock that are making two adjacent angles.



The hour hand, the minute hand and the second hand are making two angles. The second hand is the common arm of both the angles. The center of the clock is the common vertex of these two angles.



Angle AOB is adjacent to angle BOC. Their common arm is OB and the common vertex is O.

Key Fact

Two angles are called adjacent angles if:

- they have a common arm
- they are on the opposite side of the common arm.
- they have a common vertex.

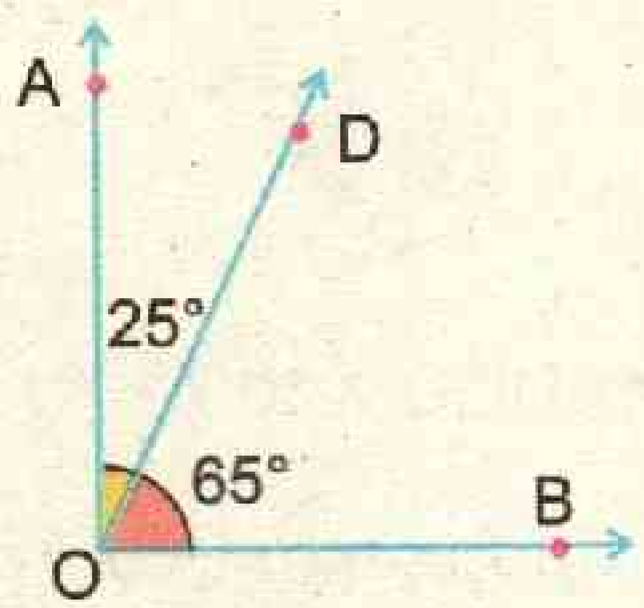
TEACHING POINT

Ask the students to find adjacent angles in different objects around them.

Complementary Angles

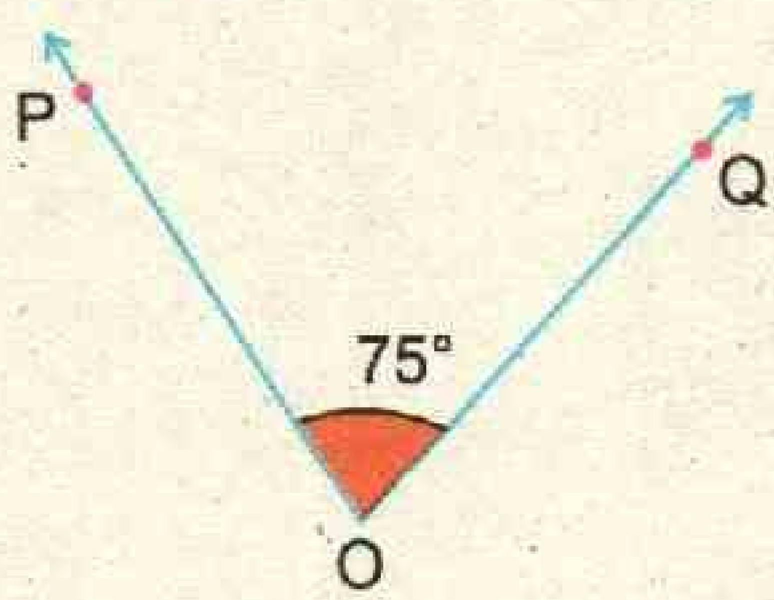
Two angles are called complementary angles if their sum is 90° they may be adjacent or non-adjacent.

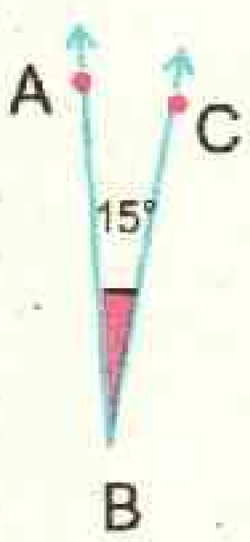
Adjacent Complementary Angles



$m\angle AOD + m\angle DOB = 25° + 65° = 90°$

Non-Adjacent Complementary Angles





$m\angle POQ + m\angle ABC = 75° + 15° = 90°$

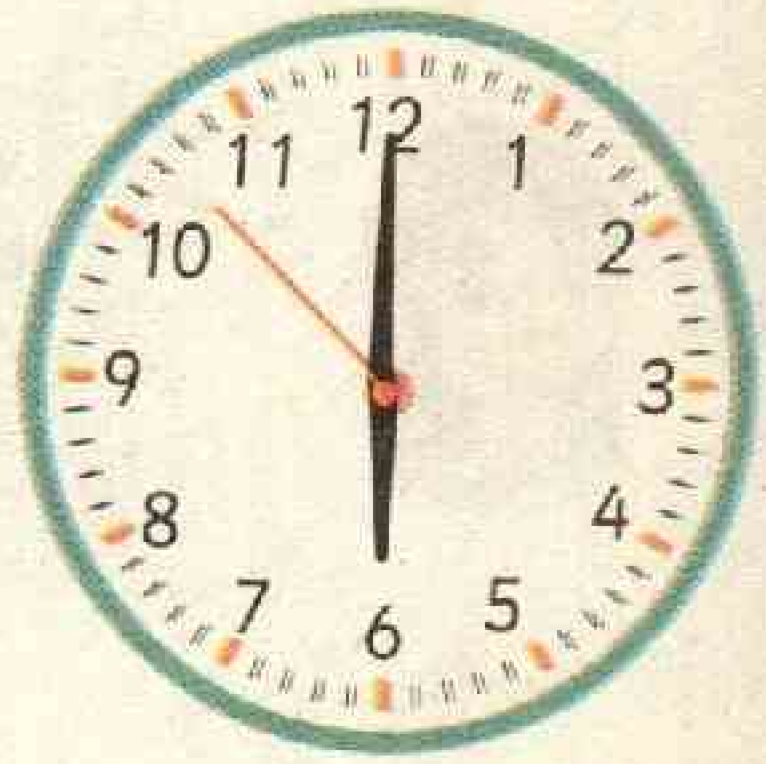
Try Yourself

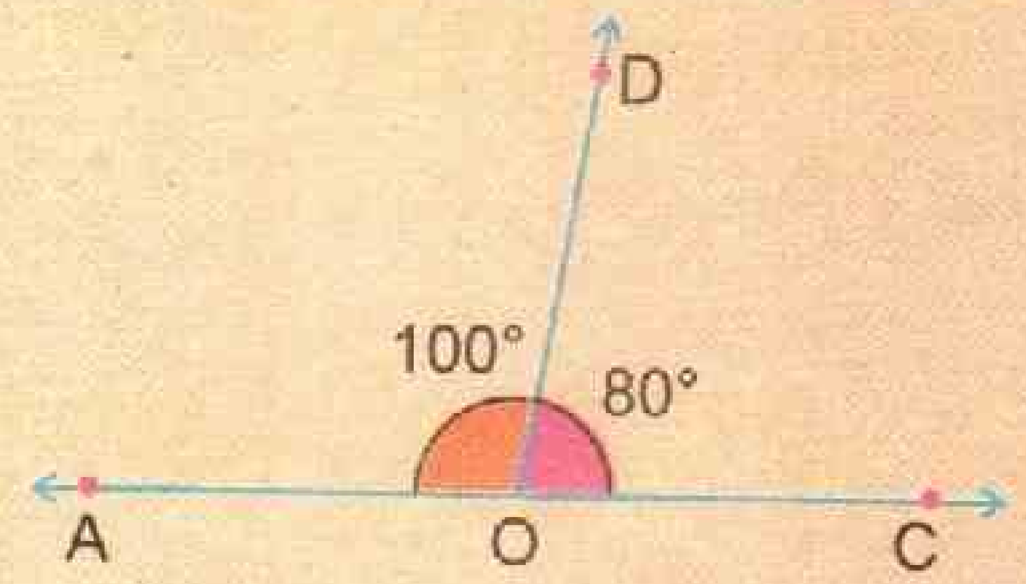
Can two right angles be the complement of each other?

Ask the students to find complementary angles in the objects around them.

Supplementary Angles

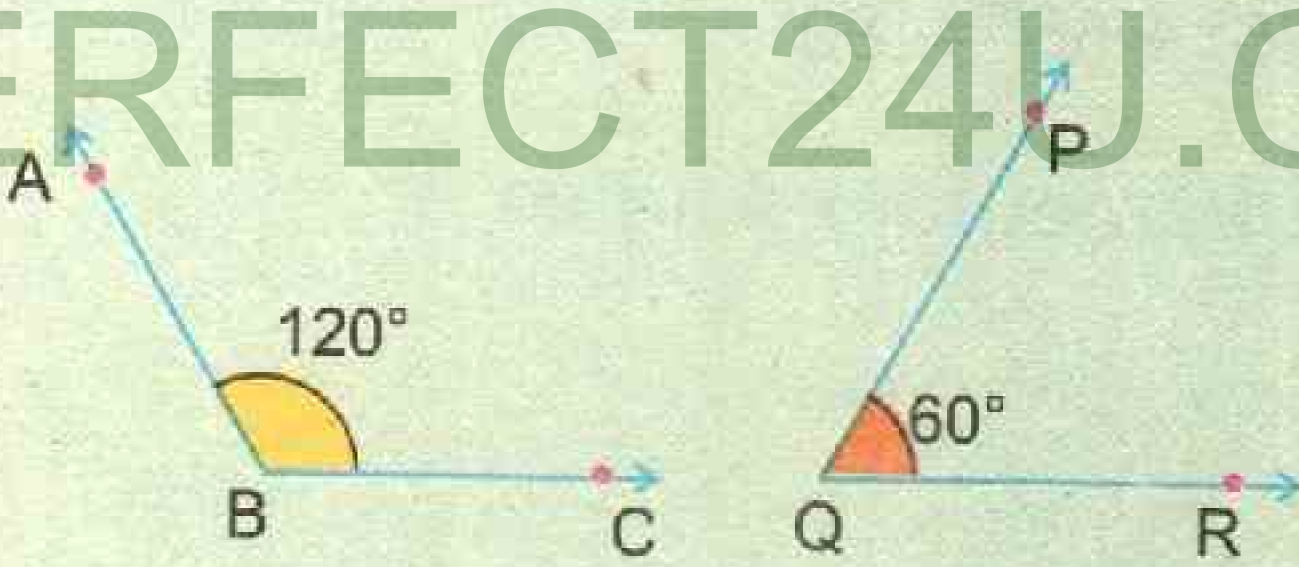
Two angles are called supplementary angles, if their sum is 180°. They may be adjacent or non-adjacent.





$m\angle AOD + m\angle DOC = 100° + 80° = 180°$

Adjacent Supplementary Angles



$m\angle ABC + m\angle PQR = 120° + 60° = 180°$

Non-Adjacent Supplementary Angles

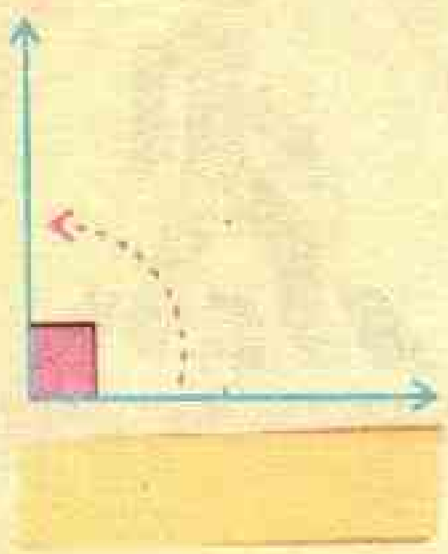
Try Yourself

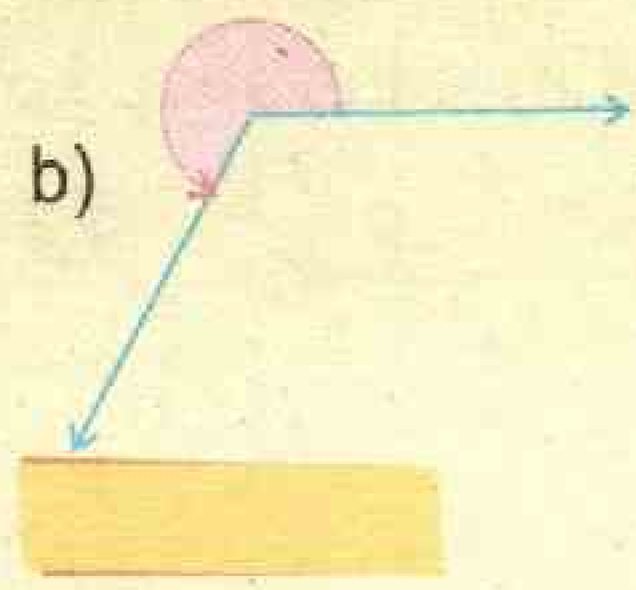
Can two straight angles be the supplement of each other? Explain your answer.

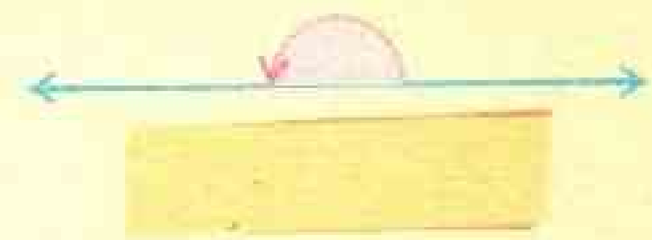
TEACHING POINT: Ask the students to find supplementary angles in the objects around them.

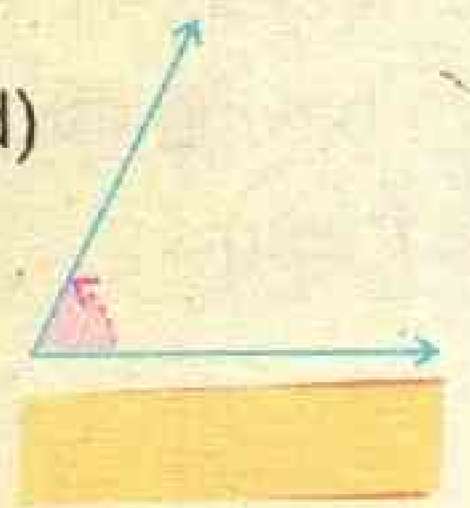
Exercise 1

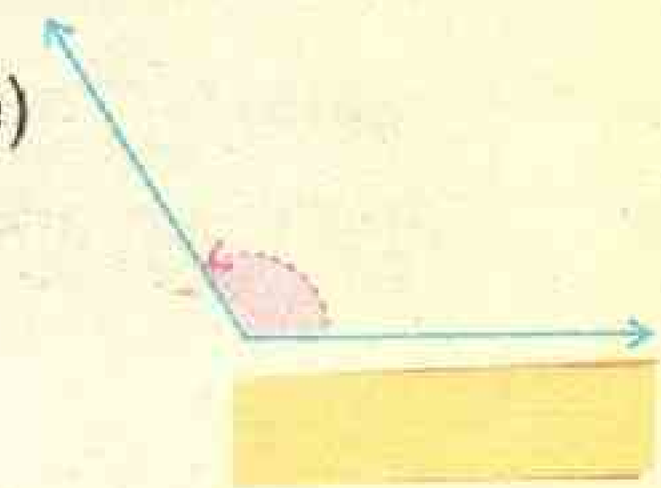
1. Draw a right angle using cardboard and compare it with the given angles to accurately indicate the types of angles.

a)


b)


c)


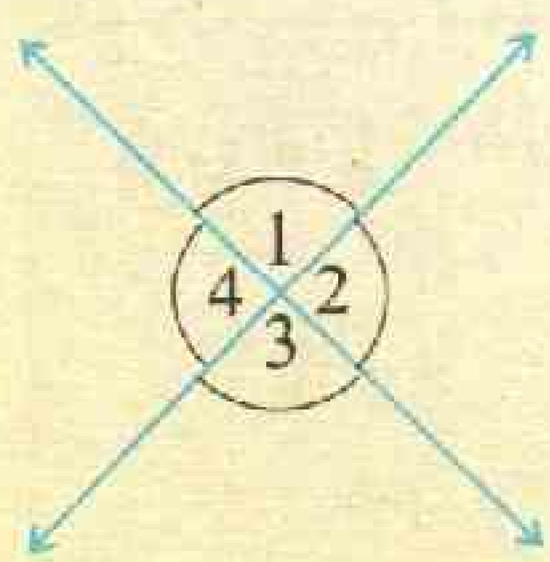
d)


e)


2. Use the protractor to draw the given angles.

a) 35° b) 45° c) 240° d) 180° e) 90° f) 60° g) 300° h) 155°

3. Identify adjacent angles from the given angles.



4. Find the supplement of the following.

a) 98° b) 180° c) 115° d) 3° e) 78° f) 135° g) 90°

5. Find the complement of the following.

a) 12° b) 88° c) 90° d) 10° e) 62° f) 40° g) 70°

Triangle

There is a sign board in front of our school. What is the shape of this board?

This board is triangular in shape as it has three sides. A simple closed figure having three sides and three angles is called a triangle.

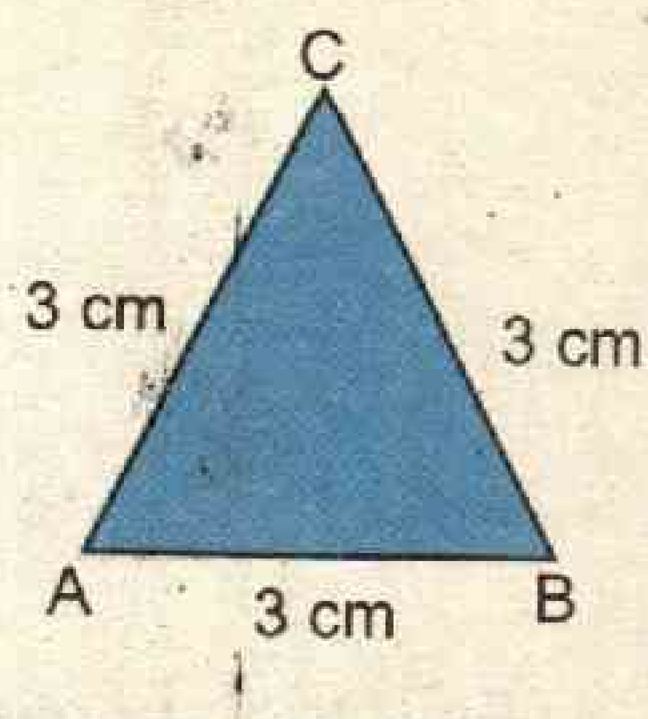
Types of Triangles with respect to the Sides

Equilateral Triangle

All the sides of the given triangle are equal.

$m\overline{AB} = m\overline{BC} = m\overline{CA} = 3$ cm

It is an equilateral triangle.



Key Fact

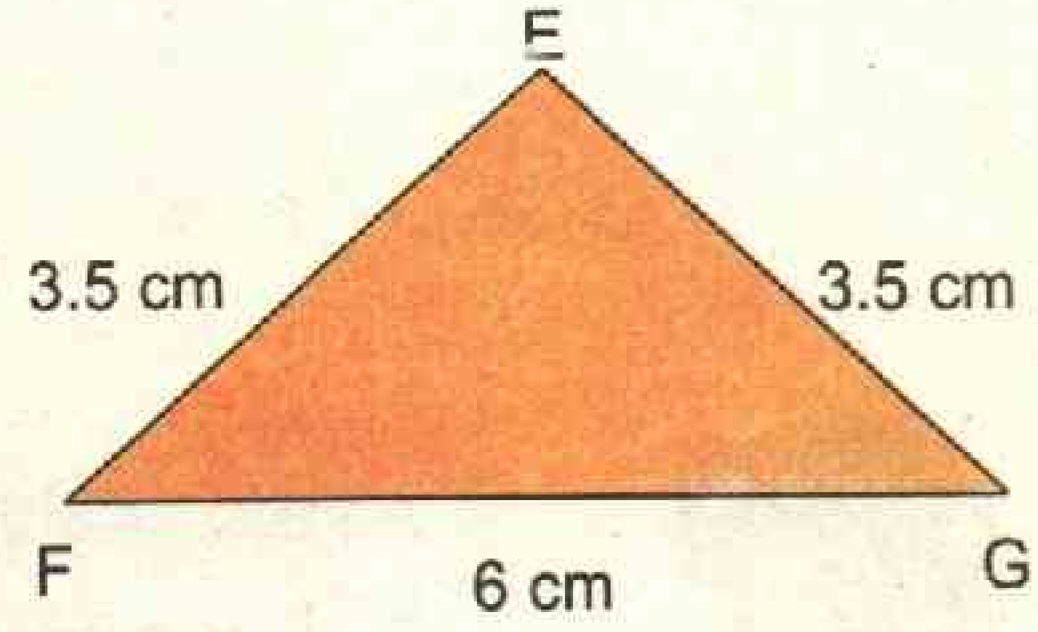
A triangle in which all the three sides are equal is called an equilateral triangle. All angles of an equilateral triangle are equal to 60°.

Isosceles Triangle

Two sides of the given triangle are equal.

$m\overline{EF} = m\overline{EG} = 3.5$ cm

So this is an isosceles triangle.



Key Fact

A triangle having two equal sides is called an isosceles triangle.

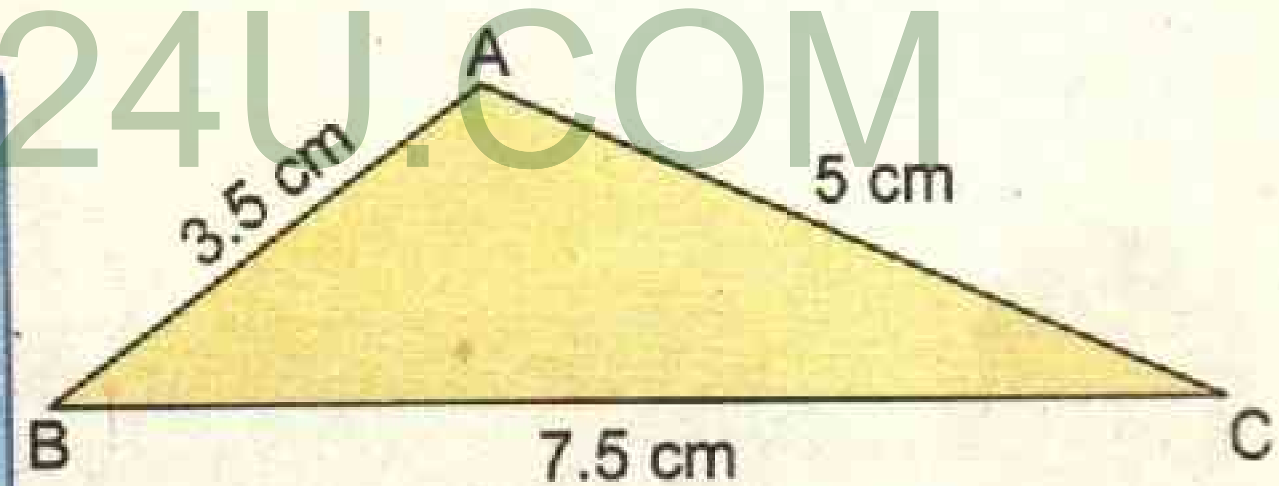
Two base angles of an isosceles triangle are equal in measure.

Scalene Triangle

All the sides of the given triangle are different in length.

$m\overline{AB} \neq m\overline{BC} \neq m\overline{C}$

It is a scalene triangle.



Key Fact

A triangle having all sides of different measure is called a scalene triangle. All angles in a scalene triangle are different in measure.

Try Yourself

Is every equilateral triangle an isosceles triangle? Explain your answer.

TEACHING POINT

Give the cutouts of different types of triangle to the students and ask them to sort with respect to their sides.

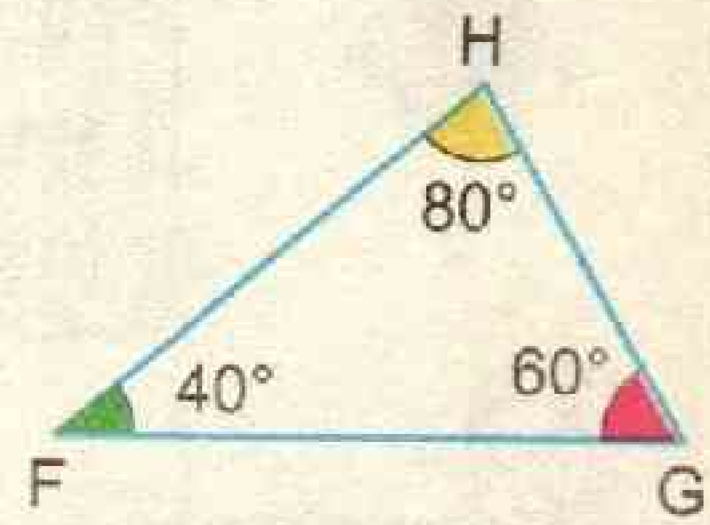
Types of Triangles with respect to their Angles

Acute-Angled Triangle

All the angles of the given triangle FGH are acute.

$m\angle F = 40^\circ$, $m\angle G = 60^\circ$, $m\angle H = 80^\circ$

This is an Acute angled-triangle.



Key Fact

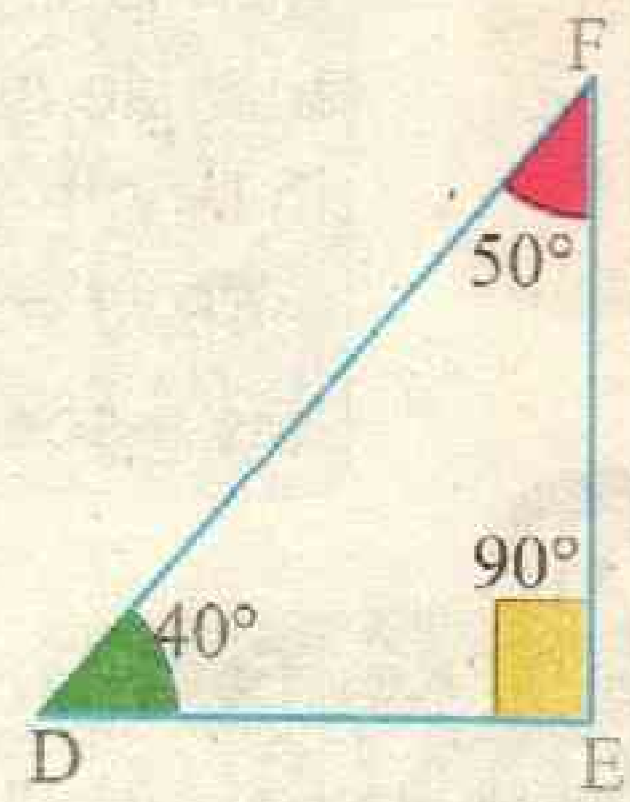
A triangle in which all angles are acute, is called an acute angled-triangle.

Right-Angled Triangle

One angle in the given triangle is a right angle.

$m\angle E = 90^\circ$

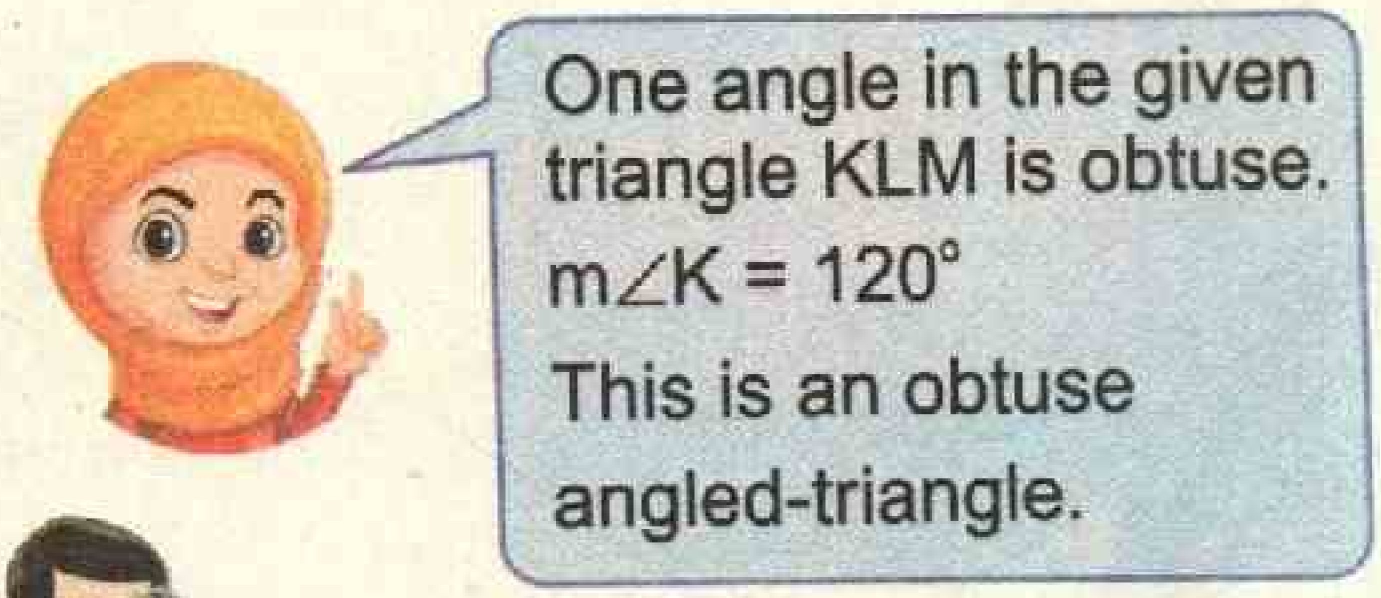
This is a right angled-triangle.

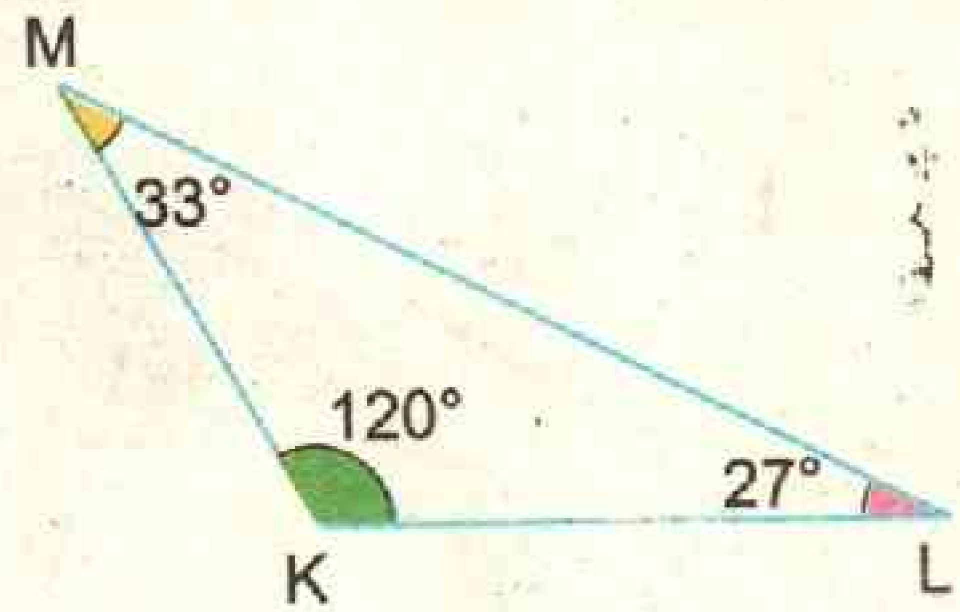


Key Fact

A triangle in which one angle is right angle is called a right-angled triangle.

Obtuse-Angled Triangle





Key Fact

A triangle in which one angle is obtuse is called an Obtuse angled-triangle.

Construction of Triangle

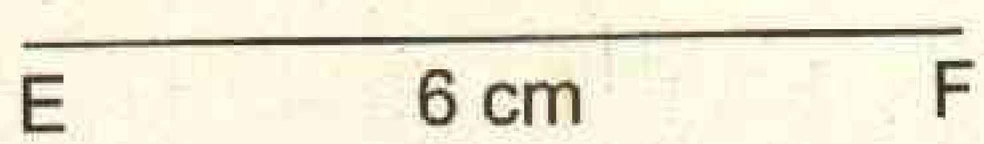
Construction of Triangle when two angles and one side is given

Construct a triangle EFG in which

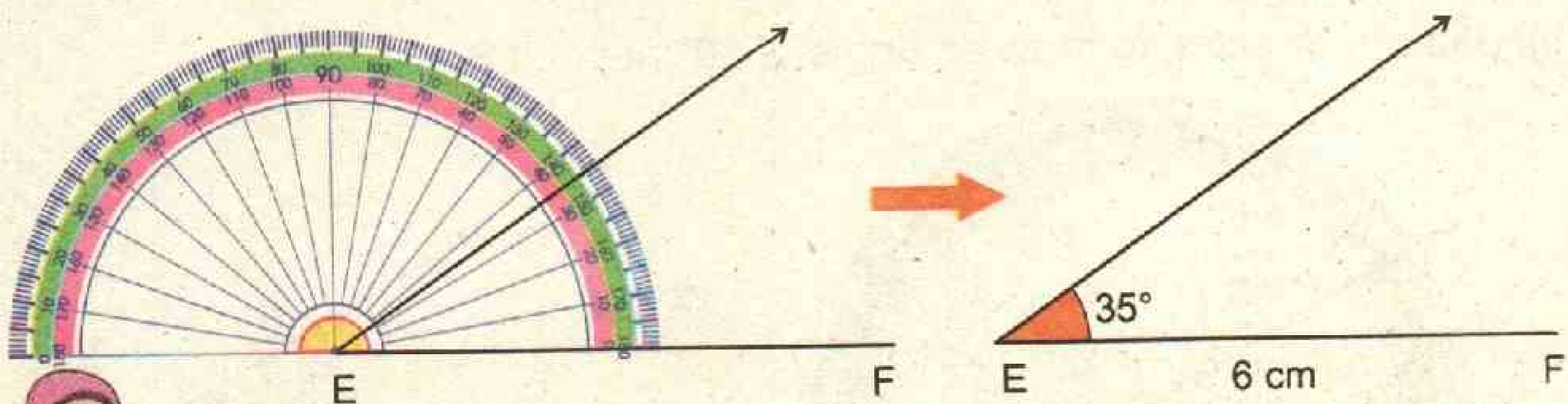
$\overline{EF}$ = 6 cm, ∠E=35° and ∠F = 70°.

Also find the measurement of the remaining sides and angle.

i) Draw a line segment m$\overline{EF}$ = 6 cm.



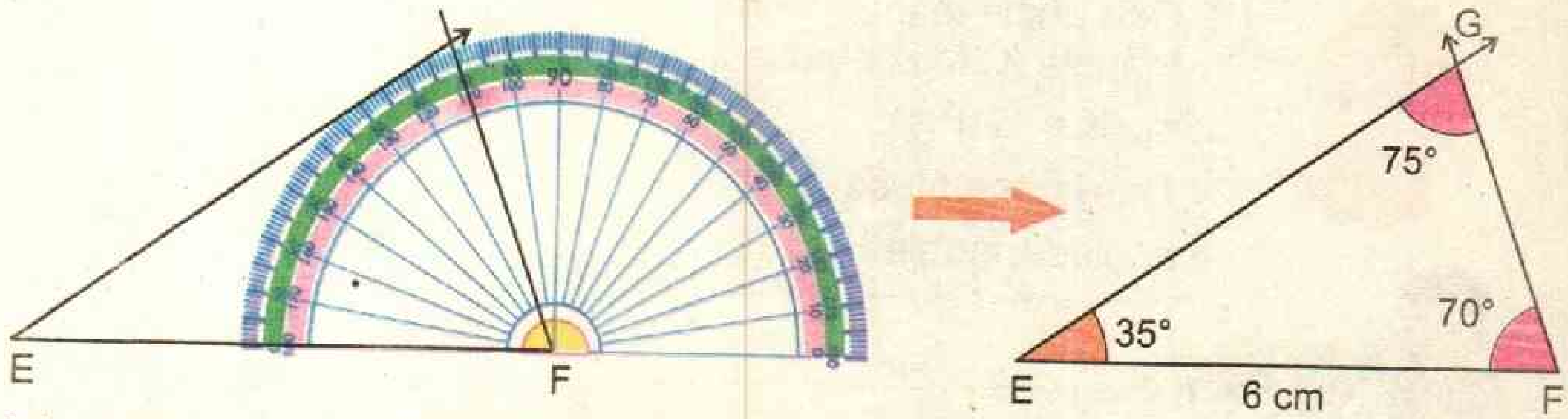
ii) Draw an angle of 35° at point E.



Key Fact

A triangle is represented by the symbol Δ.
The sum of the interior angles of a triangle is 180°.

iii) Similarly, using a protractor, draw another angle of 70° at Point F. The two drawn rays intersect at G.



iv) EFG is the required triangle.

Now calculate angle G.

$$m\angle G = 180^\circ - (35^\circ + 70^\circ) = 180^\circ - 105^\circ = 75^\circ$$

Try Yourself

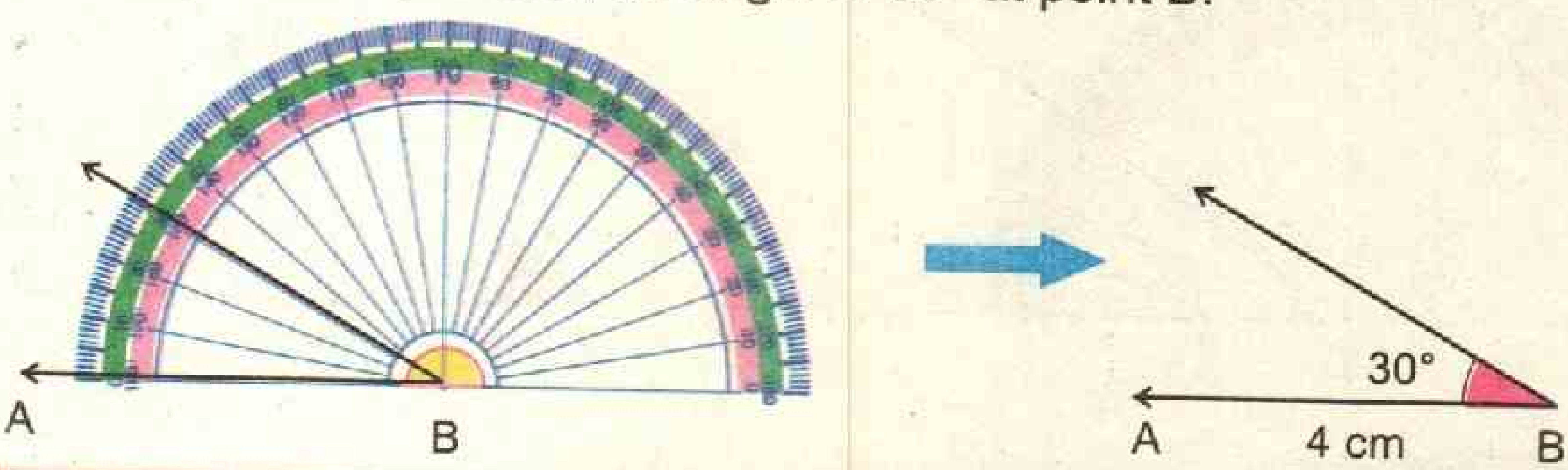
Measure $\overline{EG}$ and $\overline{FG}$ using a ruler.

Construction of a Triangle when two sides and included angle is given

Construct a $\triangle ABC$ in which $\overline{AB} = 4cm$, $\angle B = 30°$, $BC = 3cm$

i) Using ruler, draw a line segment $\overline{AB} = 4$ cm.

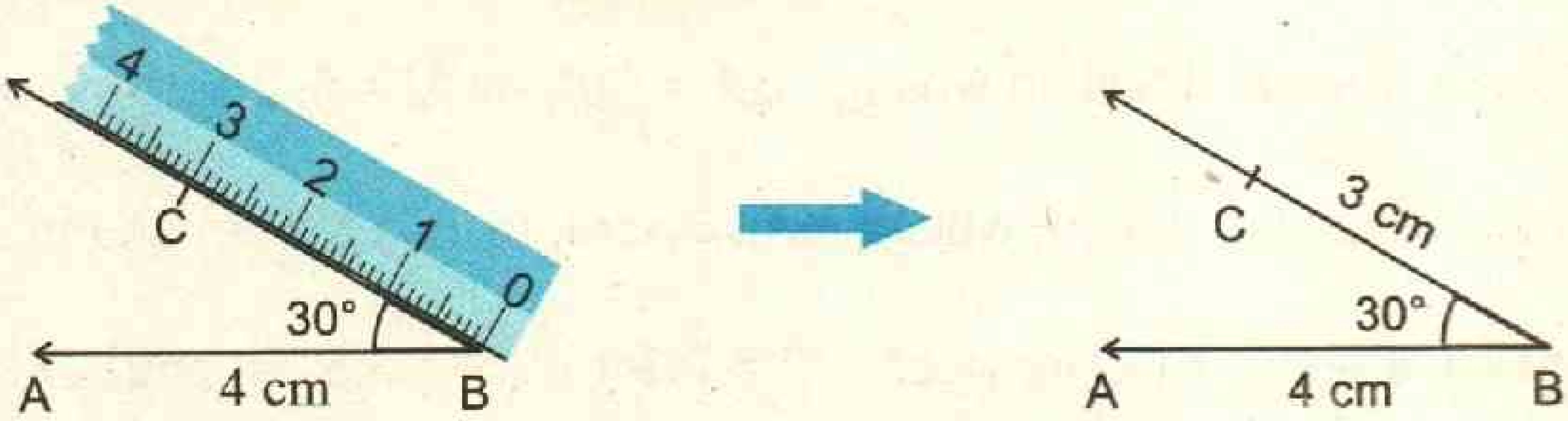
ii) Use a protractor, to draw an angle of 30° at point B.



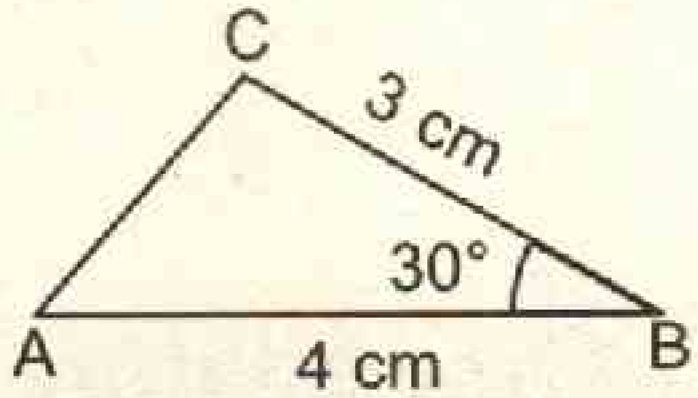
TEACHING POINT

Use the geometry box and construct the triangles step by step. Ask the students to follow you and construct it on their notebooks.

iii) Mark a point C on the arm of 30° such that $\overline{BC}$= 3cm.



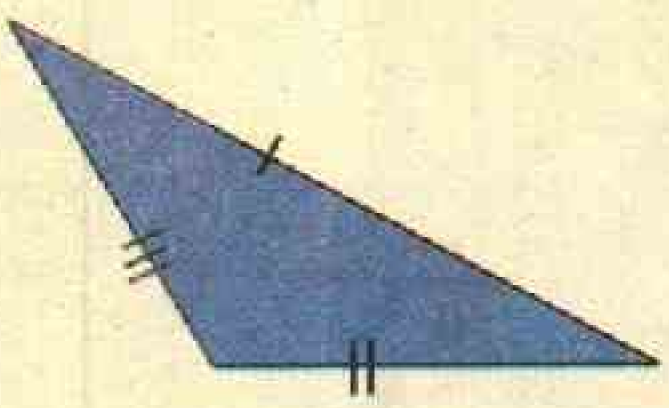
iv) Use ruler to Join A to C.



∆ABC is the required triangle.

Exercise 2

1. Identify these triangles with respect to their sides.

a)

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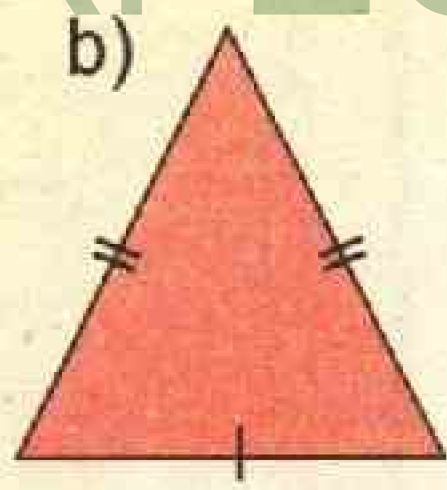
b)

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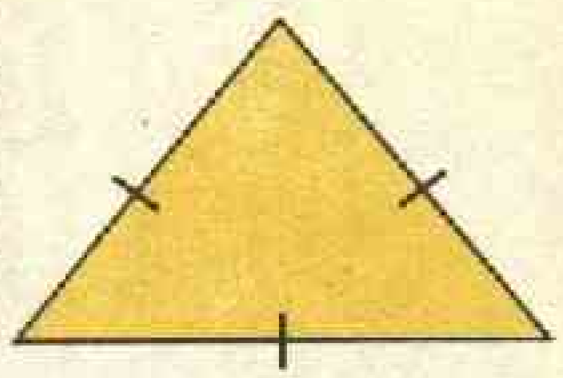
c)

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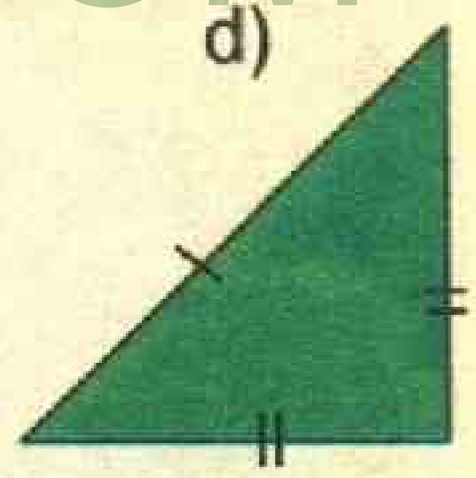
d)

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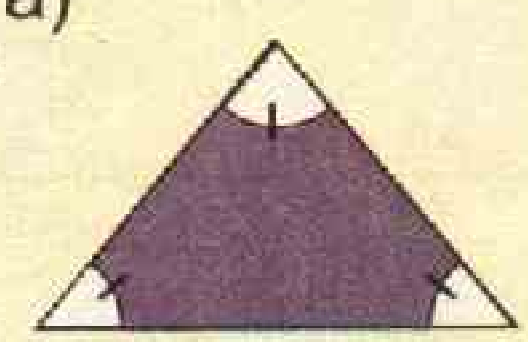
2. Identify these triangles with respect to their angles.

a)

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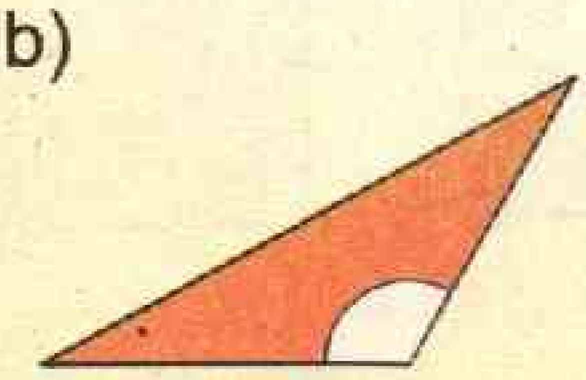
b)

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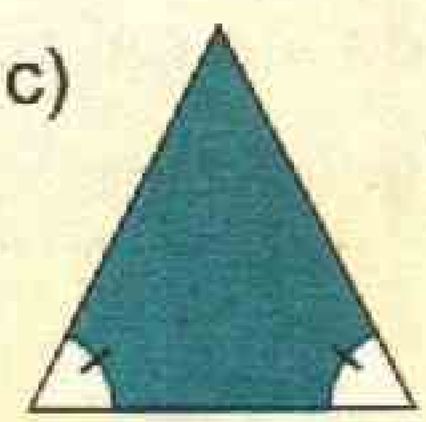
c)

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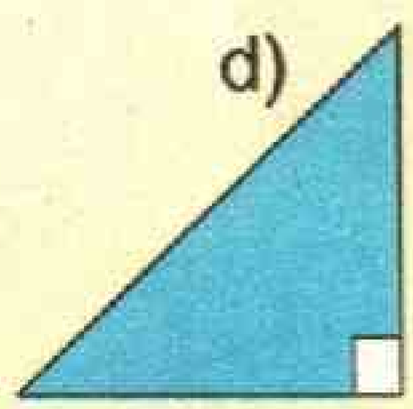
d)

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3. Draw a triangle ABC in which, $m\angle A = 75°$, $m\overline{AB} = 4$ cm and $m\angle B = 55°$.

4. Draw a triangle LMN in which, $m\angle L = 60°$, $m\overline{LM} = 5.5$ cm. And $m\angle M = 30°$.

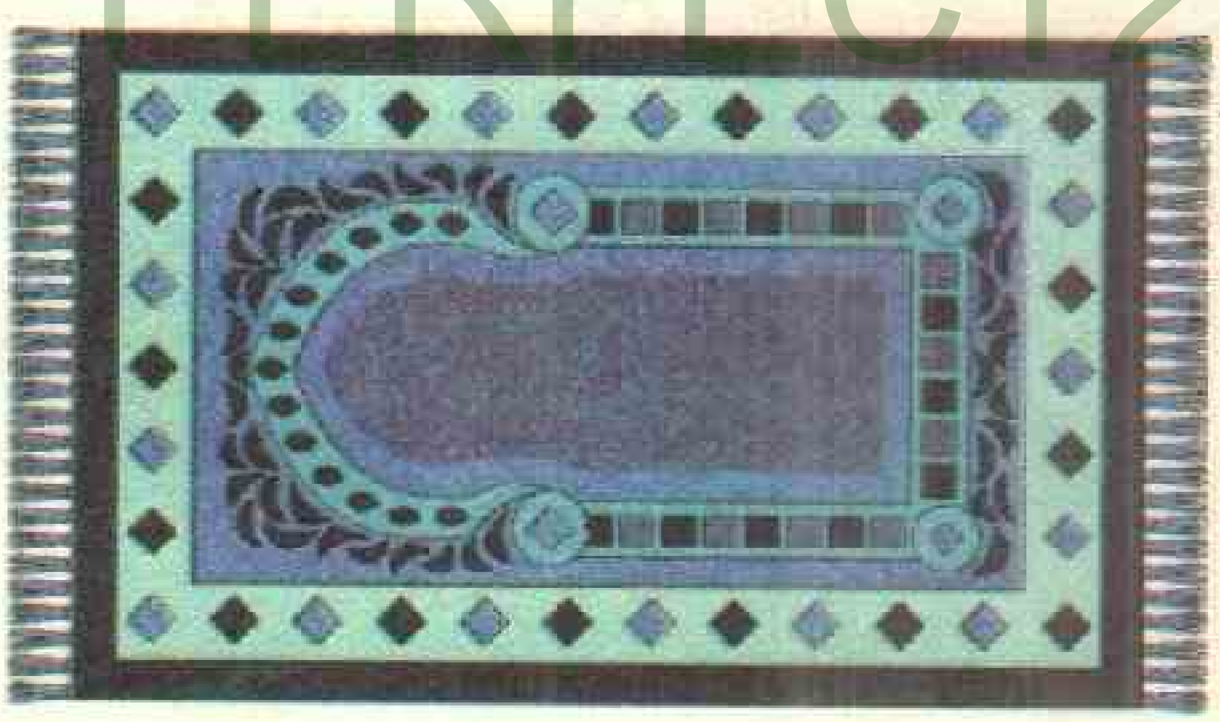
5. Draw a triangle JKL in which, $m\overline{KL} = 4$cm, $m\overline{JK} = 3.2$ cm and $m\angle JKL = 30°$.

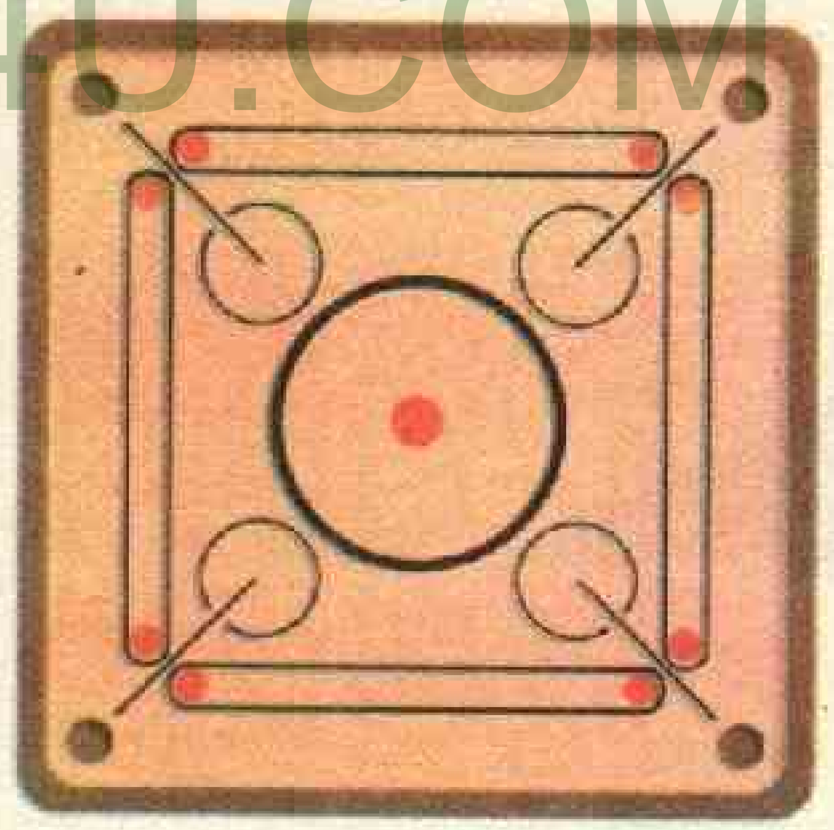
6. Draw a triangle XYZ in which, $\overline{YZ} = 7.3$cm, $\overline{XY} = 3.5$ cm and $\Delta XYZ = 40°$.

Measure the remaining angles and sides of triangle in Q. 3-6.

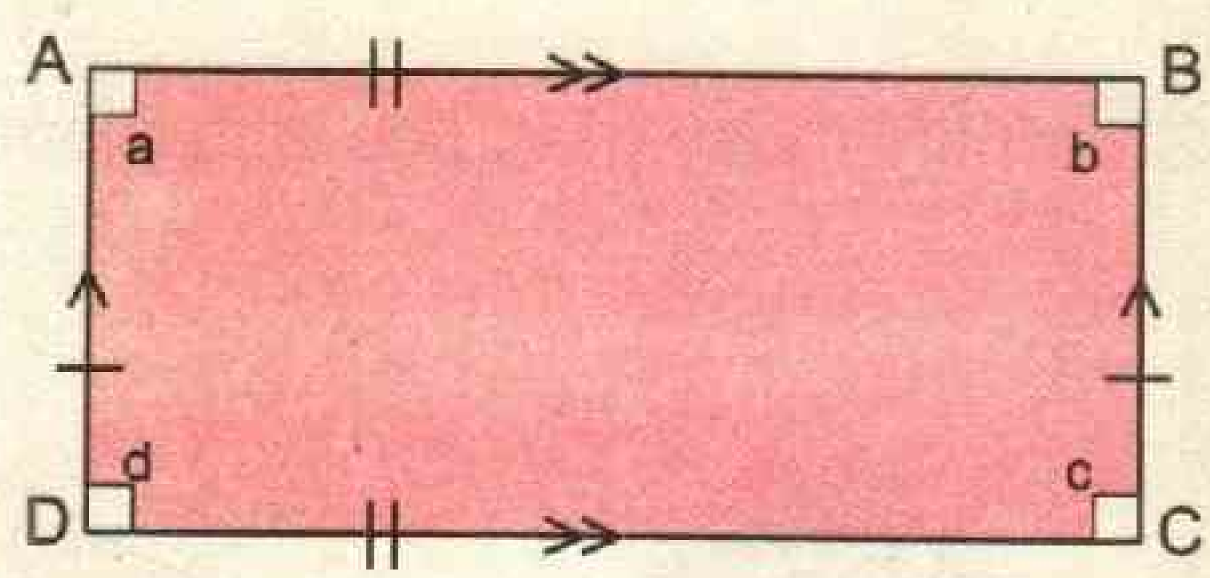
Quadrilaterals

There are various objects around us which have 4 sides. What do we call these shapes?





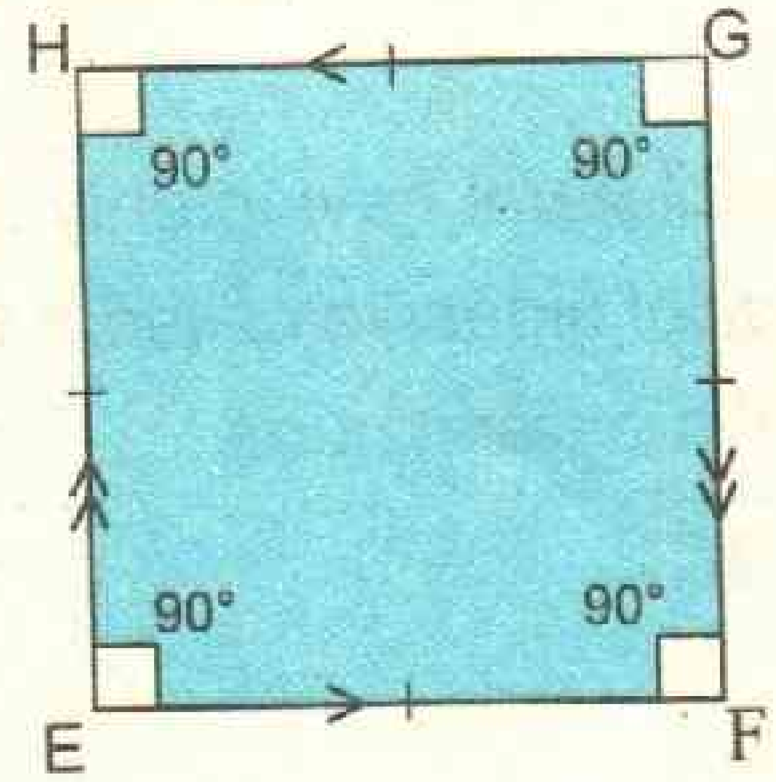
Shapes which have four sides and four angles are called quadrilaterals.



ABCD is a quadrilateral. $\overline{AB}$, $\overline{BC}$, $\overline{CD}$ and $\overline{DA}$ are its four sides. $\angle a$, $\angle b$, $\angle c$ and $\angle d$ are its four angles.

Types of Quadrilaterals

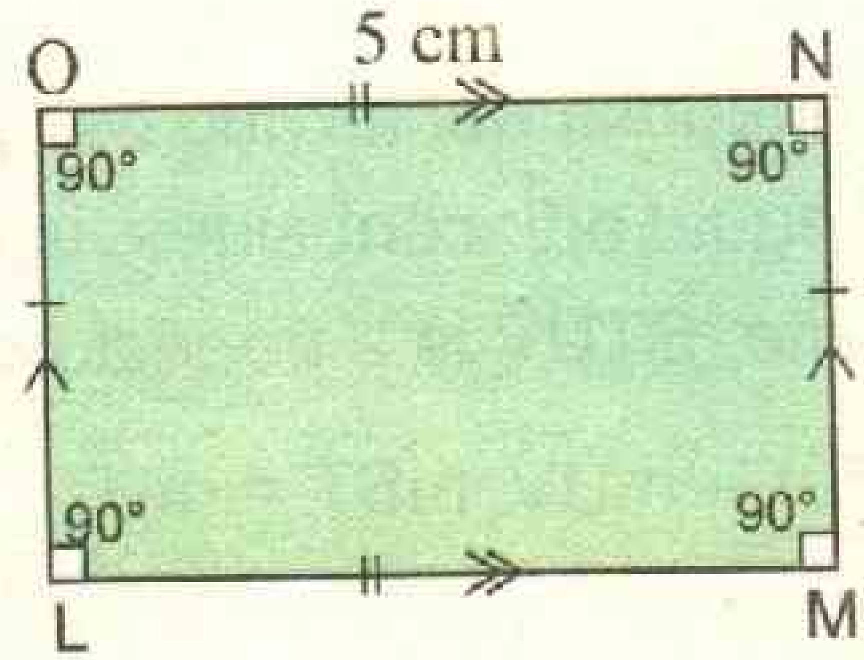
Square



A quadrilateral having four equal sides and four right angles is called a square. EFGH is a square.

$m\overline{EF} = m\overline{GH} = m\overline{EH} = m\overline{FG}$

Rectangle

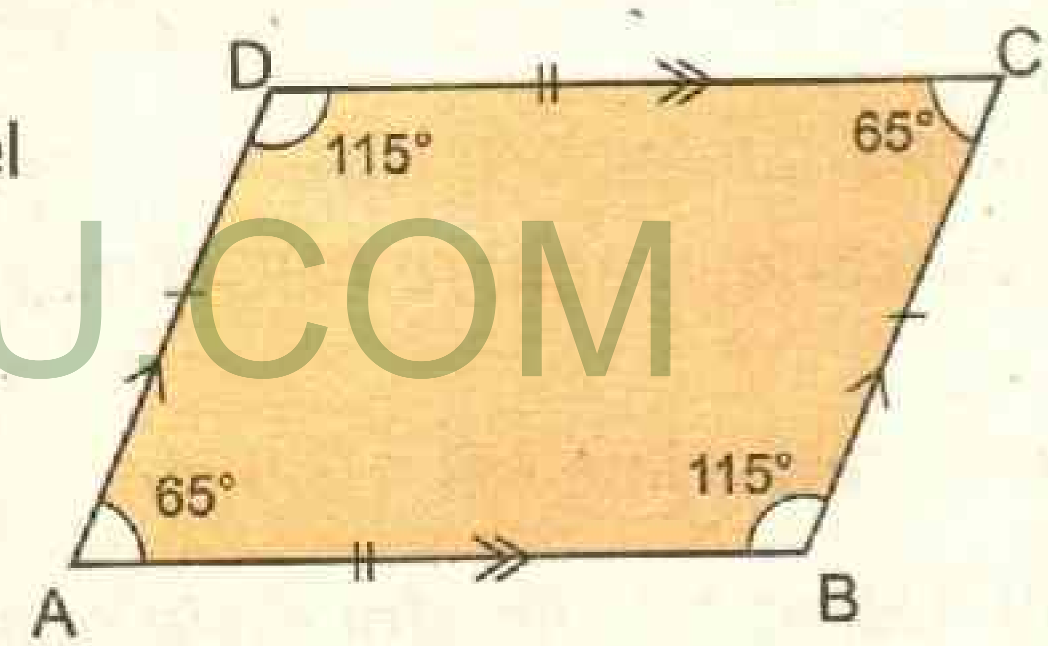


A quadrilateral having opposite sides equal in length is called a rectangle. All four angles are right angles in a rectangle.

$m\overline{LM} = m\overline{ON}$, $m\overline{LO} = m\overline{MN}$

$\overline{LM} \parallel \overline{ON}$, $\overline{LO} \parallel \overline{MN}$

Parallelogram



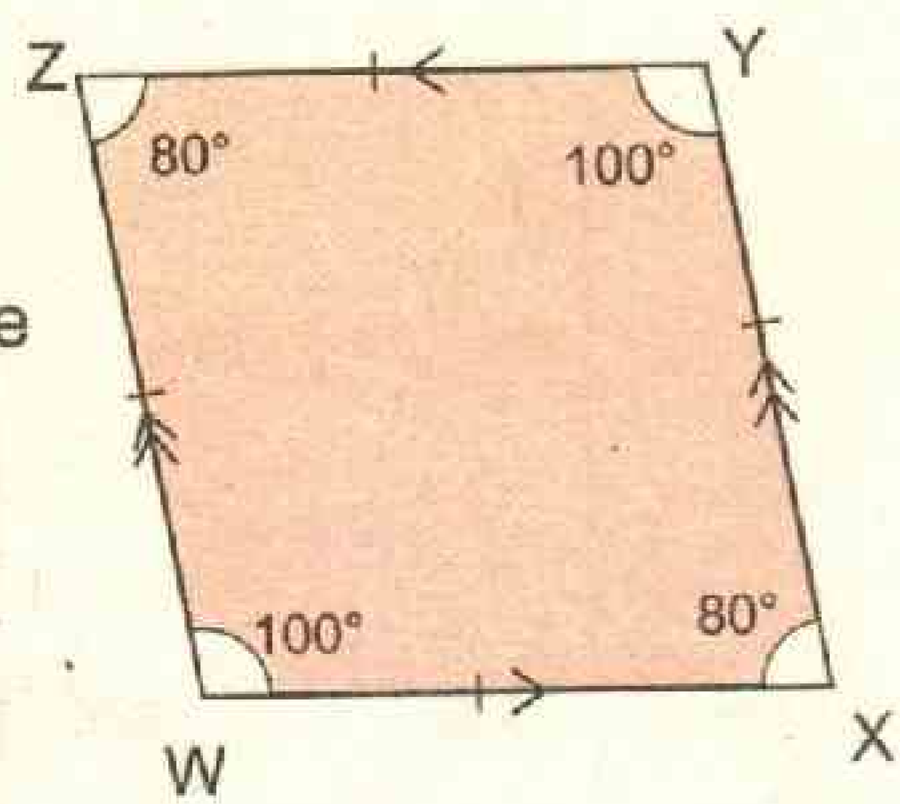
A quadrilateral with two pairs of opposite parallel sides and opposite equal angles, is called a Parallelogram. ABCD is a parallelogram.

$m\overline{AB} = m\overline{DC}$, $m\overline{AD} = m\overline{BC}$

$\overline{AB} \parallel \overline{DC}$, $\overline{AD} \parallel \overline{BC}$

$\angle A = \angle C$, $\angle B = \angle D$

Rhombus



A quadrilateral having all sides are equal and parallel, is called a rhombus. Opposite angles are equal but there is no right angle in rhombus. WXYZ is a rhombus.

$m\overline{WX} = m\overline{YZ}$, $m\overline{WZ} = m\overline{XY}$

$\overline{WX} \parallel \overline{YZ}$, $\overline{WZ} \parallel \overline{XY}$

$\angle X = \angle Z$, $\angle W = \angle Y$

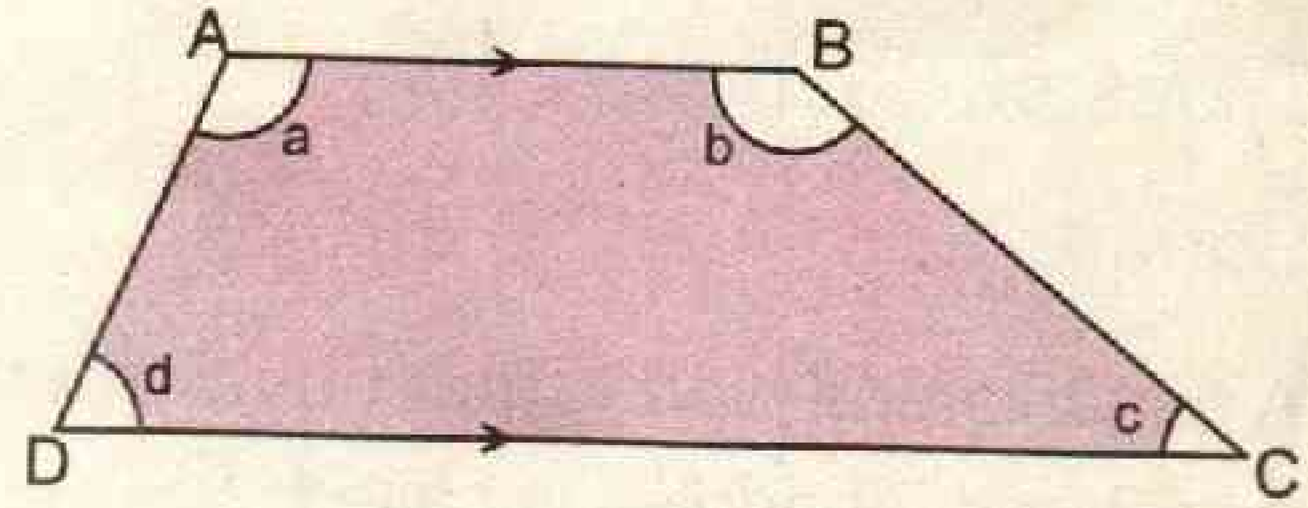
TEACHING POINT

Divide the student in groups. Ask each group to compare any two quadrilaterals and write their properties.

Trapezium

A quadrilateral having only one pair of parallel sides, is called a trapezium. ABCD is a trapezium.

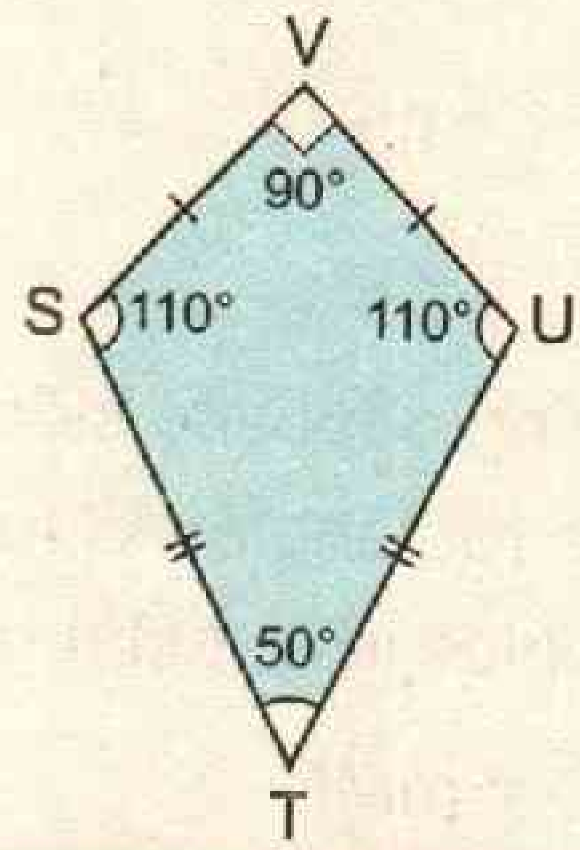
$\overline{AB} \parallel \overline{DC}$



Kite

A quadrilateral having two pairs of equal adjacent sides, is called a kite. STUV is a trapezium.

$m\overline{SV} = m\overline{UV}$, $m\overline{ST} = m\overline{UT}$



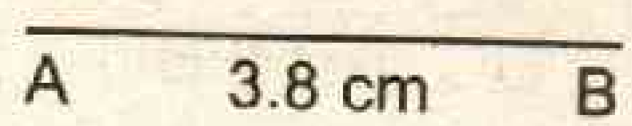
Construction of a Square and a Rectangle

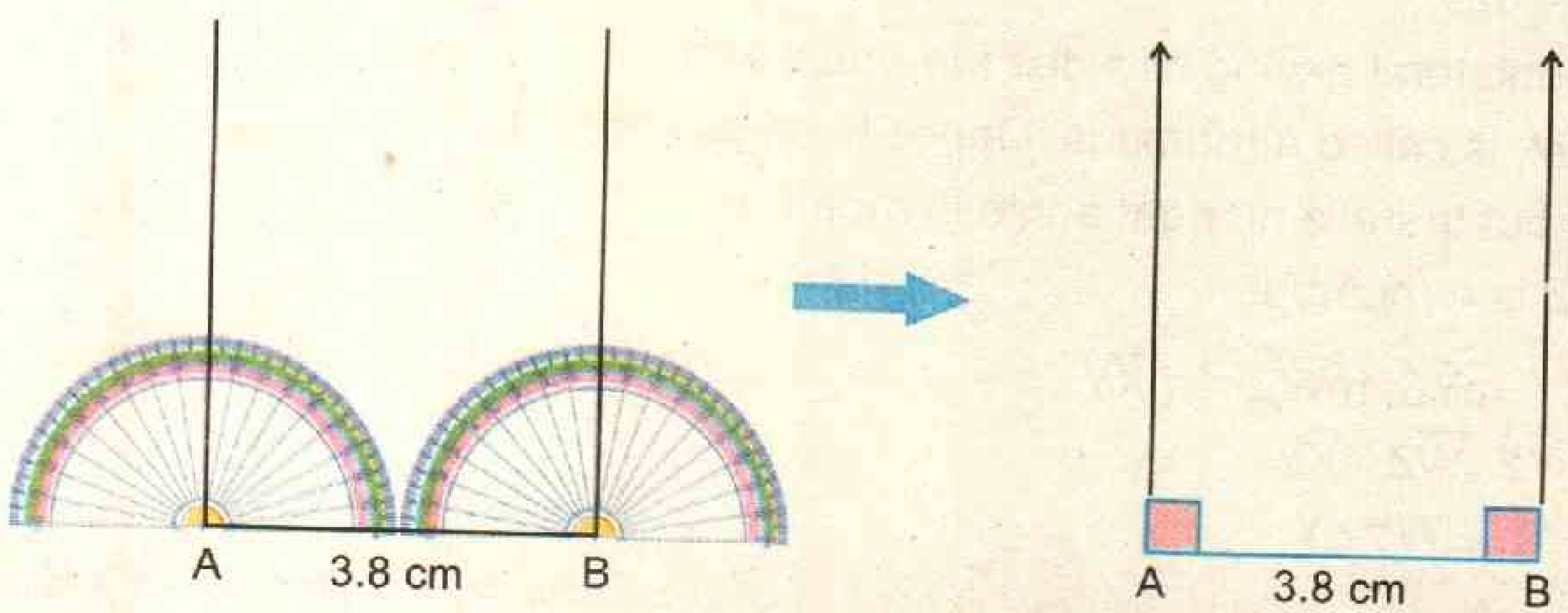
Construction of square

Construct a square ABCD that has length of a side 3.8 cm.

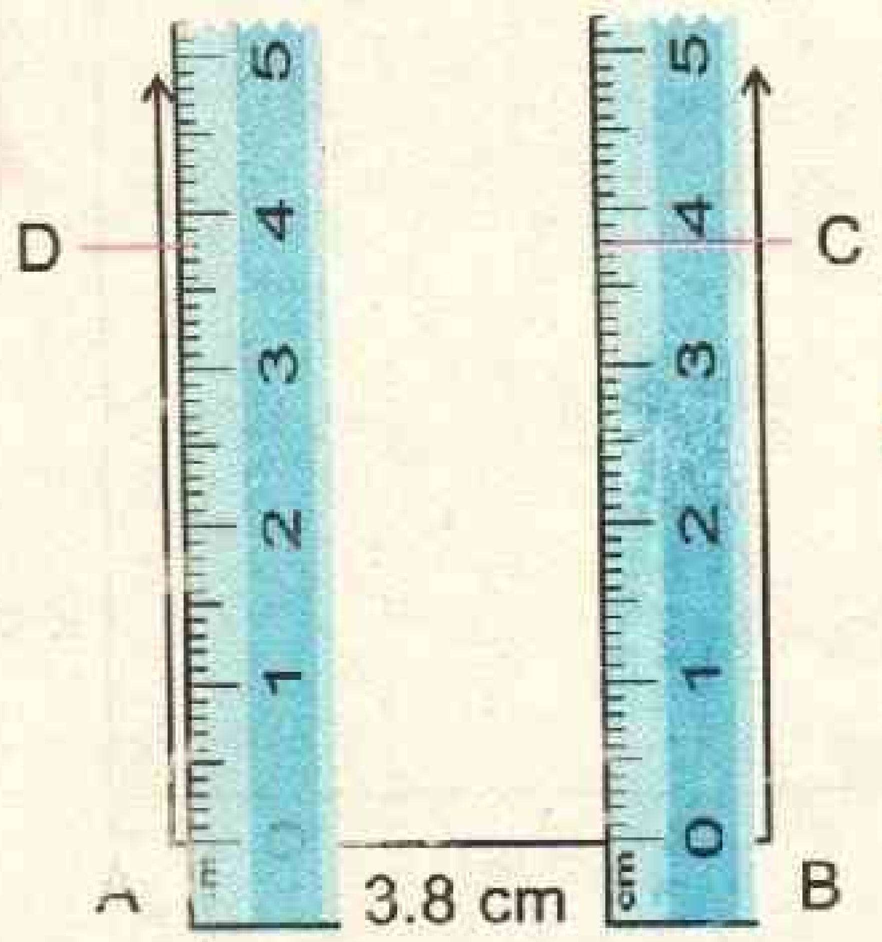
i) Draw a line $\overline{AB}$ = 3.8 cm.

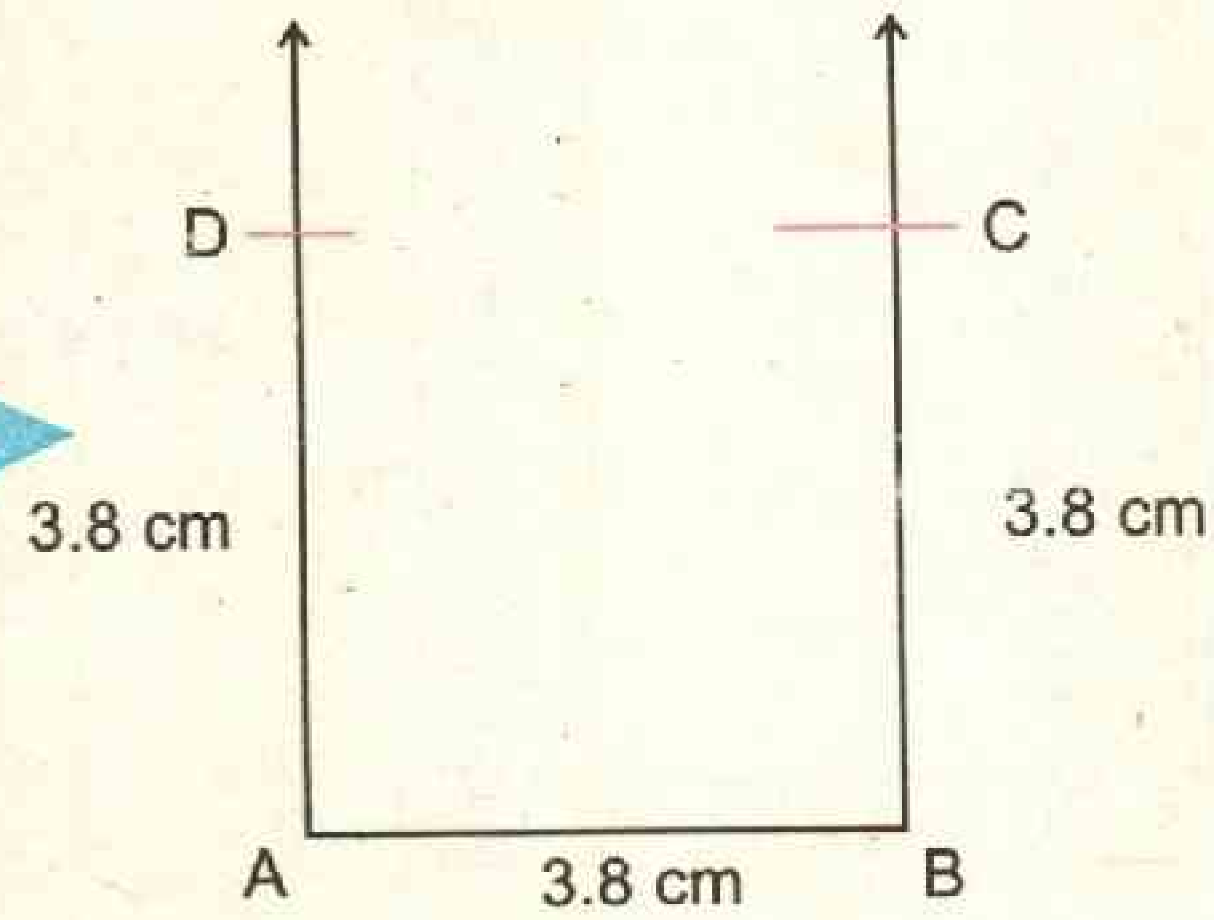
ii) Using a protractor draw right angles at point A and B.

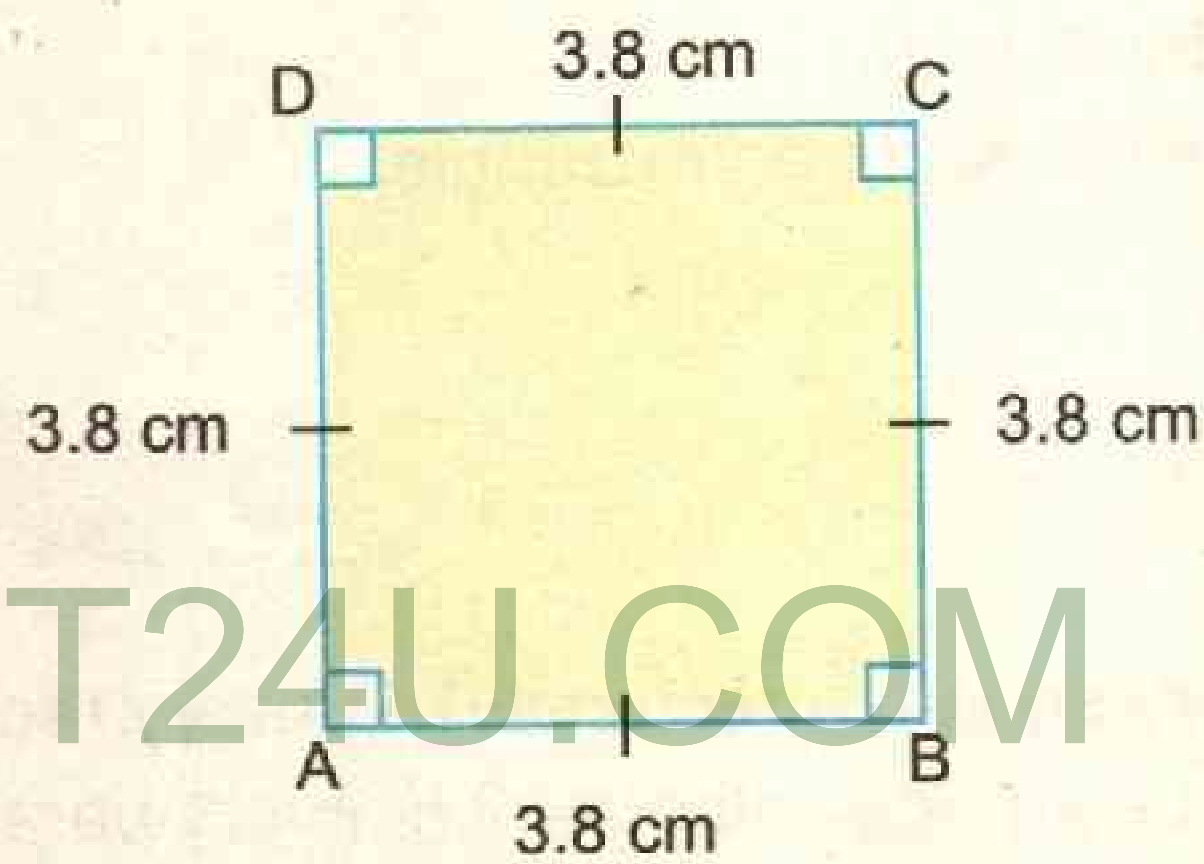




iii) Mark points D and C such that $m\overline{AD} = m\overline{BC} = 3.8$ cm.







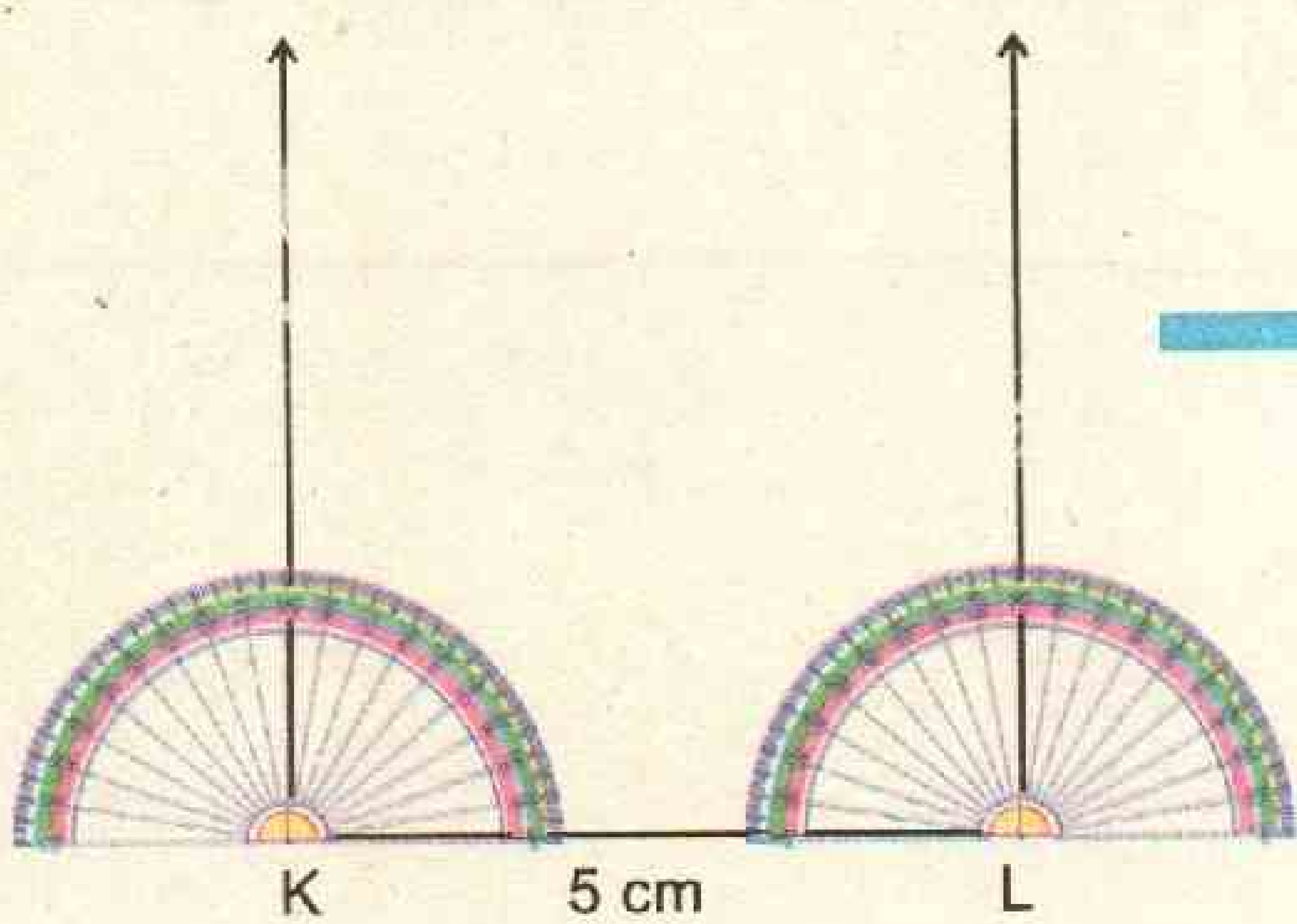
iv) Joing point C to D
ABCD is the required square.

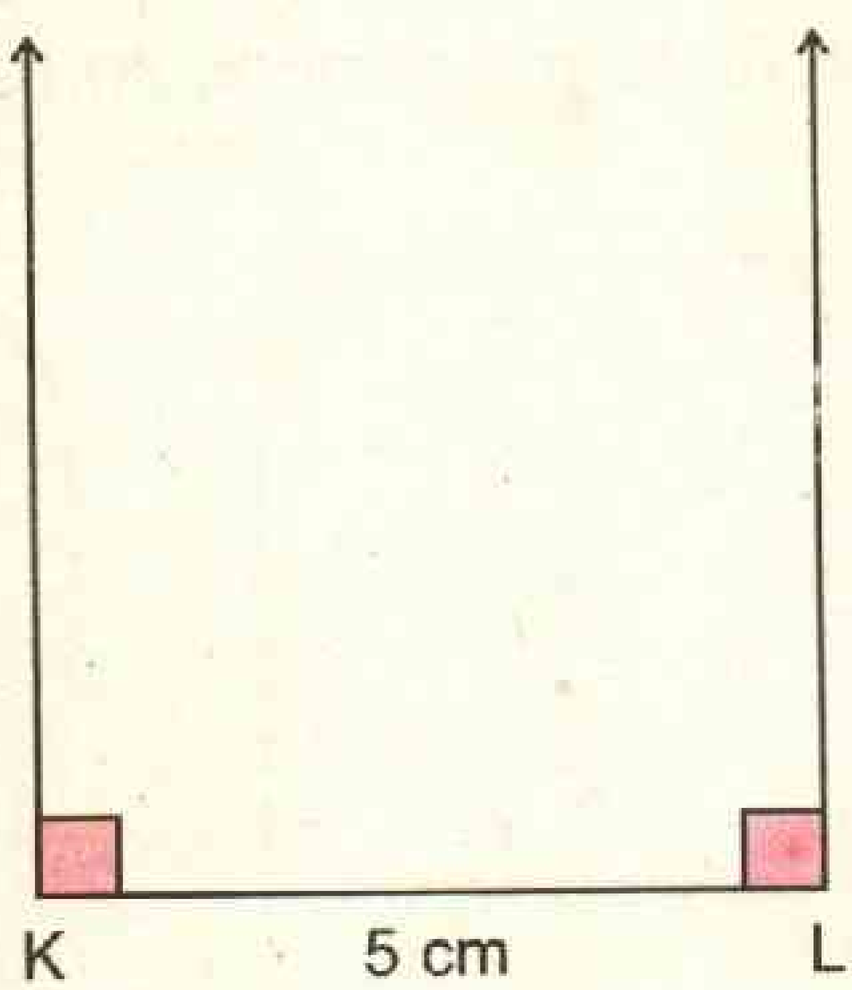
Construction of a rectangle

Construct a rectangle KLMN whose length is 5 cm and width is 2 cm.

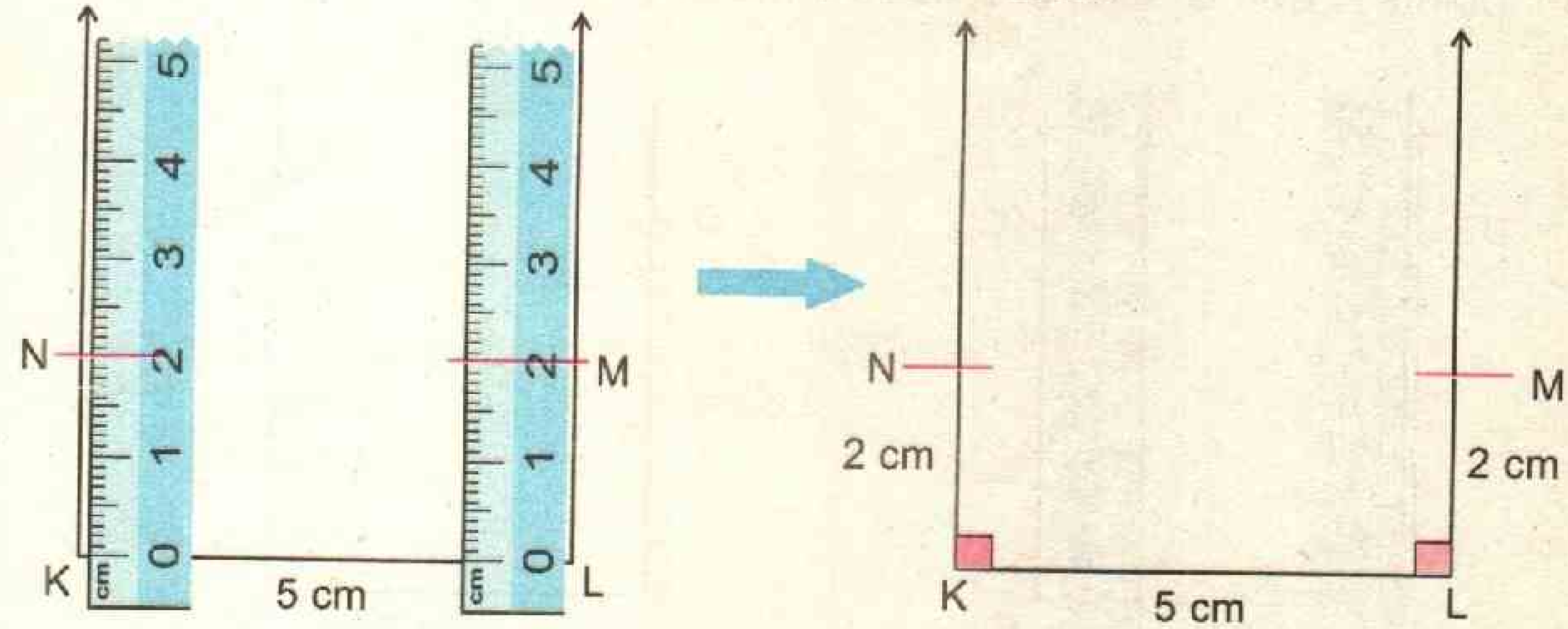
i) Draw a line $m\overline{KL} = 5$ cm.

ii) Using a protractor draw 90° angles at point K and L.

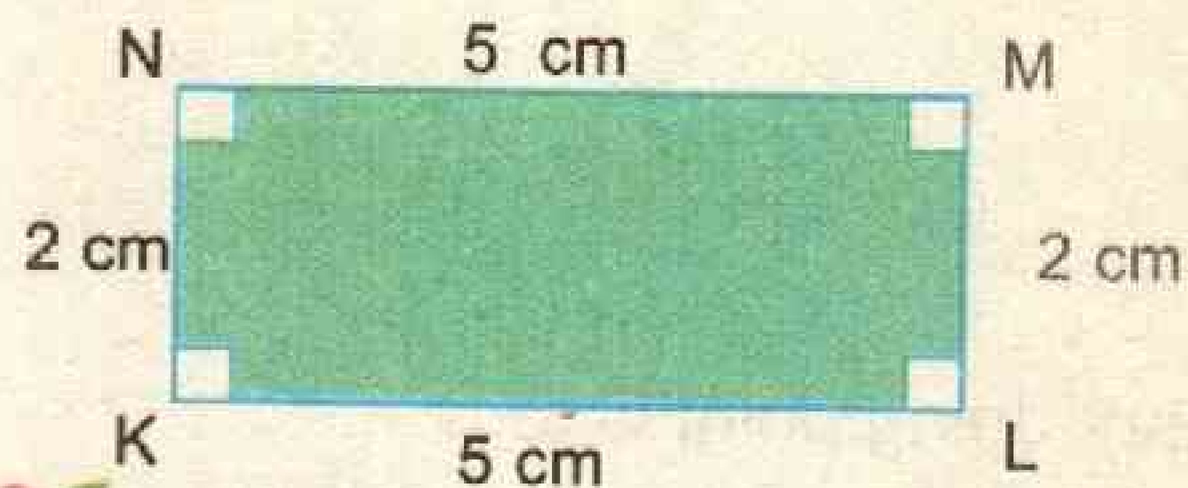




Mark points M and N such that $m\overline{LM} = m\overline{KN} = 2cm$.



Join point M to N.
KLMN is the required rectangle.

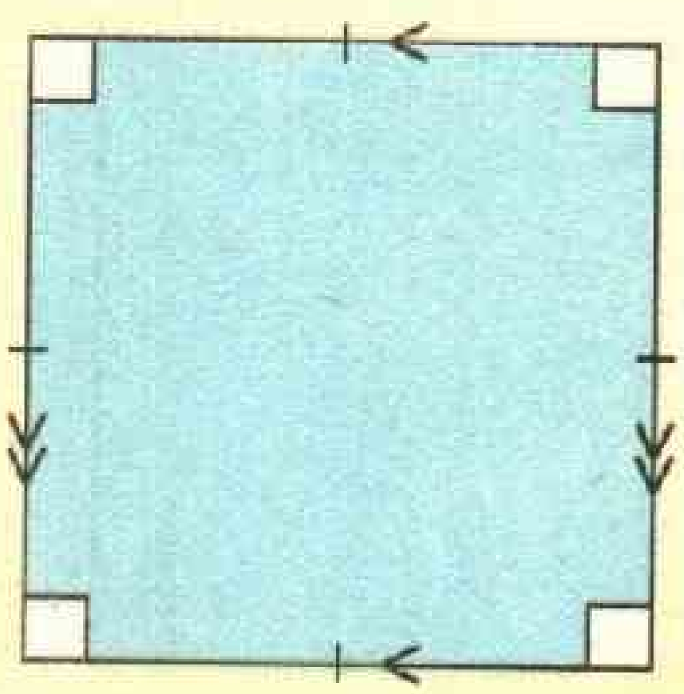


Try It! Challenge

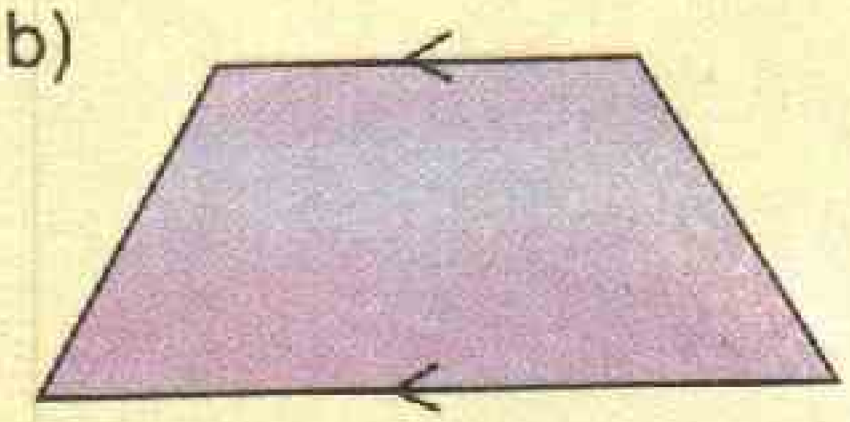
Is every square a rectangle? Is every rectangle a square? Is every Rhombus a parallelogram? Is every parallelogram a rhombus? Explain your answers.

Exercise 3

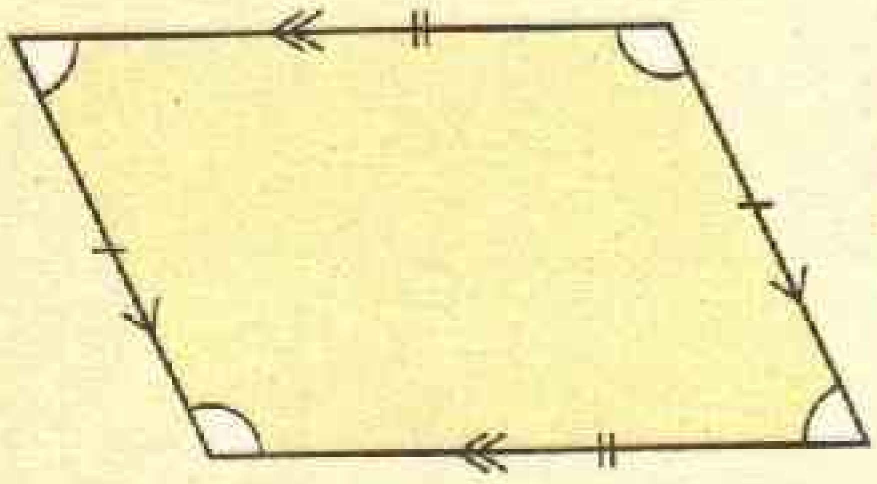
1. Label the following quadrilaterals and describe at least two properties of each (in terms of sides and angles).

a) 

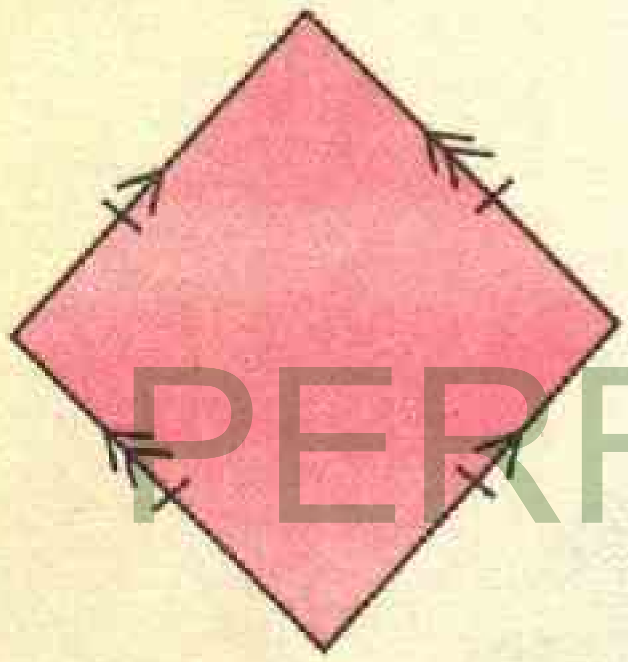
b)



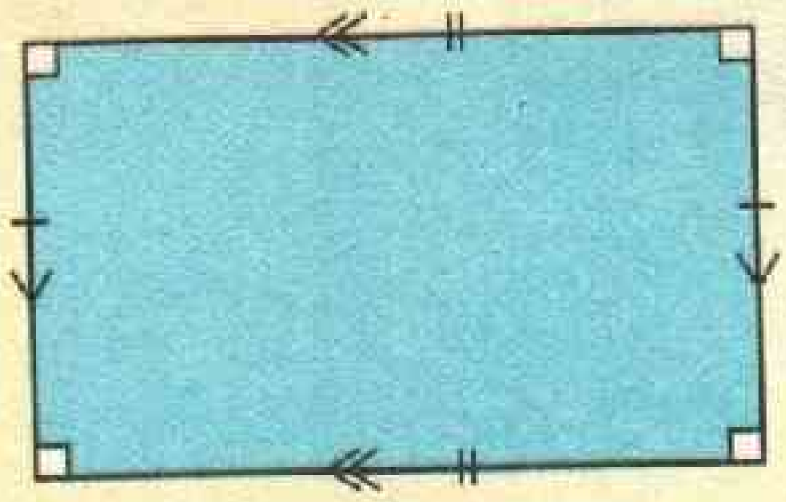
c)



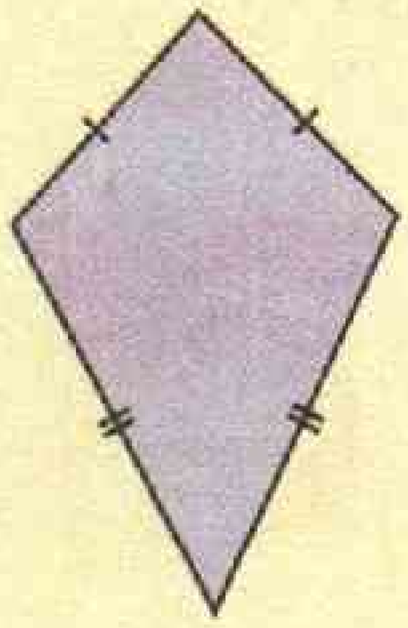
d)



e)



f)



2. Draw squares with to the given lengths using of protractor and ruler.

a) 3.4 cm b) 5 cm c) 7.2 cm d) 4 cm

e) 6.3 cm f) 5.5 cm g) 8.9 cm h) 3.3 cm

3. Draw rectangles using protractor and ruler with the given lengths and widths.

a) 7 cm, 5 cm b) 8 cm, 4.4 cm

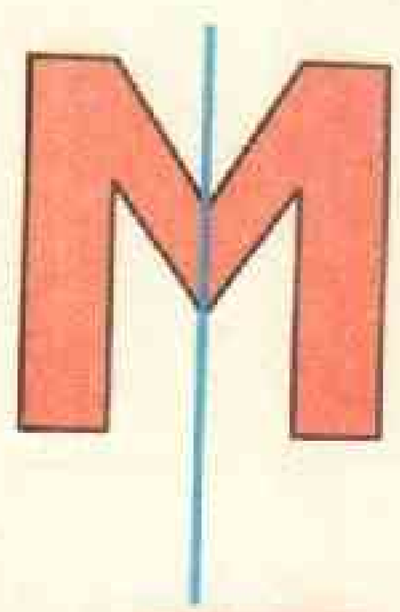
c) 6.6 cm, 3.4 cm d) 8.5 cm, 5 cm

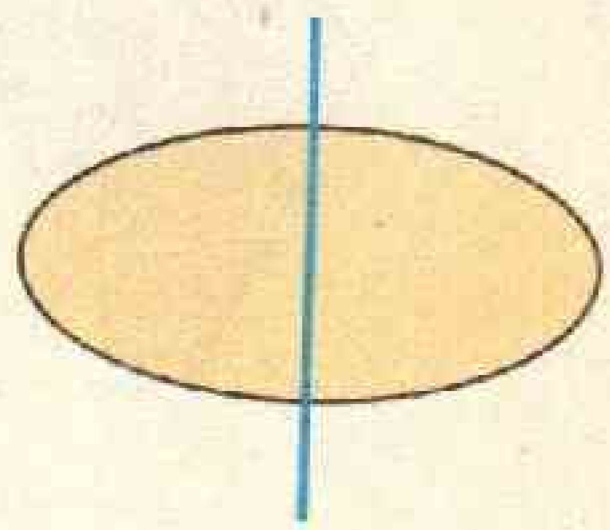
e) 6 cm, 3.2 cm f) 9 cm, 5.2 cm

Symmetry

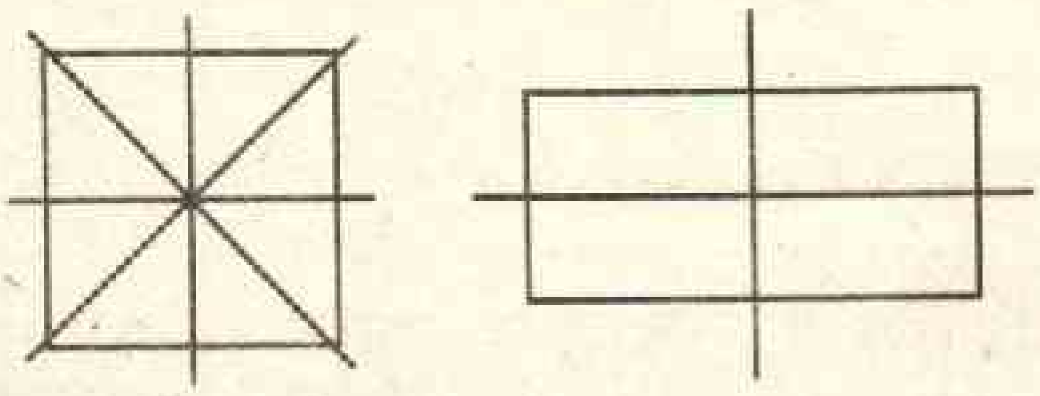
I have two different types of leaves printed on my notebook. I have observed that the left and right sides of the leaves are exactly the same. If we will fold the leaf about the mid way one half, it will exactly fit the other half.

Observe these figures. They have reflective symmetry in them. The blue line is the line of symmetry which is dividing the shapes in two parts.



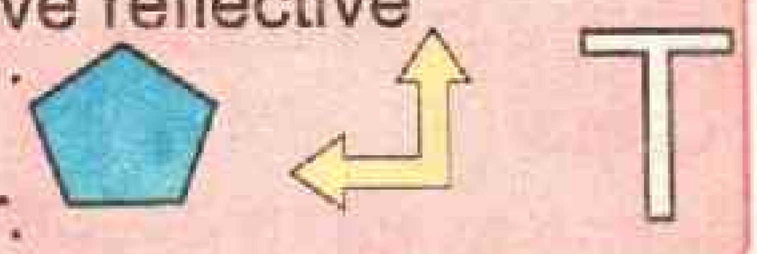


The symmetry of figure about its line of symmetry may be tested by folding it along that line. If the figure is symmetrical, the part to the left of the line will fit exactly on to the part of right of the line and vice versa. This is called reflective symmetry. A figure may have more than one line of symmetry for example a square has four lines of symmetry and the rectangle has two lines of symmetry.



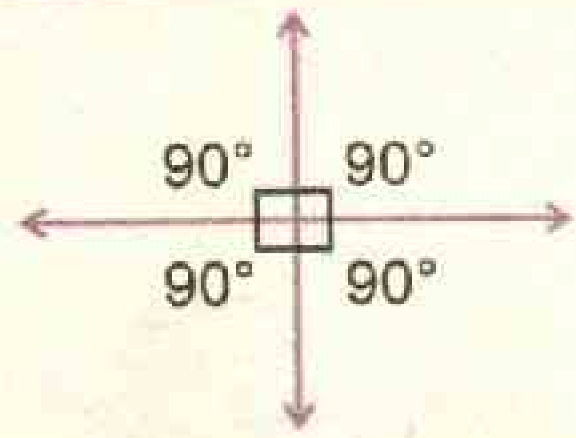
Try Yourself

Does the shapes have reflective symmetry?
Explain your answer.

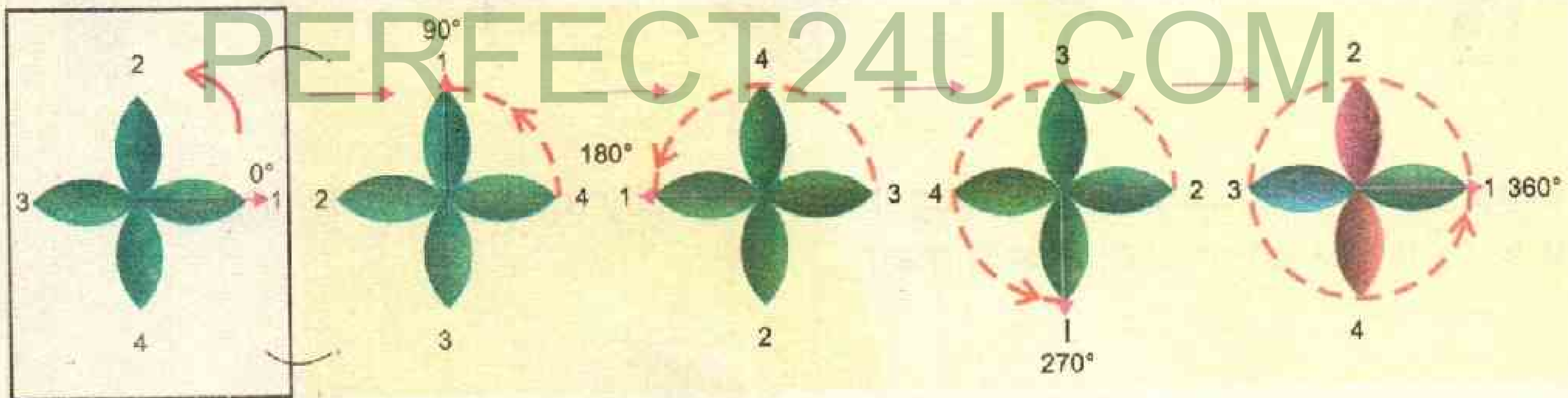


Apart from reflective symmetry, there is another type of symmetry which is called a rotational symmetry.

A complete revolution has 4 rotations of 90°.



Let's observe this shape.

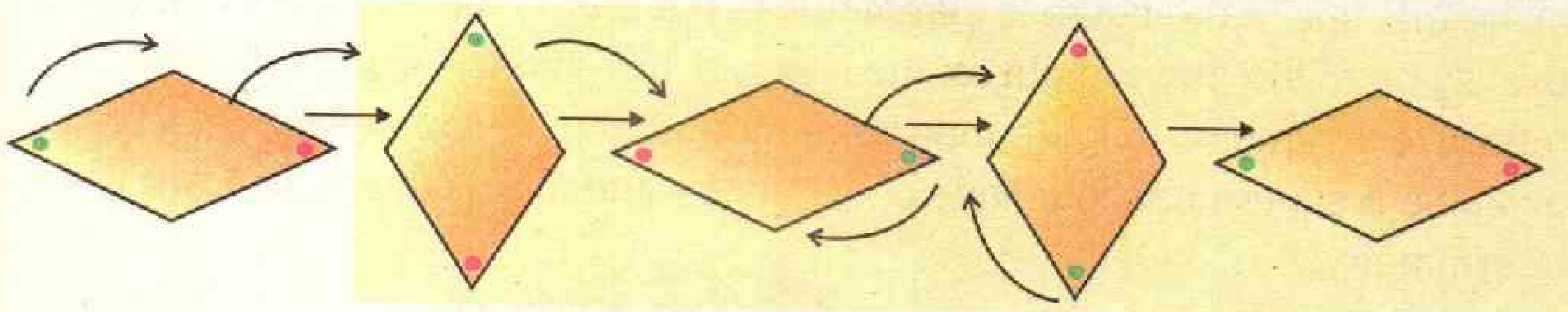


We can see that when it is rotated around its center at an angle of 90° looks exactly the same 4 times. It mean it has a rotational symmetry and the order of its rotational symmetry is 4.

Key Fact

The number of times a shape looks exactly the same is called the order of its rotational symmetry. The center of the shape is called the center of rotation.
A figure will have rotational symmetry if it is rotated about its a center point and looks exactly the same, at least two times during the full rotation.

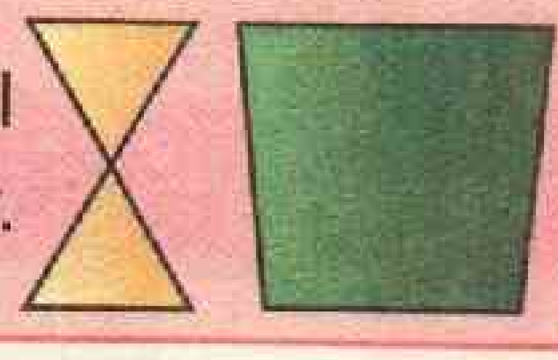
Now observe at the following figures.



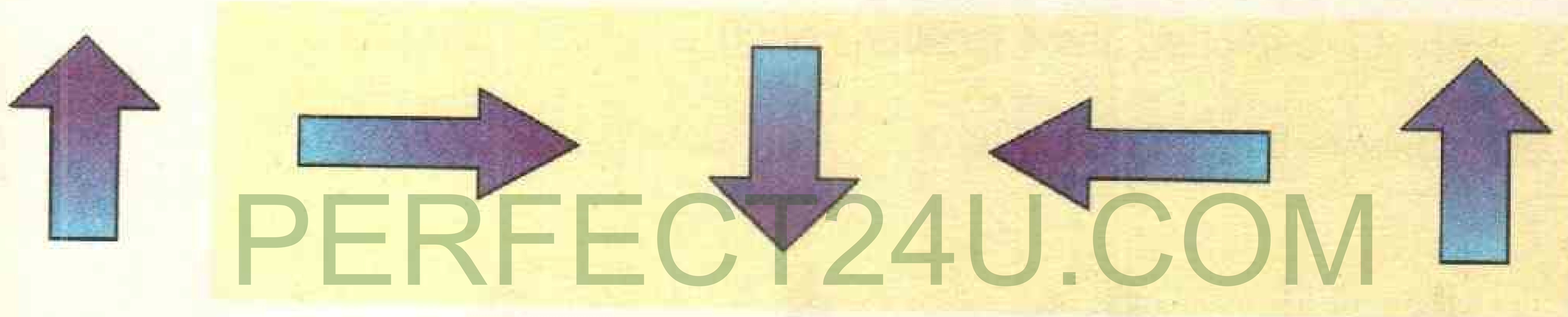
We can see that when the shape is rotated about its center, it looks exactly the same twice. It means it has a rotational symmetry of order 2.

Try Yourself

Do these shapes have rotational symmetry? Explain your answer.



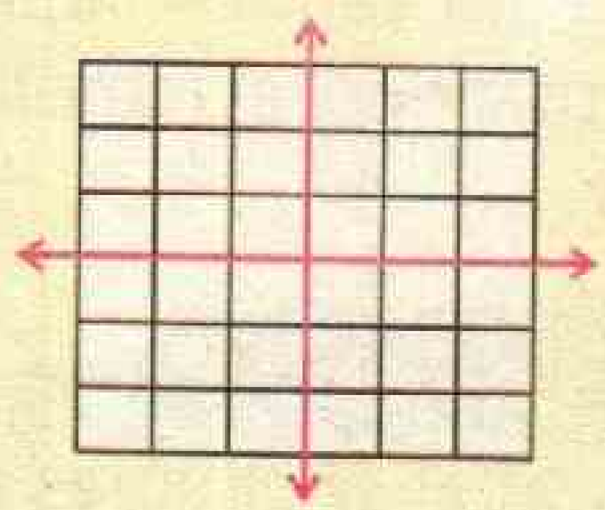
Look at the following.



When its rotated about its center, it looks exactly the same only once. It means it has no rotational symmetry.

Try It!

Colour the given boxes in such a way that the shape becomes symmetrical along the horizontal and vertical lines.

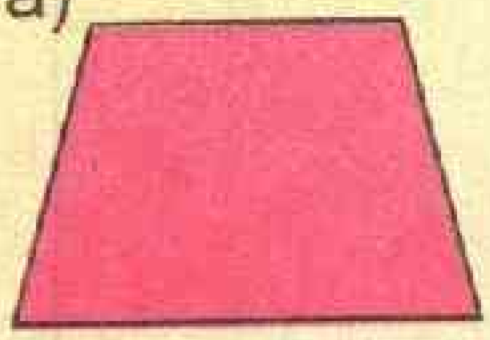


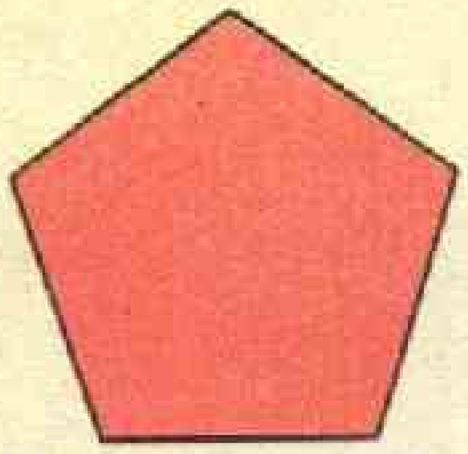
TEACHING POINT

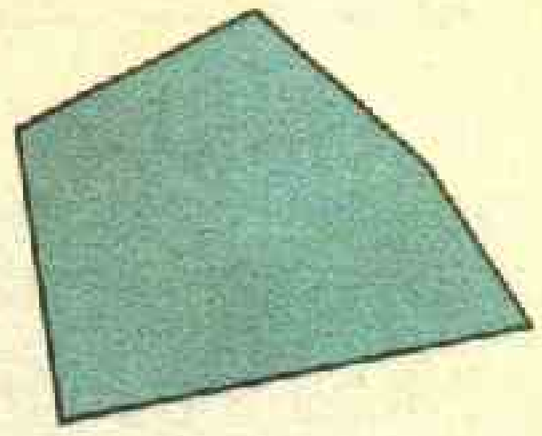
Ask the students to cut different shapes using a cardboard. Then ask them to identify shapes with reflective symmetry and rotational symmetry.

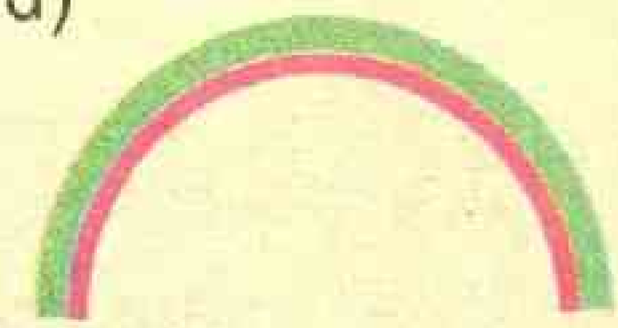
Exercise 4

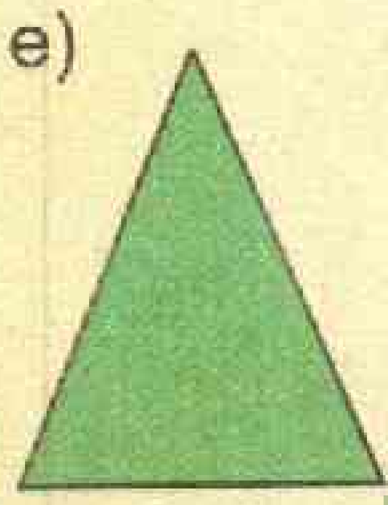
1. Circle the figures which have reflective symmetry. Also draw their line of symmetry.

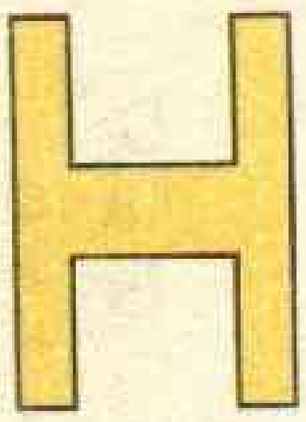
a) 

b) 

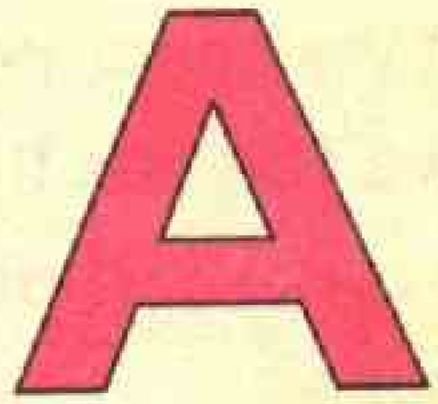
c) 

d) 

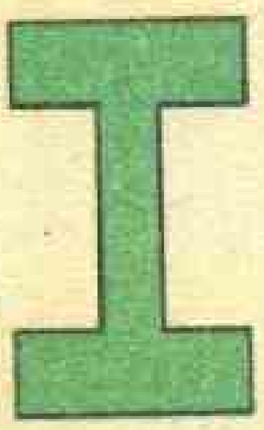
e) 

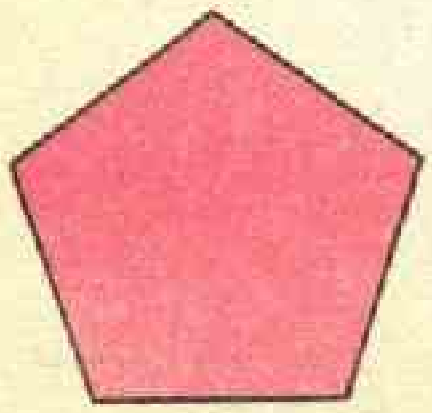
f) 

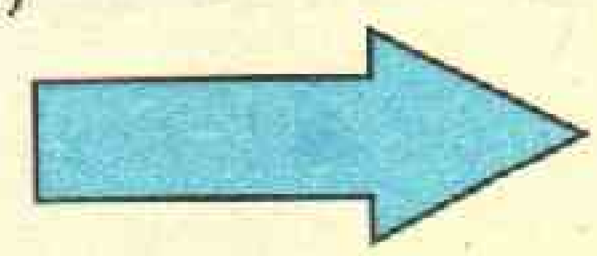
g) 

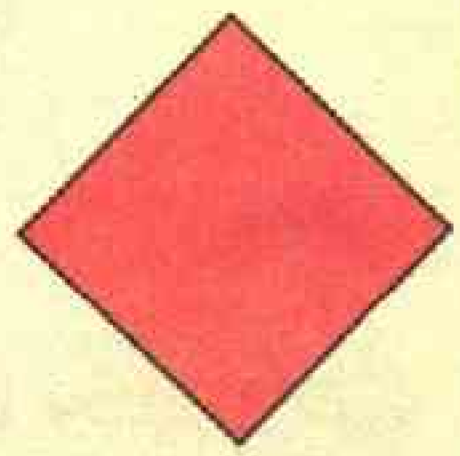
h) 

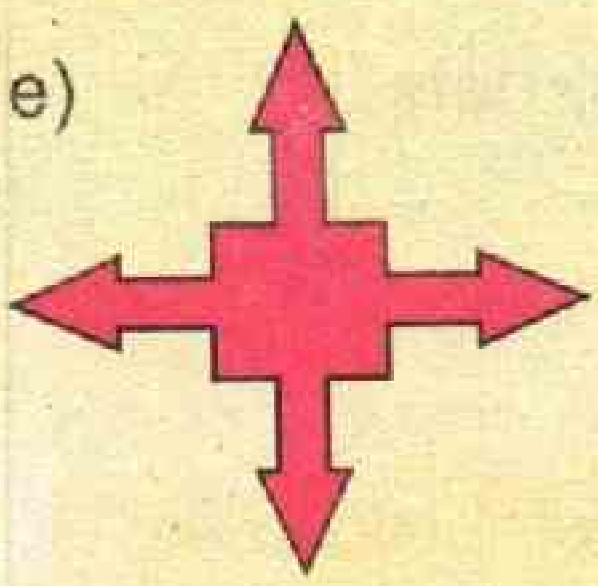
2. Circle the figures having rotational symmetry. Also write the order of their rotation and mark their center of rotation.

a) 

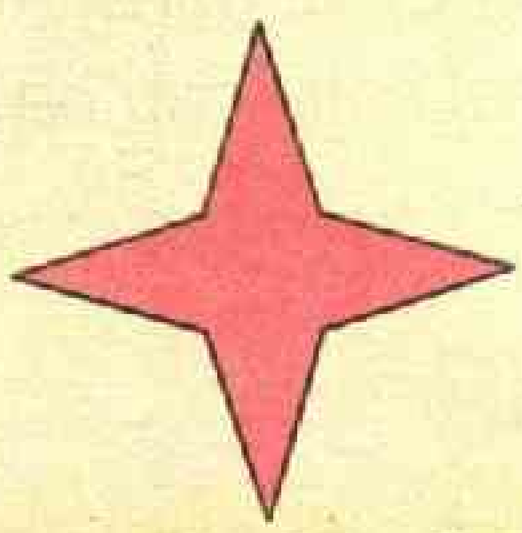
b) 

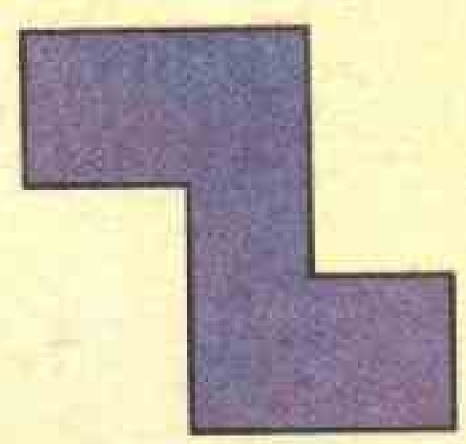
c) 

d) 

e) 

f) 

g) 

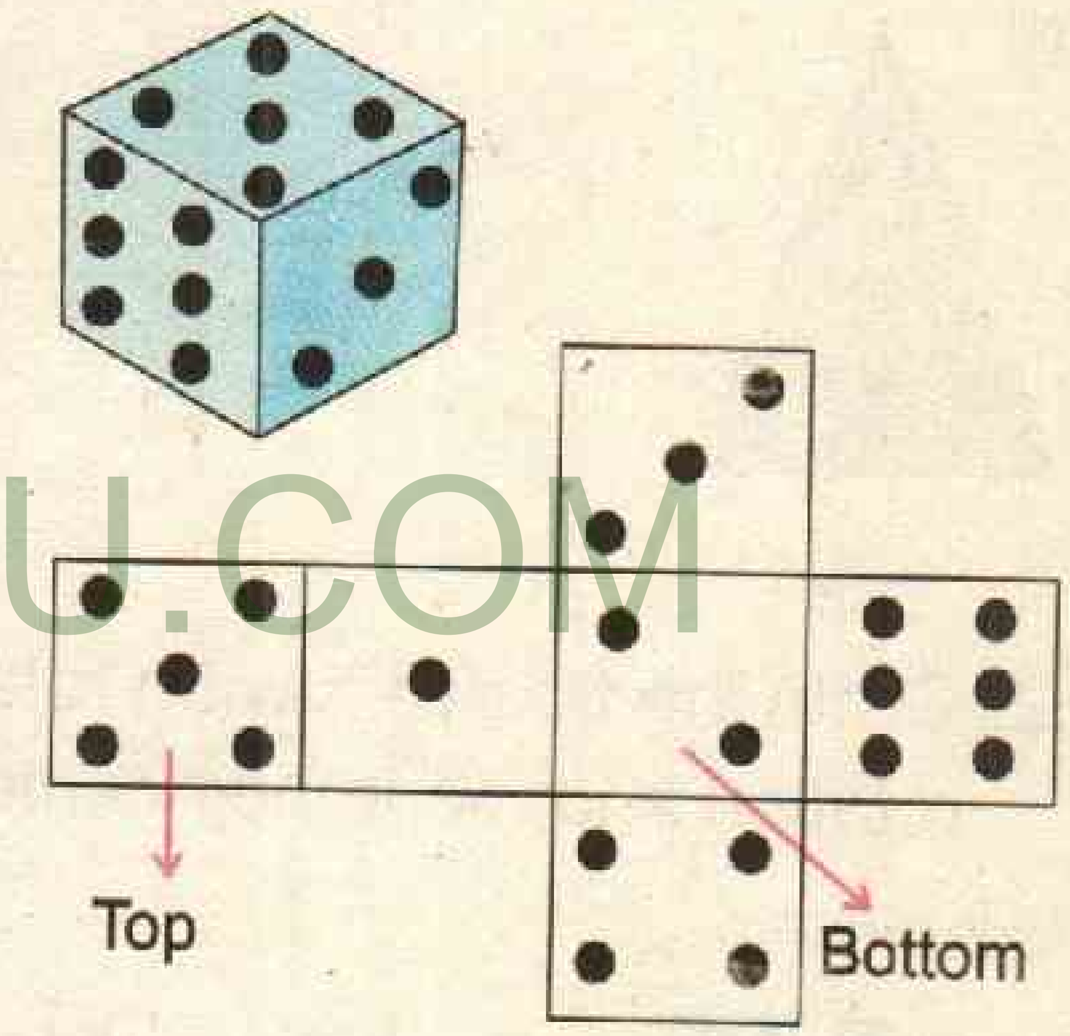
h) 

Nets of 3-D Shapes

I want to make a dice by using a cardboard to play with my friends. How can I make it?

Dice is a cube which is a three dimensional solid shape. All three dimensional solids are made up of different two-dimensional shapes.

If we separate all the sides of a cube, then we can see that it is made up of 6 similar squares. These squares make the net of a cube.



We can see that dice is a three-dimensional shape which can be unfolded in a specific pattern to get 6, two-dimensional surfaces.

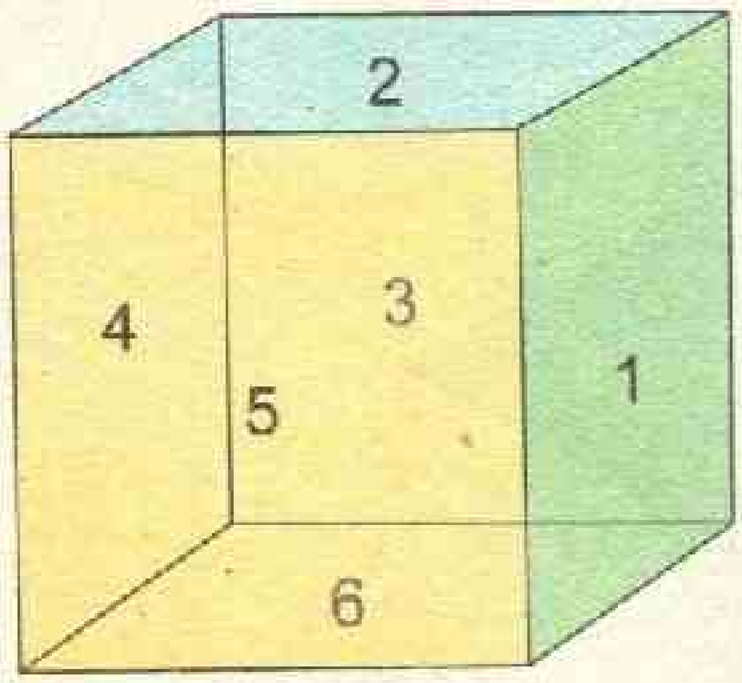
Key Fact

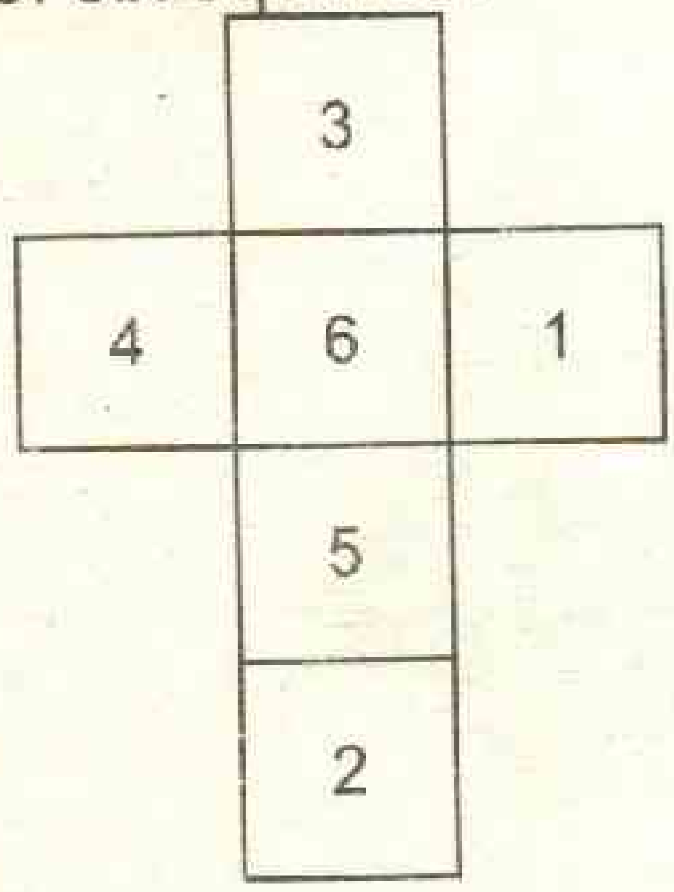
- A net is a two dimensional shape which can be folded in a specific pattern to get a three dimensional solid.
- Three dimensional solid can have more than one possible nets.

Try Yourself

Make at least three to four solid shapes and describe their properties.

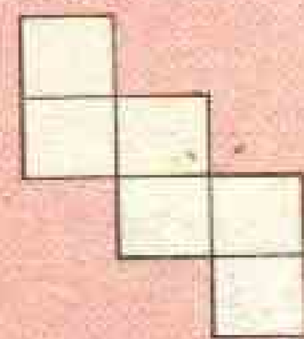
Look at the given figures. On the left side there is a cube and on the right side there is the net of the cube. It is made up of six squares.

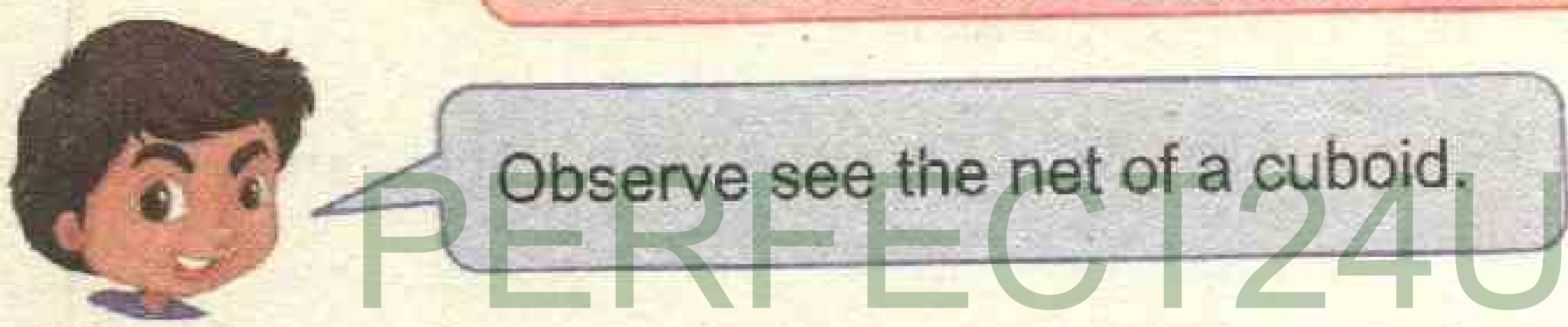




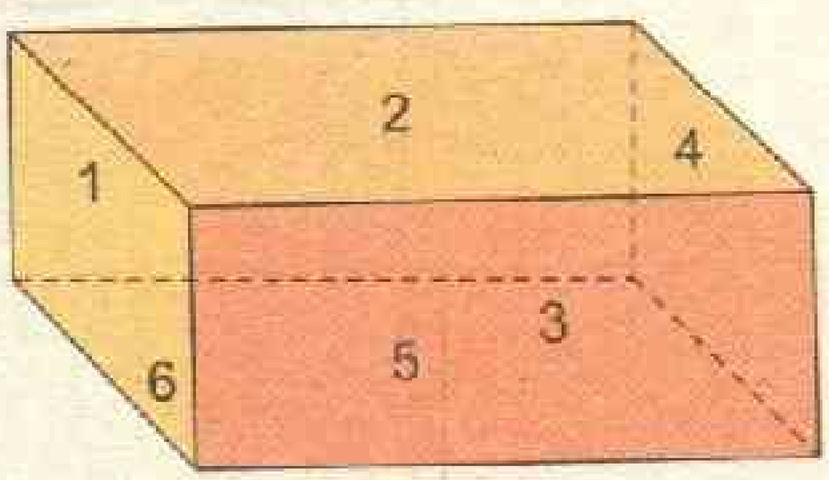
Try Yourself

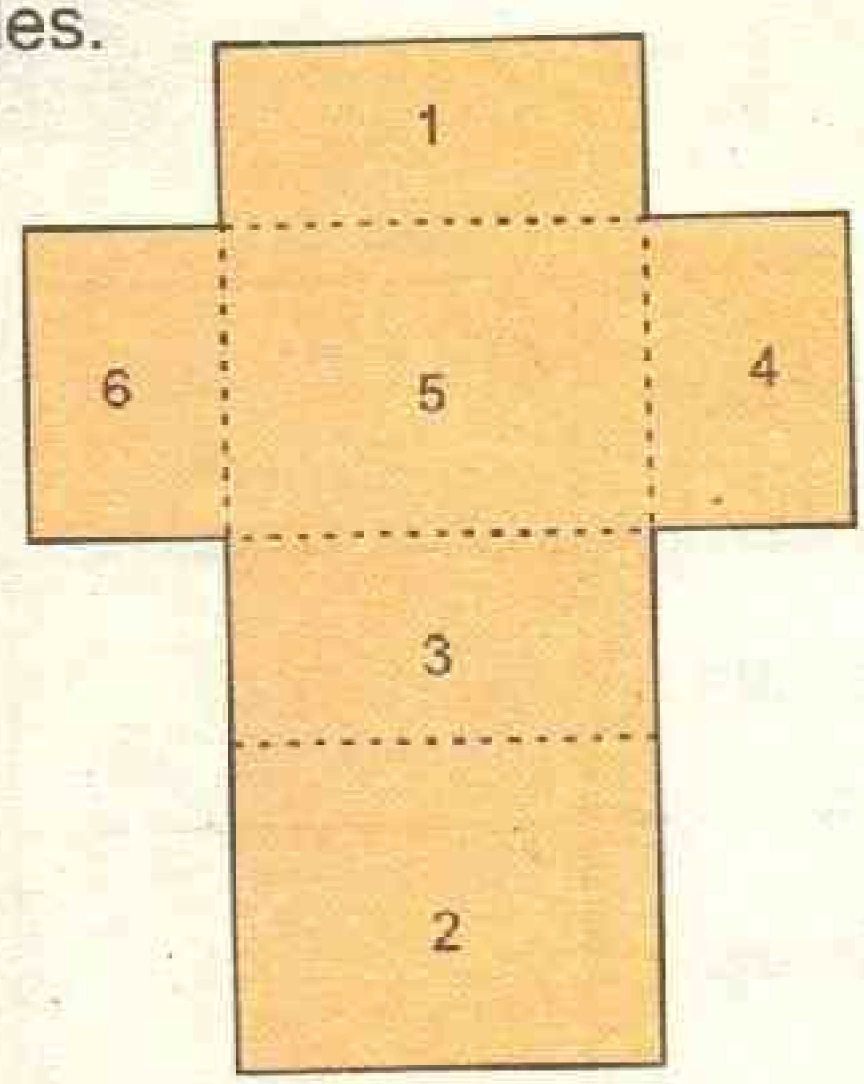
Tell if the given net is the net of a cube or not?





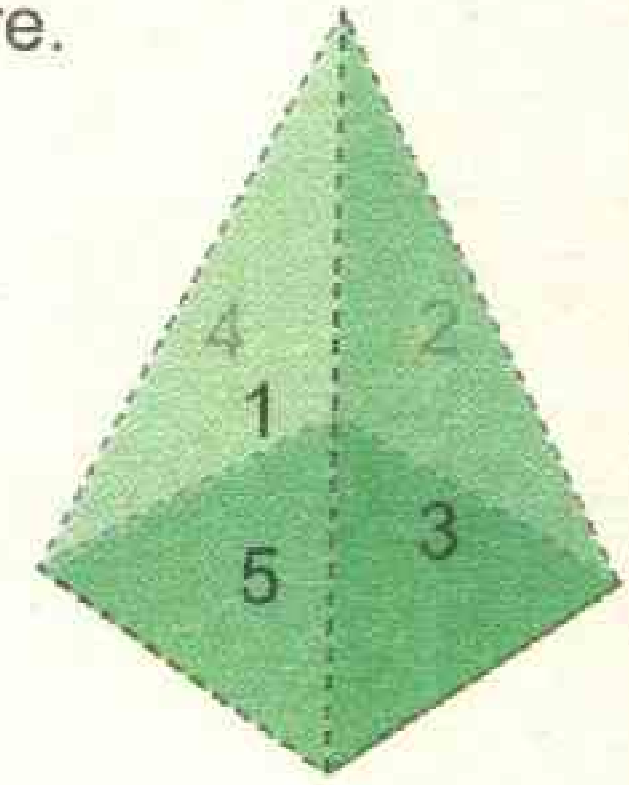
On the left side, there is a cuboid and on the right side there is the net of the cuboid. It is made up of six rectangles.

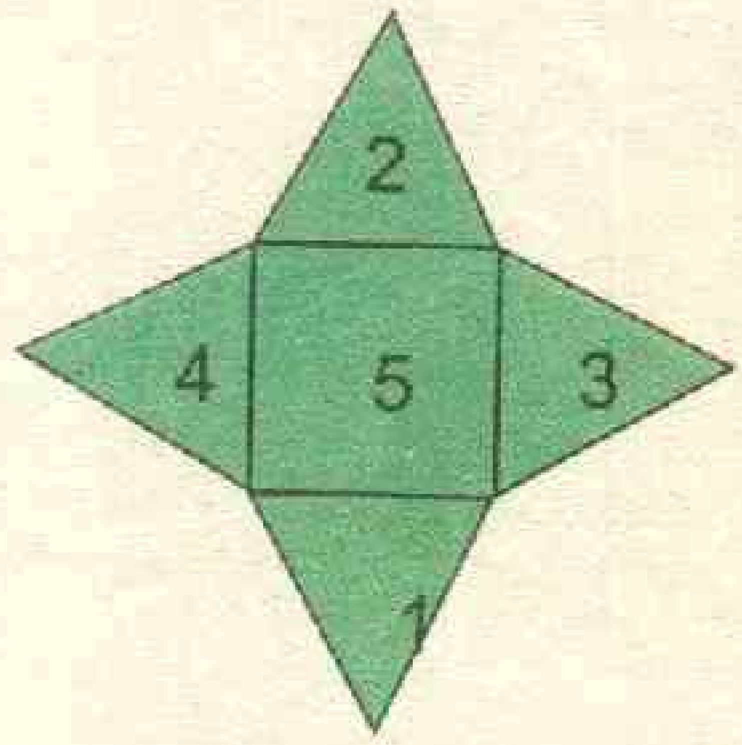




Divide the students into groups and provide them papers in different colours. Ask them to cut these papers to make three dimensional solids and observe their nets.

Look at the given figure. On the left there is a square based pyramid and on the right there is the net of the pyramid. It is made up of four triangles and one square.

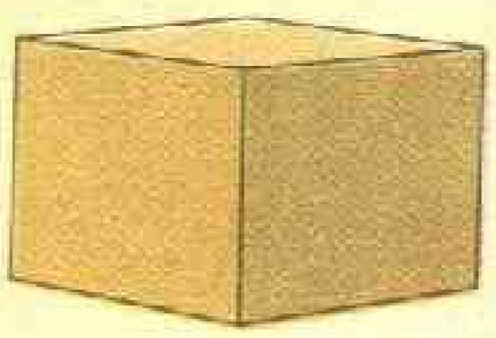




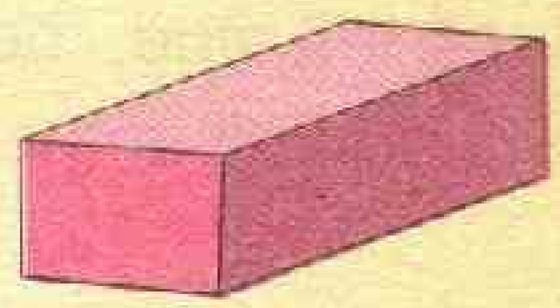
Net of a square pyramid

Exercise 5

1. Write the names of these figures. Also write the number of faces and identify the shape of the faces.

a) 

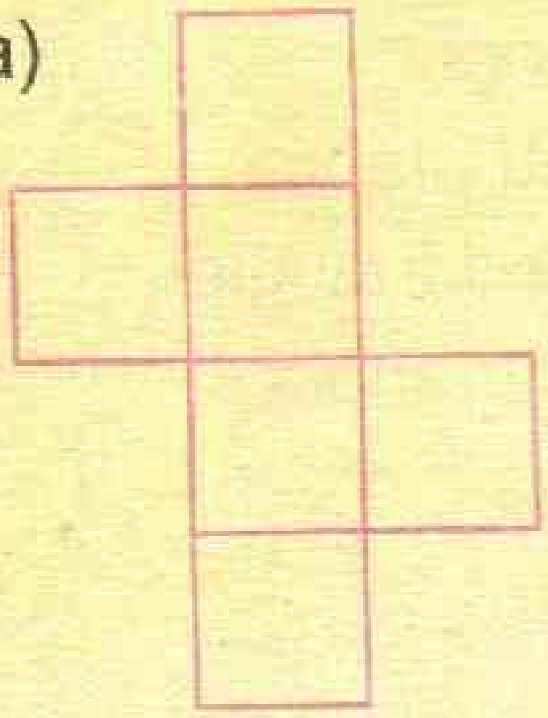
b) 

c) 

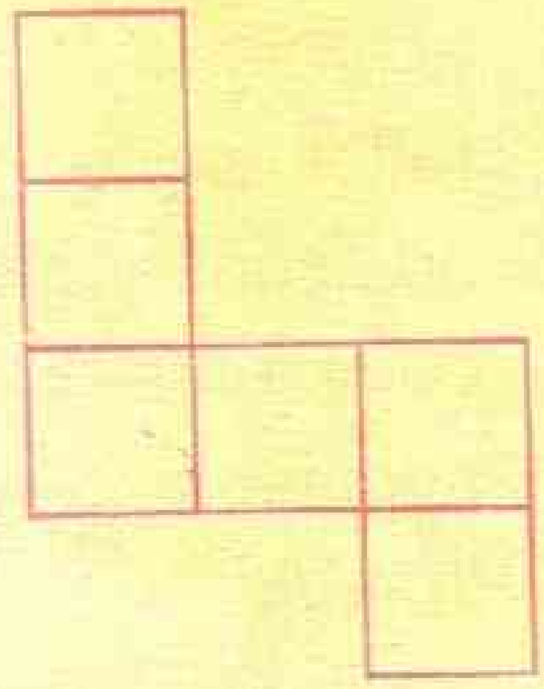
Name of 3-d shape	a)	b)	c)
Number of faces			
Names of faces			

2. Identify the nets of cube and colour them.

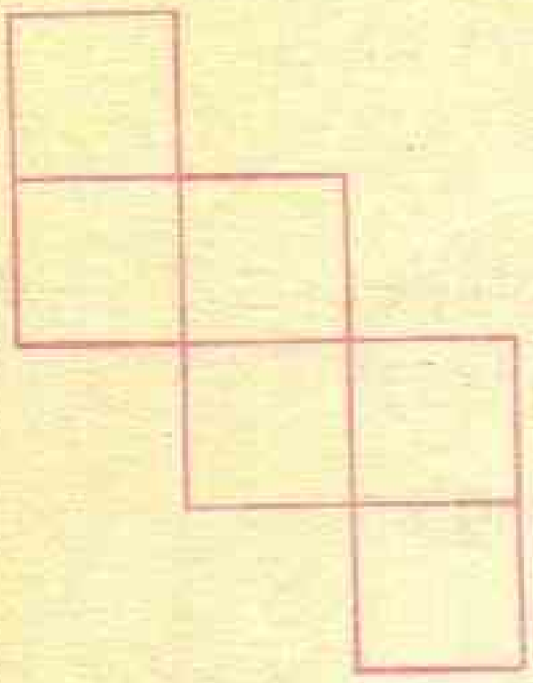
a)



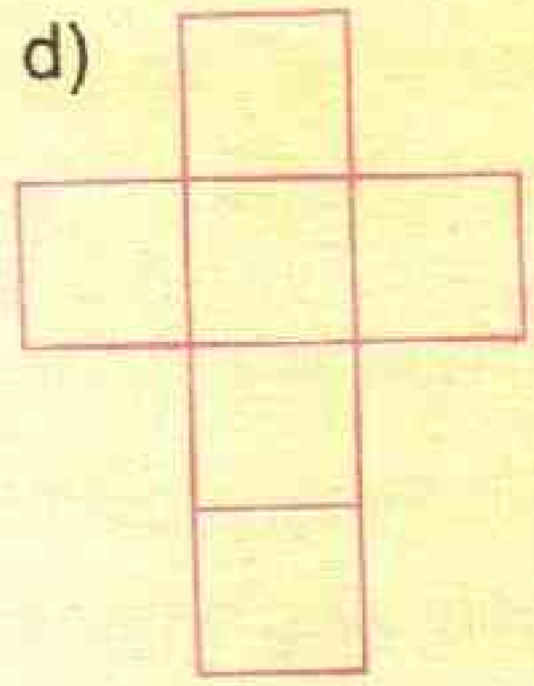
b)



c)

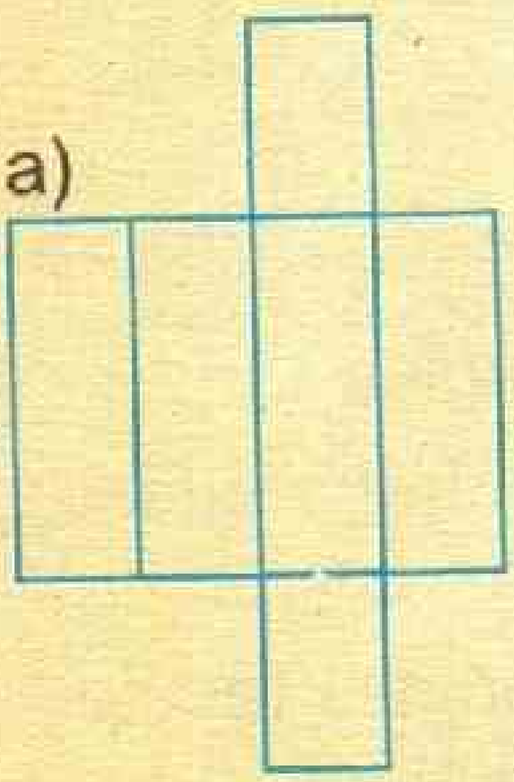


d)

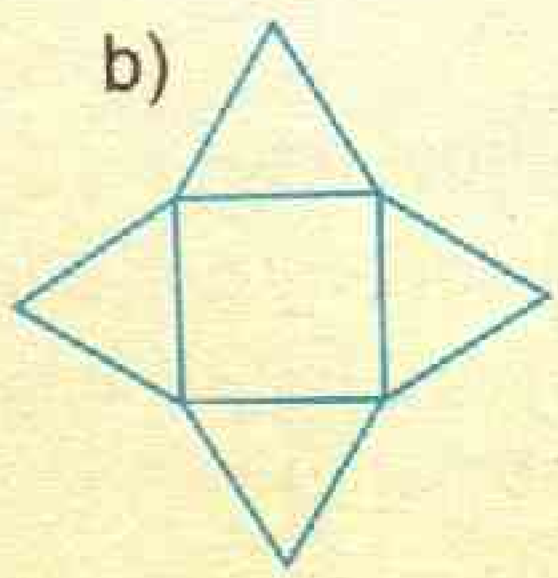


Observe these nets and identify the 3D solid they are made up of.

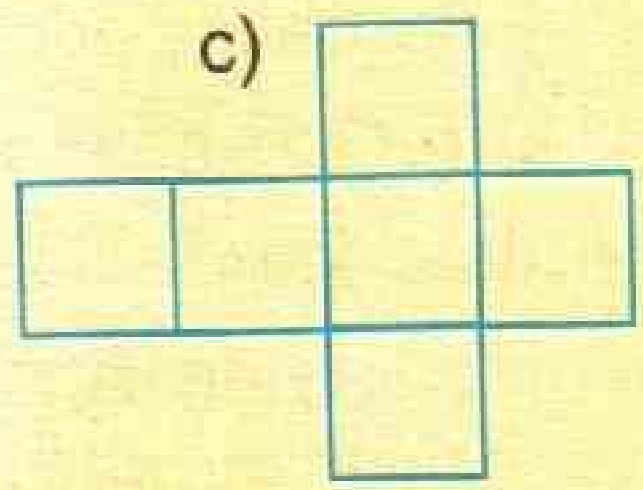
a)



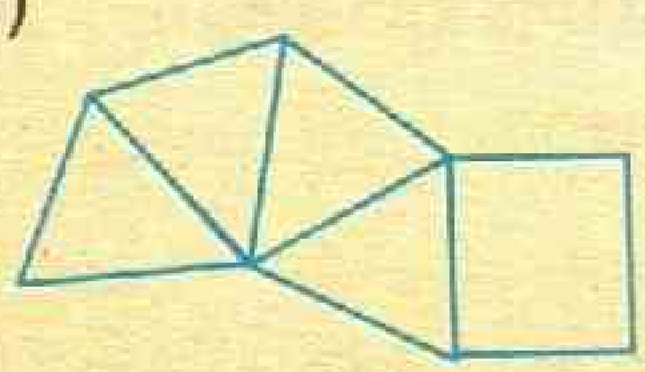
b)



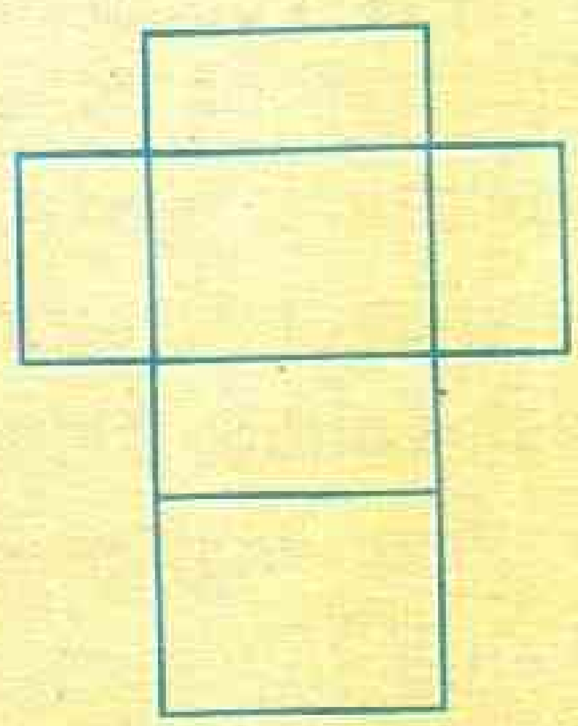
c)



d)



e)



Vocabulary

right angle	isosceles triangle
acute angle	scalene triangle
reflex angle	acute-angled triangle
adjacent angles	obtuse-angles triangle
complementary angles	right-angled triangle
supplementary angles	quadrilaterals
triangle	symmetry
equilateral triangle	nets

I Have Learnt

- recognising a straight and a reflex angle.
- recognising the standard units for measuring angles is 1°, which is defined as $\frac{1}{360}$ of a complete revolution.
- Identifying, describing and estimating the size of angles.
- classifying angles as acute, right or obtuse.
- comparing angles with right angles and recognising that a straight line is equivalent to two right angles.
- using a protractor and ruler to construct:
  - a right angle
  - a straight angle
  - reflex angles of different measures
- describing adjacent, complementary and supplementary angles.
- identifying and describing triangles with respect to their sides. (isosceles, equilateral, and scalene).
- identifying and describing triangles with respect to their angles (acute angled triangle, obtuse angled triangle and right-angled triangles).
- using a protractor and ruler to construct a triangle when:
  - two angles and their included side is given
  - two sides and included angle is given
- measuring the lengths of the remaining sides and angles of the triangle.
- recognising different kinds of quadrilaterals (square, rectangle, parallelogram, rhombus, trapezium, and kite).

- identifying and describing properties of quadrilaterals including square, rectangle, parallelogram, rhombus, trapezium, and kite, and classifying those using parallel sides, equal sides and equal angles.
- constructing a square and rectangle when the lengths of sides are given.
- recognising reflective and rotational symmetry in 2-D figures.
- identifying lines of symmetry for the given 2-D figures.
- finding the point of rotation and order of rotational symmetry of the given 2-D figures.
- identifying cubes, cuboids and pyramids from their nets.
- describing and making 3-D objects (cubes, cuboids, cylinder, cone, sphere, pyramids).

Review Exercise

1. Encircle the correct option.

a) Which of these is a reflex angle?

i) 75° ii) 215° iii) 180° iv) 90°

b) The supplement of 20° is:

i) 160° ii) 40° iii) 70° iv) 80°

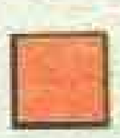
c) The sum of two right angles is equal to:

i) reflex angle ii) straight angle iii) acute angle iv) obtuse angled

d) Two angles will be called supplementary angles if their sum is equal to :

i) 180° ii) 90° iii) 360° iv) 100°

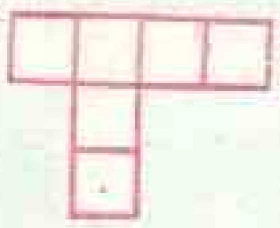
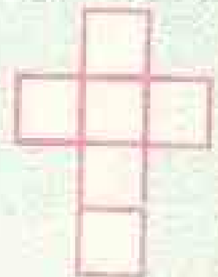
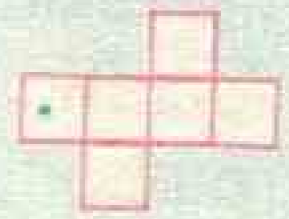
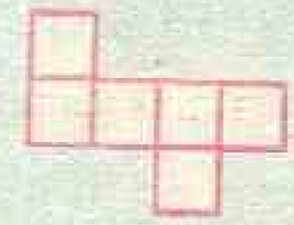
e) Which of the following shapes is not a quadrilateral?

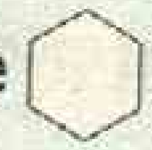
i)  ii)  iii)  iv) 

f) A triangle with sides equal is called an isosceles triangle.

i) 1 ii) 2 iii) 3 iv) 4

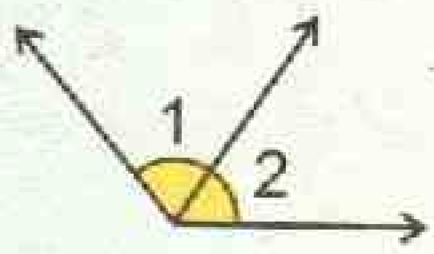
g) Which of the following is not the net of a cube?

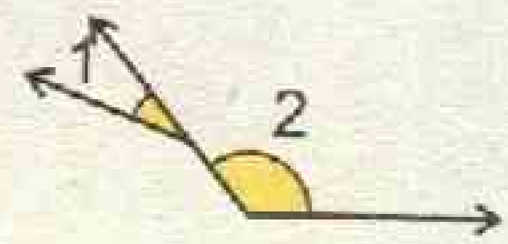
i)  ii)  iii)  iv) 

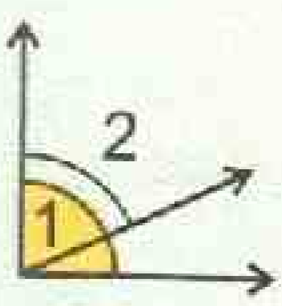
h) The order of the rotational symmetry of the shape  is:

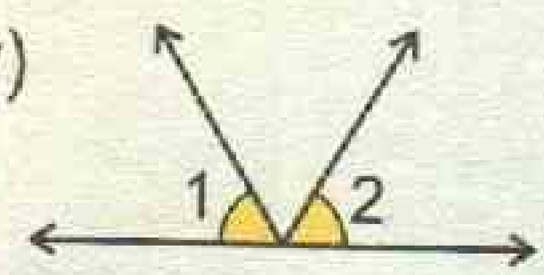
i) 1 ii) 2 iii) 3 iv) 4

i) Which of the following is showing adjacent angles?

i) 

ii) 

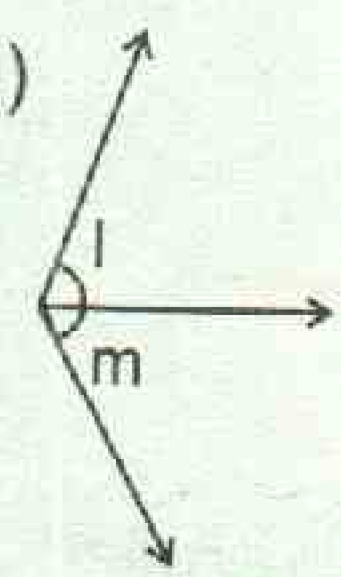
iii) 

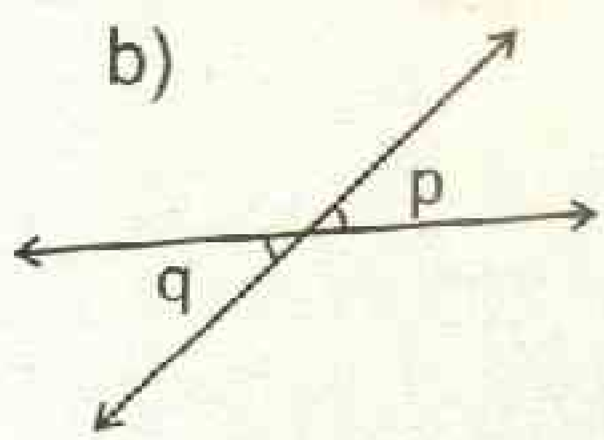
iv) 

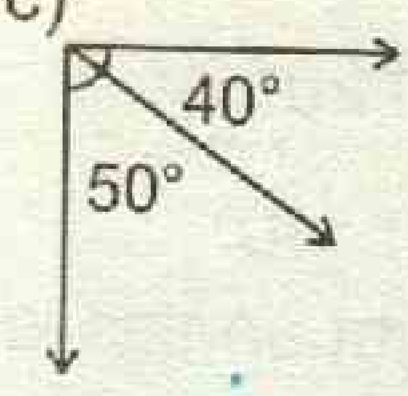
2. Draw these angles using protractor and ruler.

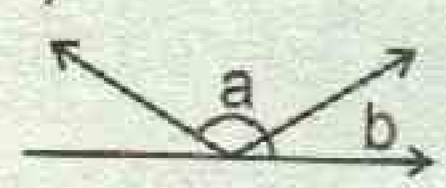
a) 35° b) 45° c) 240° d) 180°
e) 90° f) 60° g) 300° h) 155°

3. Identify the adjacent angles.

a) 

b) 

c) 

d) 

4. Make 5 pairs of each complementary and supplementary angles.

a) ______ + ______ = ______ f) ______ + ______ = ______

b) ______ + ______ = ______ g) ______ + ______ = ______

c) ______ + ______ = ______ h) ______ + ______ = ______

d) ______ + ______ = ______ i) ______ + ______ = ______

e) ______ + ______ = ______ j) ______ + ______ = ______

5. How many types of triangles are there with respect to their sides and angles?

6. Draw a triangle IJK in which, $m\angle I = 70°$, $\overline{IJ} = 6.8$ cm and $m\angle J = 28°$.

7. Draw a triangle PQR in which, $\overline{QR} = 3.3$cm, $\overline{PQ} = 5.2$ cm and $m\angle PQR = 75°$.

8. Draw squares according to the given lengths with the help of protractor and ruler.

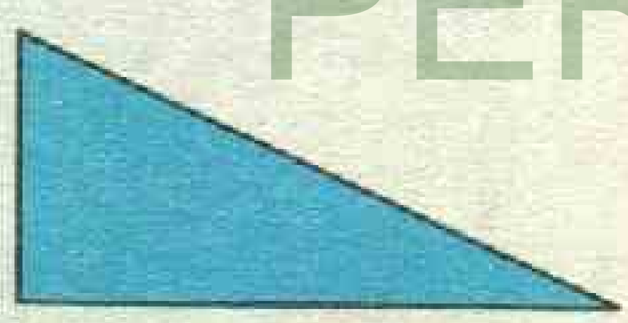
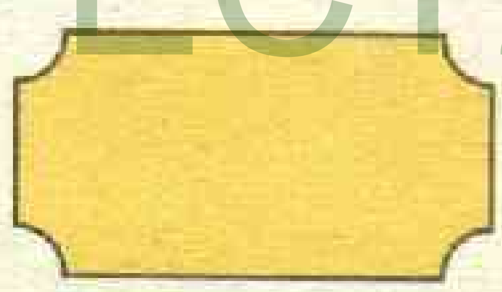
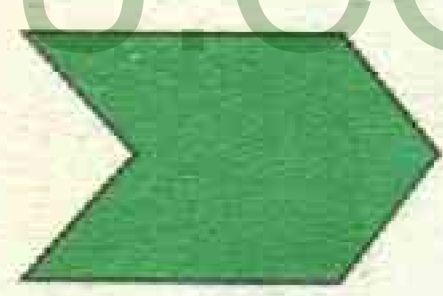
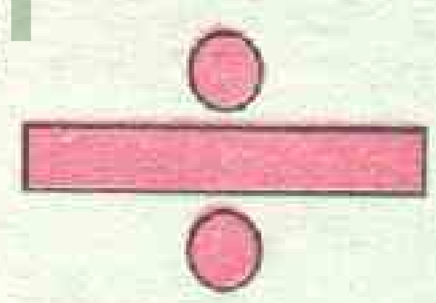
a) 4 cm b) 5.1 cm c) 3.6 cm d) 4.9 cm

9. Draw rectangles with the help of protractor and ruler according to the given lengths and widths.

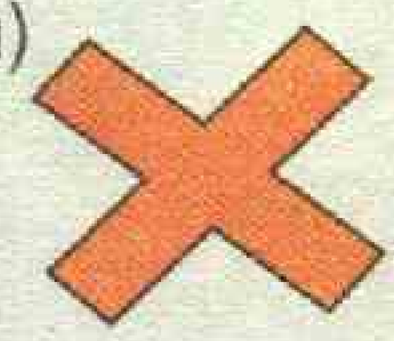
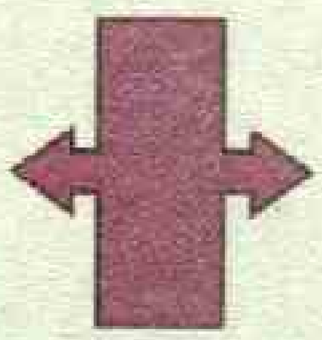
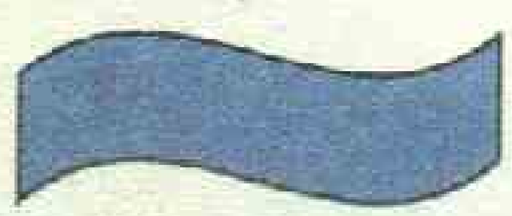
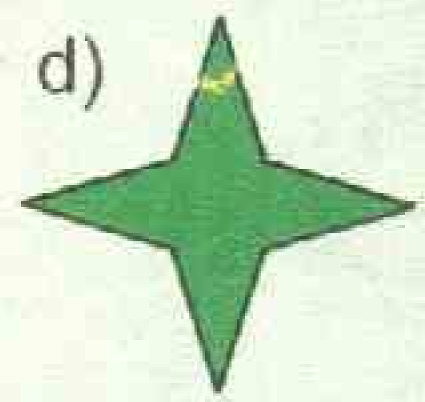
a) L = 4 cm, W = 3.4 cm b) L = 5 cm, W = 3 cm

c) L = 6.6 cm, W = 4.2 cm d) L = 7 cm, W = 2.4 cm

10. Circle the figures which have reflective symmetry. Also draw their line of symmetry.

a)  b)  c)  d) 

11. Circle the figures having rotational symmetry. Also write the order of their rotation and mark their center of rotation.

a)  b)  c)  d) 

12. Use a cardboard to make nets of various solids. Also write the number of their faces and the name of shape. Then fold them and verify whether you have created the correct net or not.

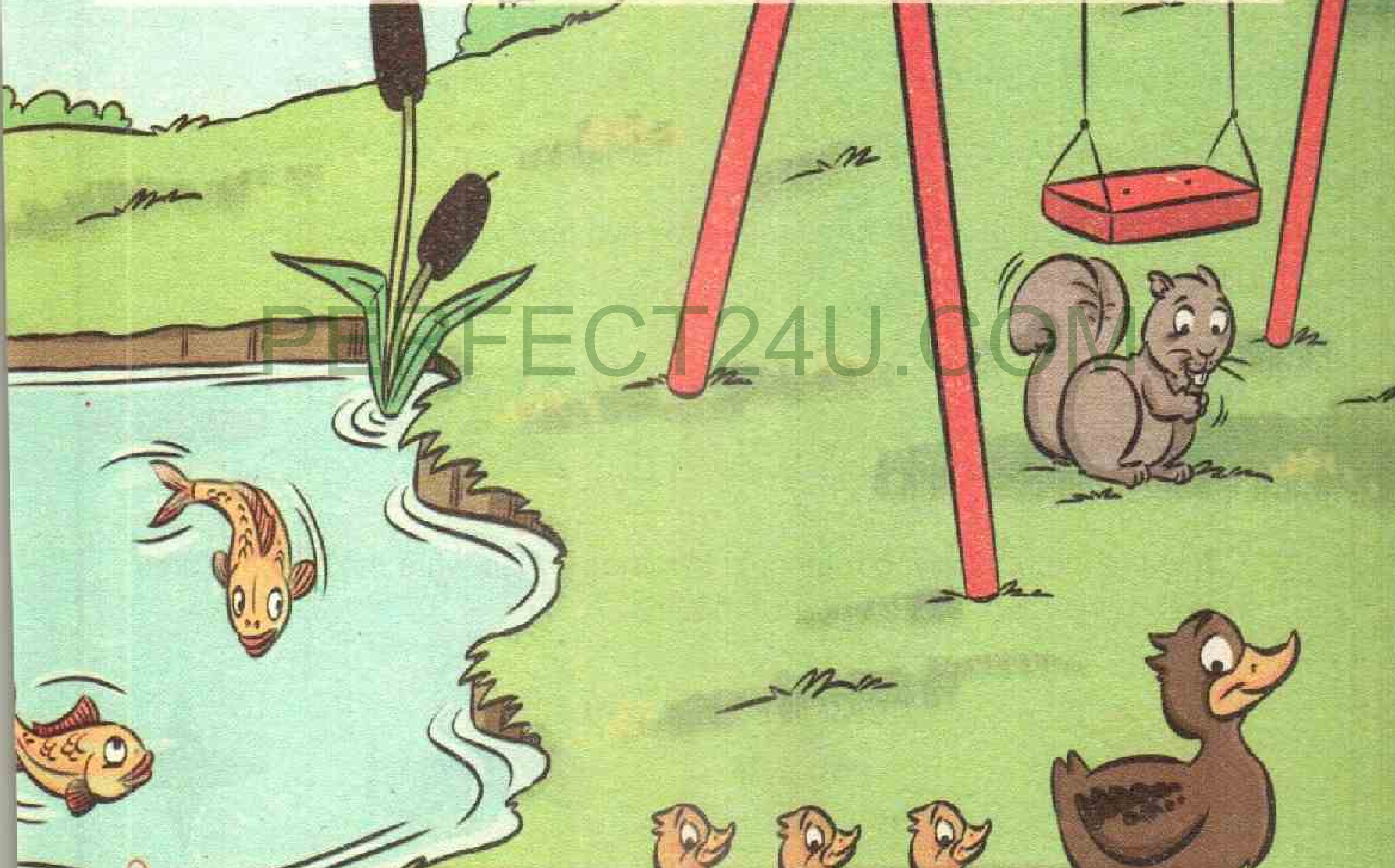
Unit 8

Perimeter and Area

Learning Outcomes

By the end of this unit, you will be able to:

- differentiate between perimeter and area of a square and rectangular region.
- identify the units for measurement of perimeter and area.
- find and apply formulas to find perimeter and area of a square and rectangular region
- solve real life situations involving perimeter and area of square and rectangular regions.



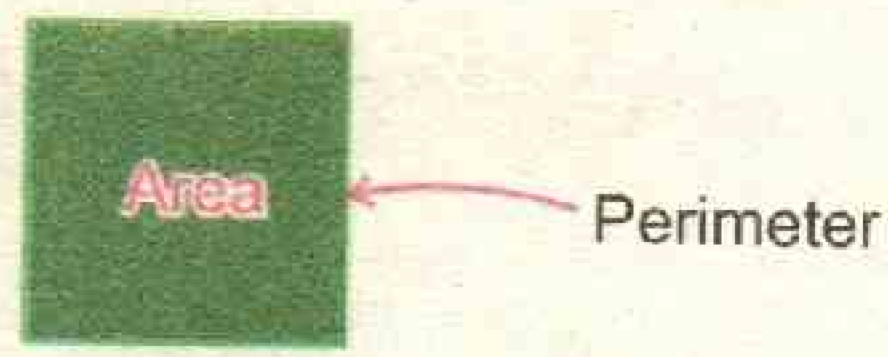
A wooden fence is to be fixed around a rectangular park. If you know the length and width of the park how can you find the required length of the fence?

Area and Perimeter

Sara and Raza are in the same school. There is a playground in their school.

Do you know what is the shape of our playground? If a wall is to be constructed around the playground, what will be its total length?

The play ground is square shaped because its length and width are equal. The length of the wall around it will be equal to its perimeter.



Area

- The space covered by the surface of any two dimensional shape is called its area.
- The unit of area are m^2 (squared metres) and cm^2 (squared centimetres) etc. (like $15cm^2$, $24m^2$ etc.)
- Example: the space inside the boundary of a park.

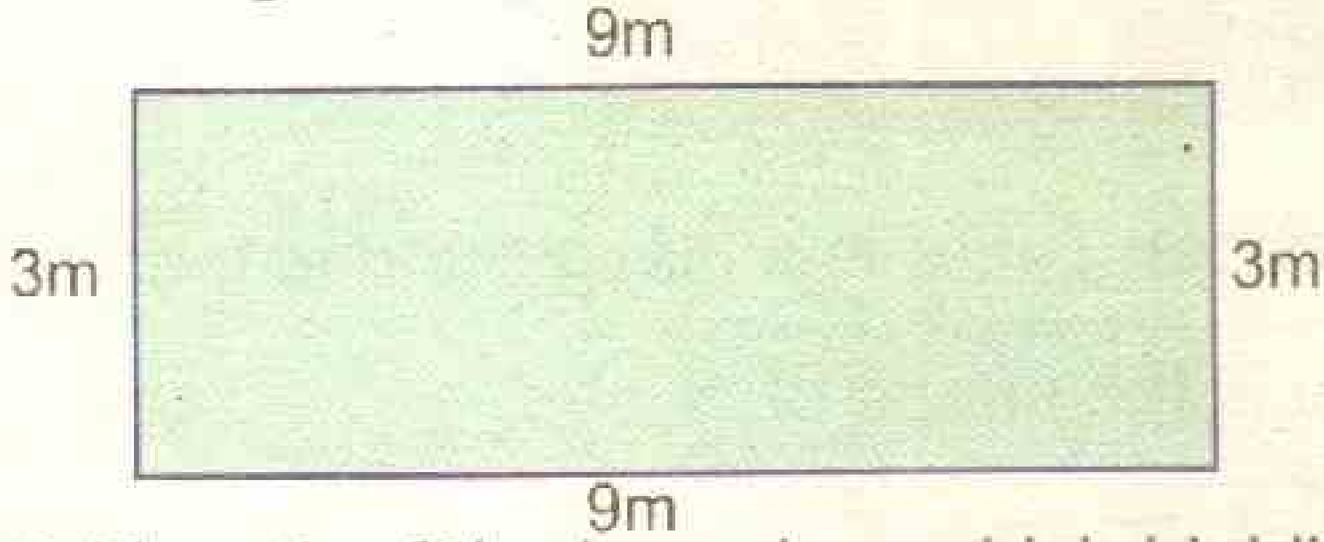
Perimeter

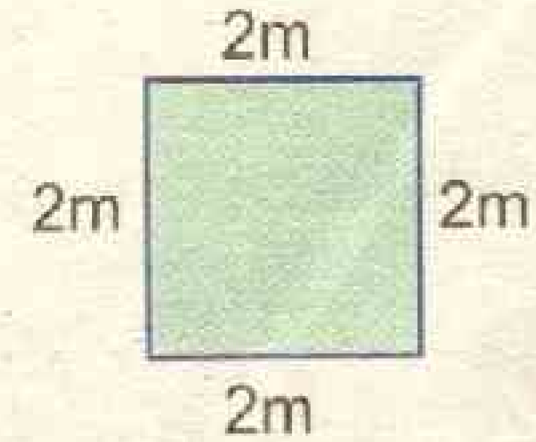
- The total length of the boundary of a closed region is called its perimeter.
- The units to measure the perimeter are m (metres), and cm (centimetres) etc.
- Example: The length of the fence around a region, the total length of a photo frame etc.

TEACHING POINT

Ask the students to draw squares and rectangles of different measurement on the notebook, use blue colour to show its perimeter and green colour to show its area.

Observe the given square and rectangle.



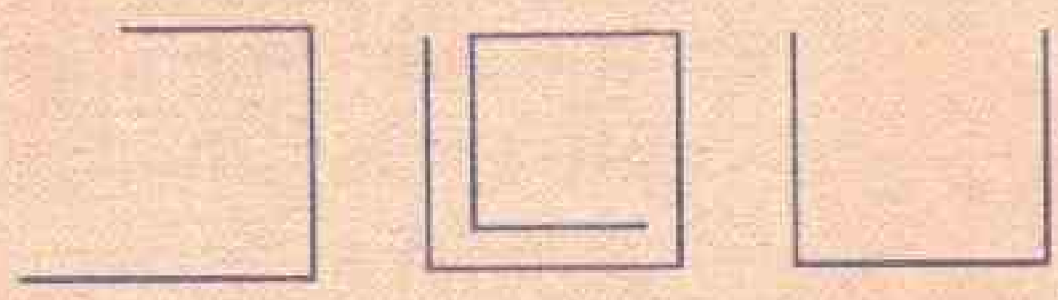


The total length of the boundary which highlighted with blue colour is called their perimeter.

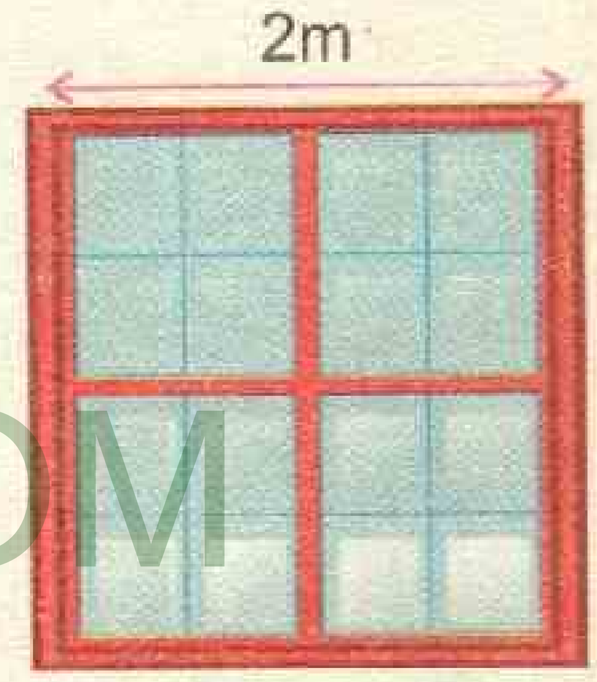
While the green portion, surrounded by their boundaries is called their area.

Try Yourself

Can we calculate the area and perimeter of the given figures? Give reason to support your answer.



Perimeter of a Square



The window of our classroom is square shaped and length of one side is 2 metres. How can we find its perimeter?

Key Fact

The lengths of all sides of a square are equal.

We can find its' perimeter by adding the length of one side of the window 4 times or by multiplying length of one side with 4.

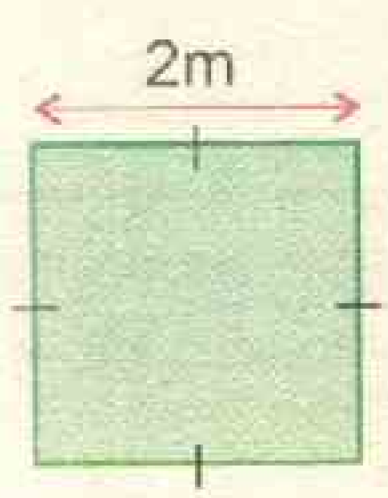
Perimeter of a square = $4 \times$ length of one side

If we represent the length of the square by L, then:

Perimeter of a square = $4 \times L$

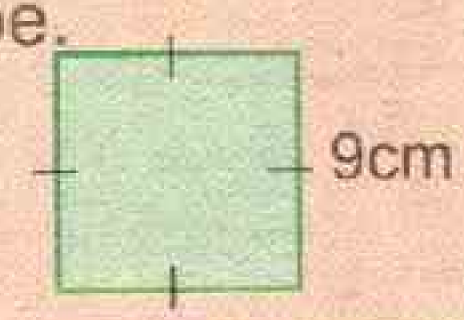
The length of one side of the window = 2 m

Perimeter of window = 4×2 m = 8 m



Try Yourself

Find the perimeter of the given squared shape.



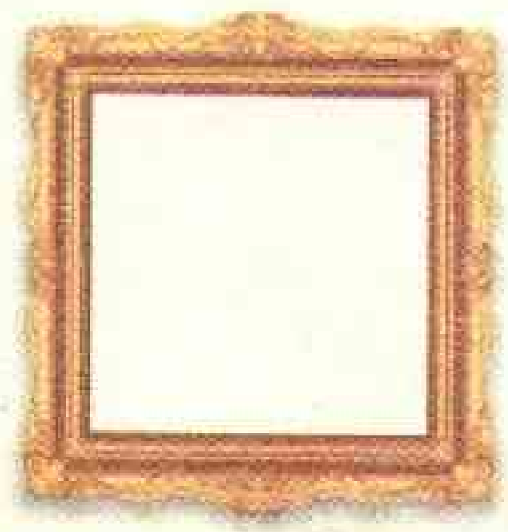
Usman has a square shaped picture frame with length of one sides is 22.5cm. Find the perimeter of the frame.

Perimeter of squared frame = $4 \times$ length of one side

$= 4 \times 22.5$ cm

$= 90$ cm

So, the perimeter of the picture frame is 90 cm.



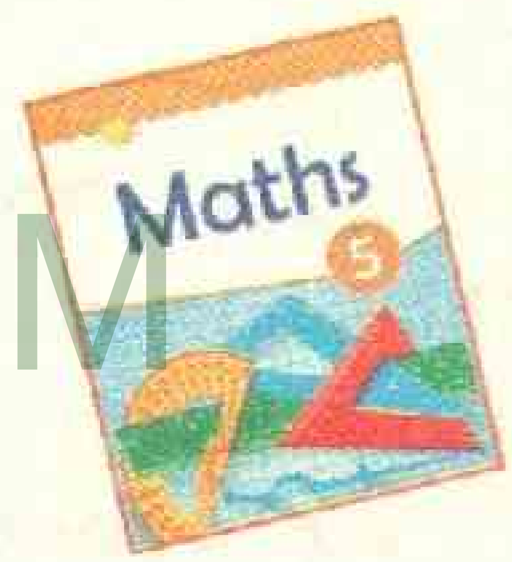
Key Fact

Perimeter of square = $4 \times$ length of one side

Try Yourself

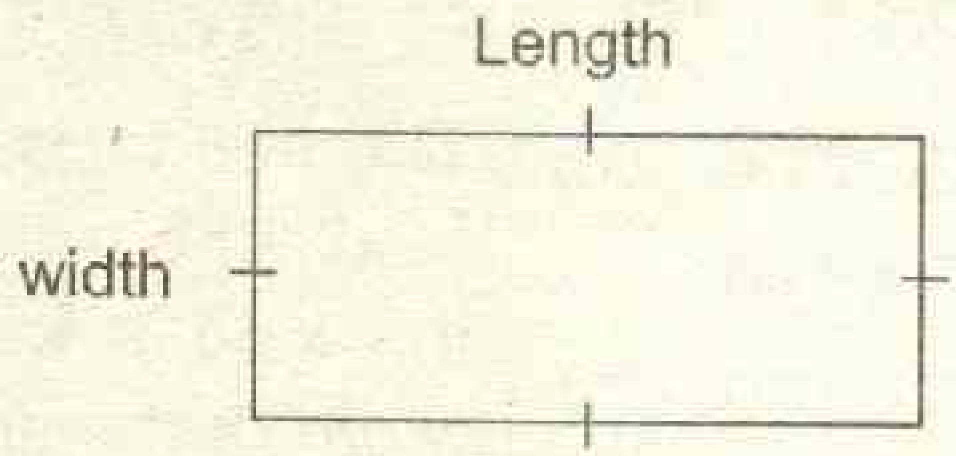
- Draw a square with the perimeter of 12 centimetres.
- A square shaped ground is 20 metre long. If a person takes 5 rounds of the ground, how much total distance does he cover?

Perimeter of a Rectangle



The length of a book is 26 cm and its width is 19.5 cm. How can we find the perimeter of the book?

We can find its perimeter by adding length of all sides.



If we denote length of the rectangle with L and width with W, then:

Perimeter of rectangle = $L + L + W + W$

Or

Perimeter of rectangle = $2L + 2W$

$= 2(L + W)$

Ask the students to look around, identify square shaped objects and find their perimeter by using the formula.

Perimeter of rectangle = 2 (L + W)

= 2(26cm + 19.5cm)

= 2(45.5) cm

= 91 cm

= 91 cm

Thus, the perimeter of the book is 91 cm.

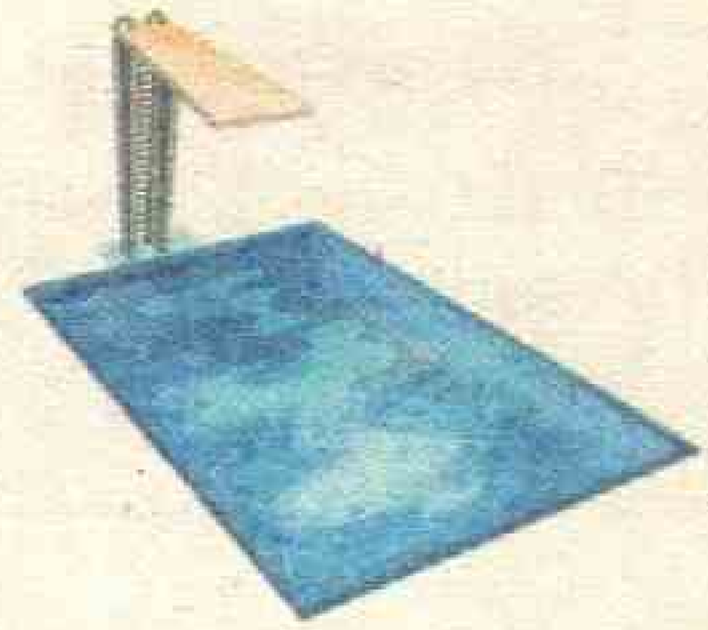
Try Yourself

Measure the length and width of your teachers table and find its perimeter by using the formula.

Key Fact

Perimeter of rectangle = 2(length + width)
= 2(L + W)

A rectangular pool is 10 metre long and 7.3 metre wide. Find the perimeter of the pool.



Length = 10m

Width = 7.3m

Perimeter of rectangle = 2 (L + W)

Perimeter of the pool = 2(10m + 7.3m)

= 2(17.3)m = 34.6m

Thus, the perimeter of the pool is 34.6m.

The length of a rectangular garden is 21 metres and its width is 16 metres. If the rate of fencing is Rs 170 per metre, find the cost of facing around it.

Perimeter of the garden = 2(L + W)

= 2(21 + 16)

= 2(37) = 74m

Cost of 1 metre of fencing = Rs 170

Cost of 74 metres fencing = Rs 170 × 74

= Rs 12,580

The cost of fencing is Rs 12,580

Try Yourself

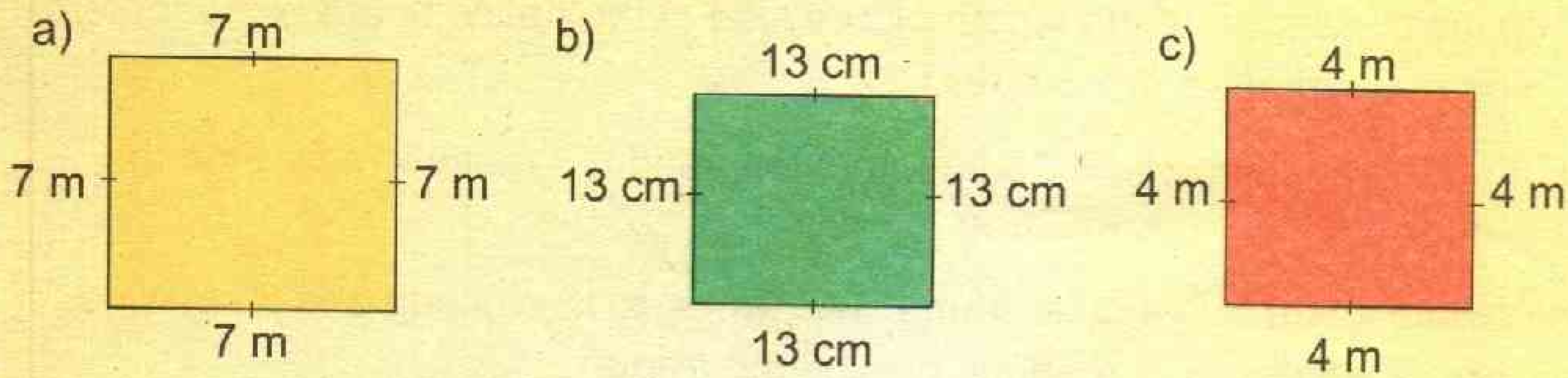
The perimeter of a rectangular field is 66 metres. If the length of this field is 15 metres, find the width of the field.
Calculate the cost of putting barbed wire around the field if the rate of wire is Rs. 220 per metre.

TEACHING POINT

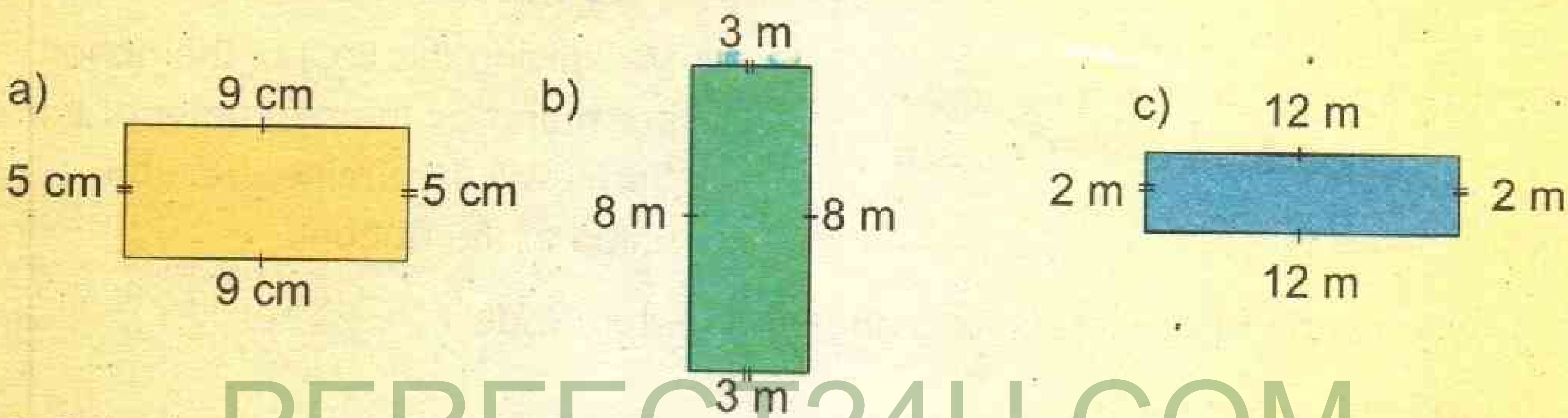
Ask to students to find rectangular objects in their classroom, measure their lengths and width and find the perimeter of each object.

Exercise 1

1. Find the perimeter of the given squares.

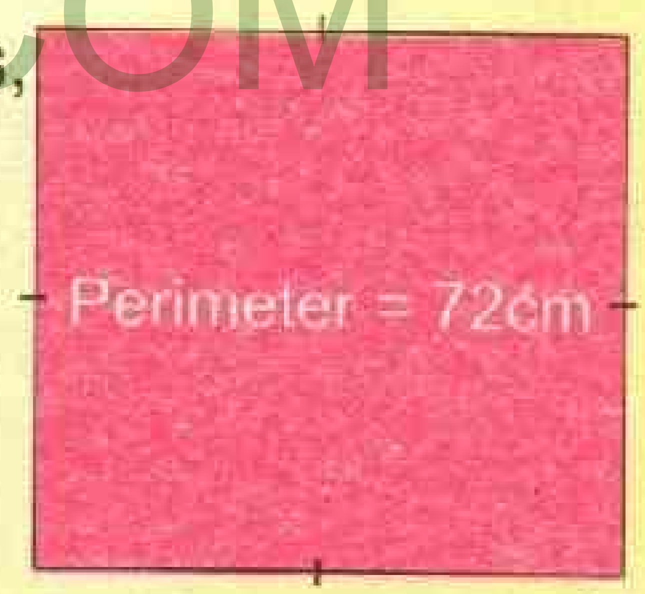


2. Find the perimeter of the given rectangles.



3. If the length of a square shaped crop field is 29 metres, what will be its perimeter?

4. The perimeter of a square shape is 72 cm. What will be its length?



5. Find the perimeter of the squares of given lengths by using formula.

a) 5 cm b) 12 cm c) 6 m d) 19 cm e) 26 m f) 2.5 cm
g) 9.7 m h) 15 m i) 16.6 cm j) 10 m k) 7.1 cm l) 2.7 cm

6. Find the perimeter of the rectangles of the given lengths and widths by using formula.

a) L =3 cm, W= 2 cm b) L = 5.3 m, W= 2.2 m c) L =6 cm, W= 4 cm
d) L =9 m, W= 1. 2 m e) L =10 m, W= 5.9 m f) L =15 cm, W= 12 cm

7. Children are playing in a square shaped playground. If the length of the playground is 12 meters, find its perimeter.

8. Harris wants to find out the perimeter of the square-shaped notice board in his classroom. If the length of one side of the notice board is 2.5 meters, find the perimeter of the board.

9. If a rectangular room is 10.8 meters long and 8.8 meters wide. Find the perimeter of the room.

10. Nadia has a rectangular frame. The frame is 12 cm long and 8 cm wide. Nadia wants to put a ribbon around the frame.
    a) Find the required length of the ribbon.
    b) What will be the total cost of ribbon if 1 meter of it costs Rs 5.

Hint
Multiplying the cost of the ribbon per meter by the perimeter of the frame will determine the total value of the ribbon.

11. A building is 128 meters long and 96.5 meters wide.
a) Find out its perimeter
b) Find the total cost required for the construction of boundary wall around this building if the rate of construction of wall is Rs. 470 per meter.

Area of a Square

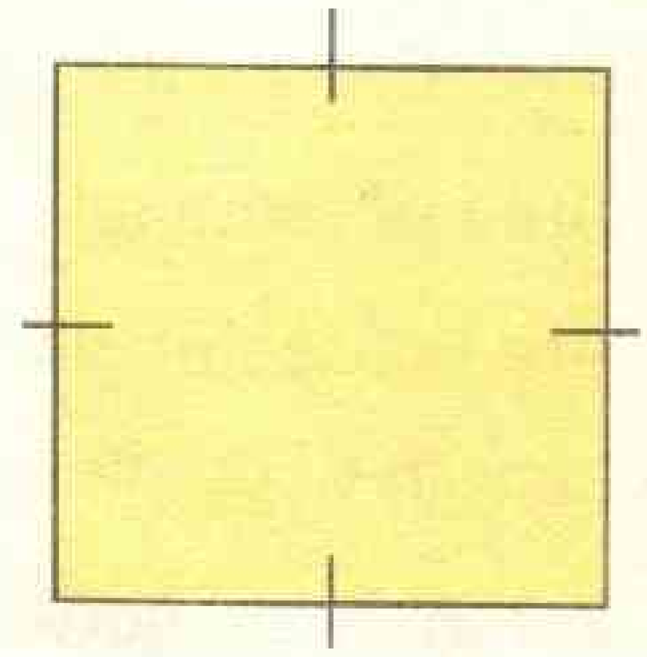
My room is square shaped. Its length is 11 metres. How can I find its area?

You can find the area of a square shaped room by multiplying its length with width.

TEACHING POINT: Ask the students to look around for square shaped objects and then find their area.

If we denote length of a side of the square by "L" then:

Area of a square = length of a side × length of the side



Length of the rrom = 11 m

Area of the room = L × L

= 11 × 11 m^2

= 121 m^2

Area of the room is 121 m^2.

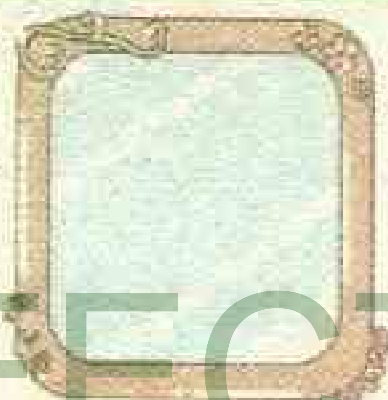
Key Fact

Area of square = length × length

L × L

As the unit of the length multiplying so unit of area is m^2.

A square mirror has a length of 42 cm. What is its area?



Length of one side L = 42cm

Area of the mirror = L × L

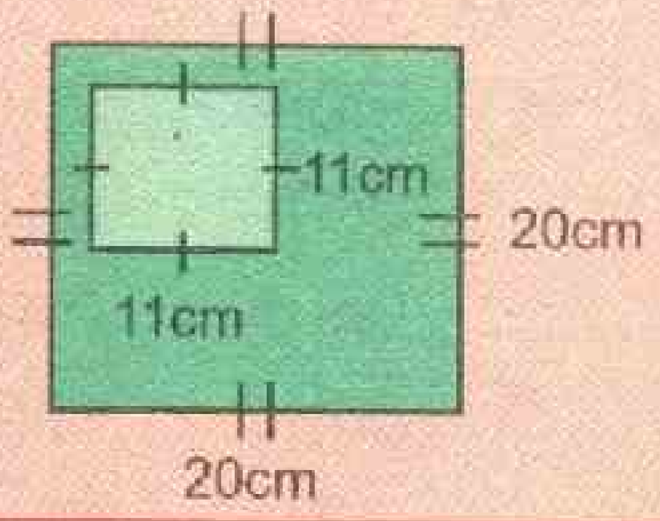
= 42cm × 42cm

= 1764 cm^2

Area of the mirror is 1764 cm^2.

Try Yourself

Find the area of the coloured portion in the given figure.



Area of a Rectangle

The playground of my school has a with length is 7.5 metres and width of 4 metres. How can we find its area?

Ask the students to look for rectangular objects in their classroom, measures their length and width.

The area of a rectangle can be found by multiplying its length with its width.

If we denote the length of the rectangle by "L" and width by "W", then:

Area of rectangle = Length $\times$ Width

Area of rectangle = $L \times W$

Length of the flower bed = 7.5m

Width of the flower bed = 4m

Area of the flower bed = $7.5 \times 4m^2$

= $30m^2$

Thus, area of the flower bed is $30m^2$.

Try Yourself

Measure the length and width of your classroom. Then find the cost of tiling your classroom if the rate of tiling is Rs 455 per metre square.

Key Fact

Area of rectangle = length $\times$ width

$L \times W$

A rectangular hospital has a perimeter equals to 294 metres. If its length is 85 metre find its area.

Area of rectangle = $2(L + W)$

$294m = 2(L + W)$

$294m = 2(85 + W)$

$294m = 170m + 2W$

$294m - 170 = 2W$

$124 = 2W$

$124 \div 2 = W$

$62m = W \therefore W = 62m$

Area of rectangle = $L \times W$

Area of rectangle = $85m \times 62m$

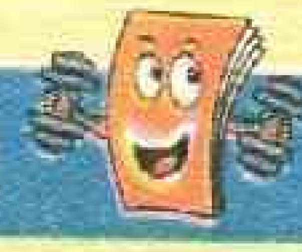
Area of hospital = $5,270m^2$

Area of the hospital is $5,270m^2$.

Try Yourself

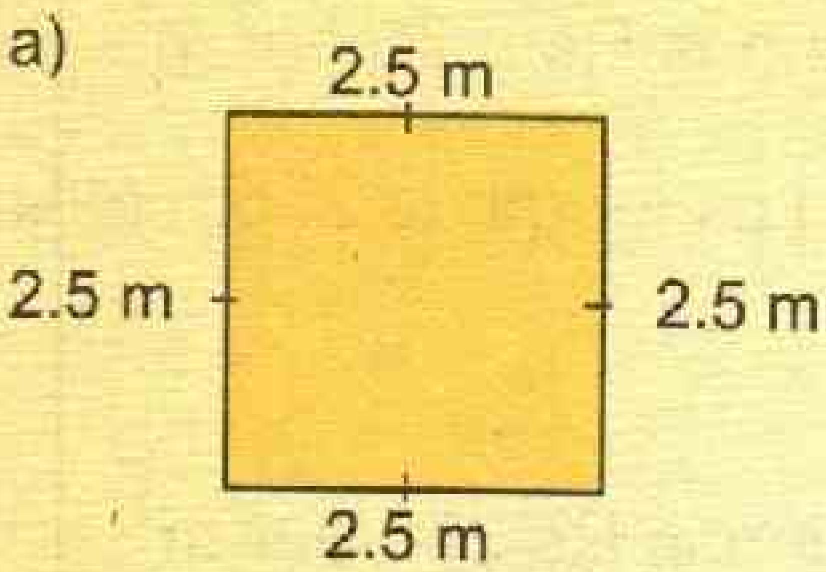
Draw two rectangles with different areas but same perimeter. Draw a square and a rectangle with same areas and perimeters.

Exercise 2

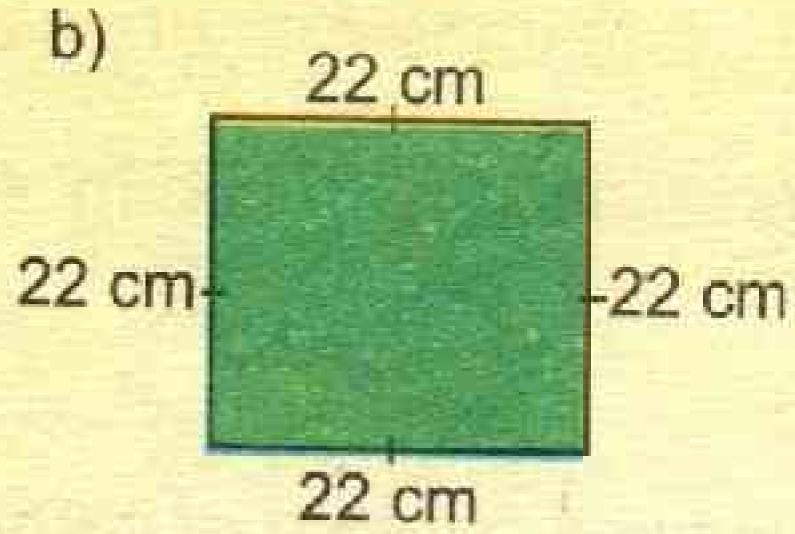


1. Find the area of the given squares.

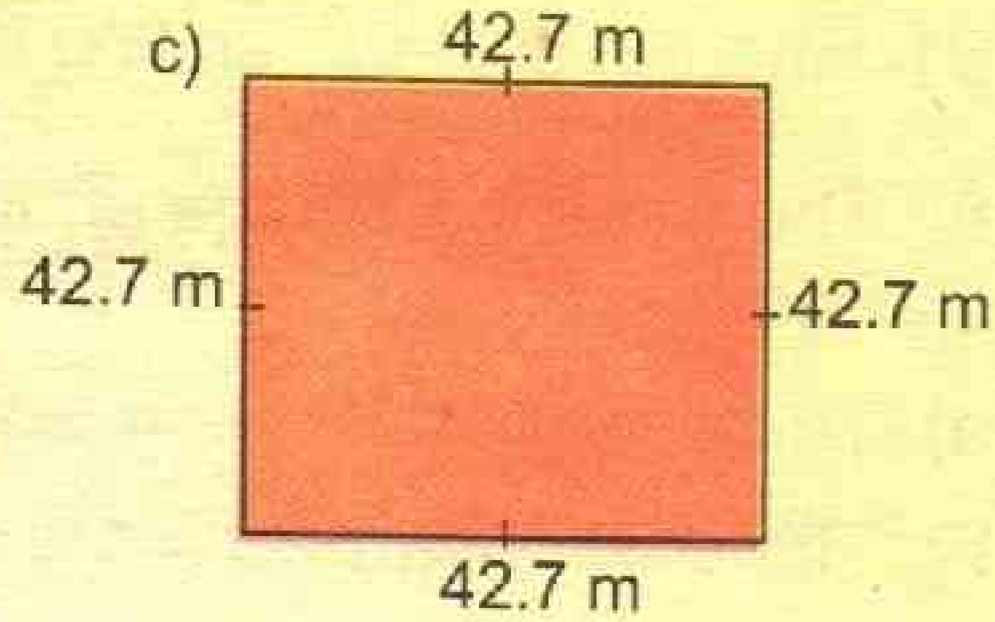
a)



b)

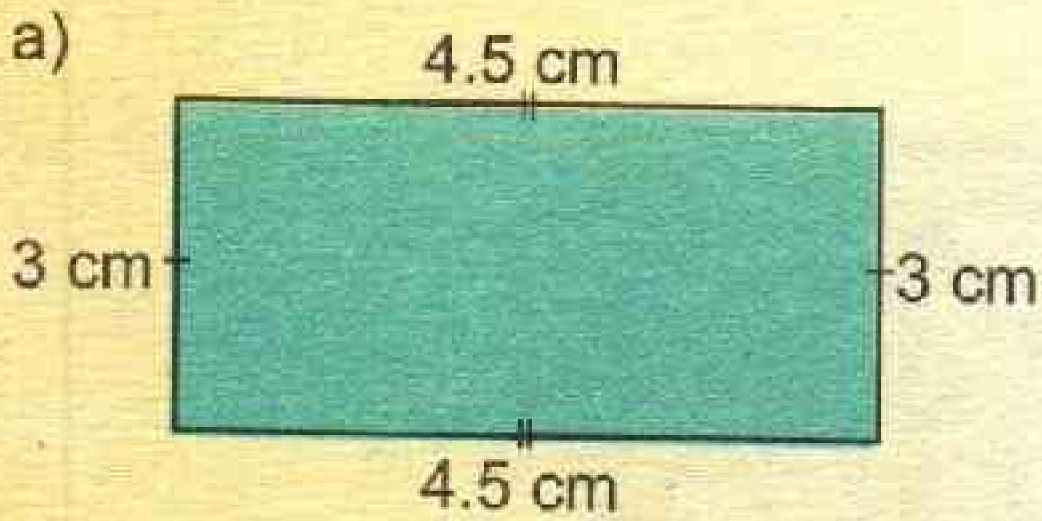


c)

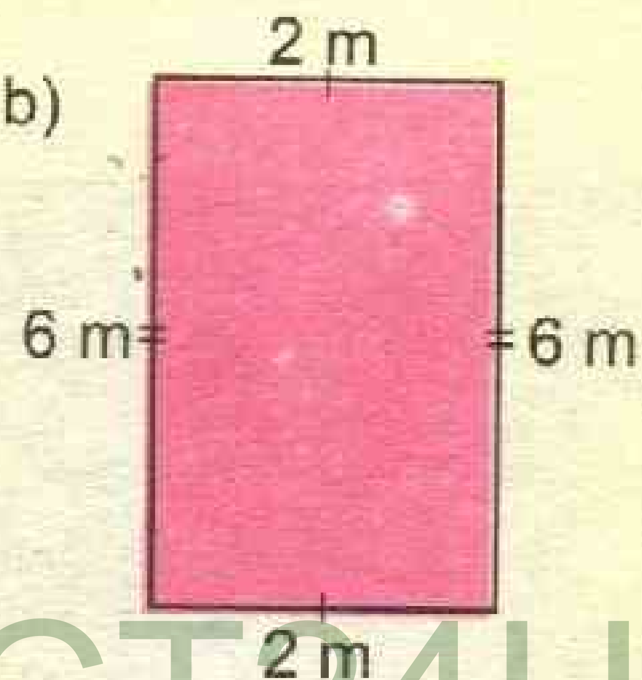


2. Find the area of the given rectangles.

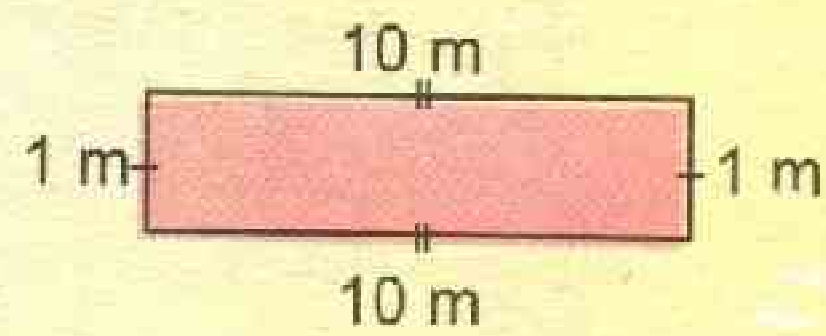
a)



b)



c)



3. The area of a rectangle is $96m^2$. If its width is 3m, find its length?

4. Find the area of the squares of the given lengths by using formula.

a) 4.5 m	b) 9.3 cm	c) 8.8 m	d) 15 cm
e) 13 cm	f) 3 m	g) 6 m	h) 2.9 m
i) 5 cm	j) 9.2 m	k) 14 m	l)1.1 cm

5. Find the area of the rectangles of the given lengths and widths by using formula.

a) L =5 cm, W= 1.9 cm	b) L = 4 m, W= 3 m
c) L =6 cm, W= 4 cm	d) L =7 cm, W= 5 cm
e) L =10.5 cm, W= 9 cm	f) L =20 m, W= 17 m

6. A rectangular shaped ground has a length of 122m and width 108m. Find the area of the ground.

7. The area of a school's main gate is $19.55m^2$.

a) If the width of the gate is 2.3m find its length.

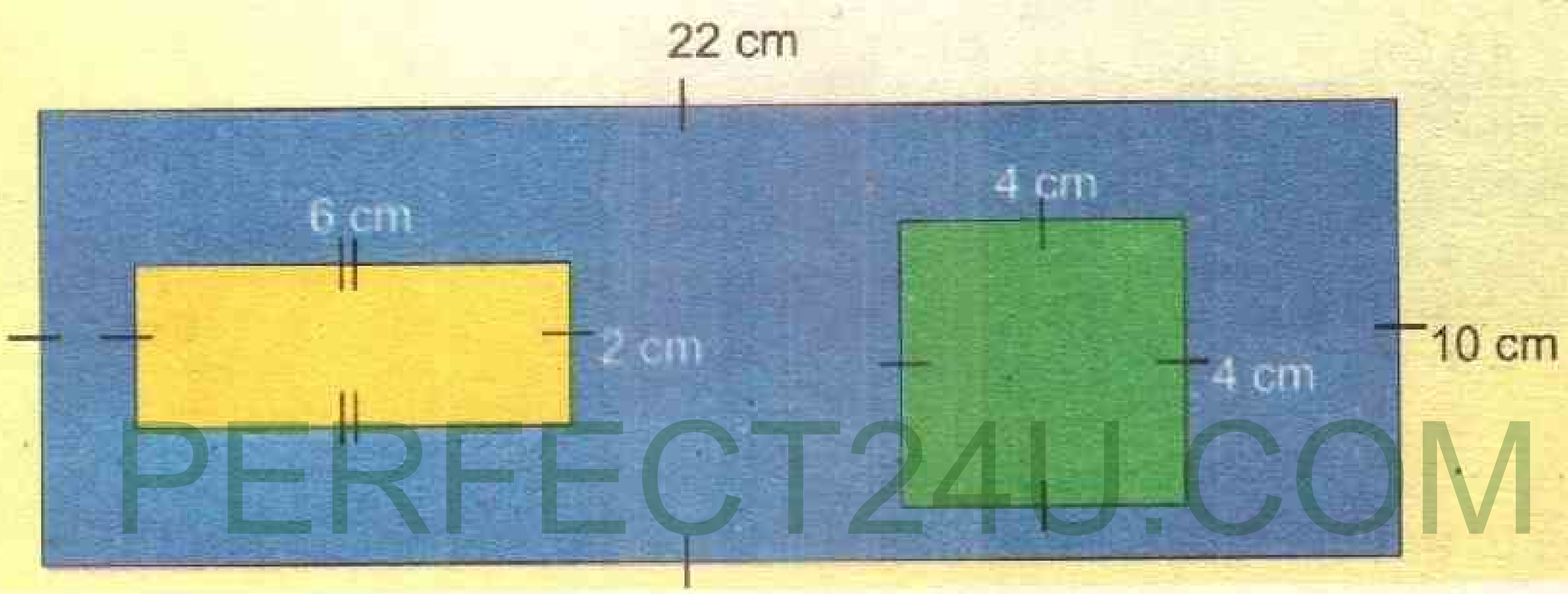
B) Find the cost of painting the gate if the rate of painting is Rs. 275 per m^2.

8. The area of a square shaped Masjid is $27,540m^2$ and its length is 255 metres. Calcualte:

a) The perimeter of the masjid.

b) The cost of carpeting the masjid if the rate of carpeting is Rs 275 per m^2.

9. Find the area of the blue part.



I Have Learnt

- differentiation between perimeter and area of a square and rectangular region.
- identifying the units for measurement of perimeter and area.
- finding and applying formulas to find perimeter and area of a square and rectangular region
- solving real life situations involving perimeter and area of square and rectangular regions.

Vocabulary

perimeter
area
square
rectangle
unit
formula
region
measurement

Review Exercise

1. Encircle the correct option.

a) If the length of a rectangle is 4 cm and width is 3.4 cm, then its perimeter will be equal to________.

i) 11.4 cm ii) 7.4 cm iii) 14.8 cm iv) 10.8 cm

b) Formula to find the perimeter of the square is:

i) 4 + L ii) 4 – L iii) 4L iv) $\frac{4}{L}$

c) The formula to find the perimeter of the rectangle is:

i) 2(L + W) ii) 2L + W iii) L + 2W iv) L + W

d) Area of a rectangle is $45m^2$. If its length is 15 m then its width is:

i) 6m ii) 3m iii) 5m iv) 15m

e) The formula to find the area of the square is:

i) L × L ii) 2(L + W) iii) L + 2W iv) 4L

f) The formula to find the area of the rectangle is:

i) L × W ii) 2(L + W) iii) L + 2W iv) 4L

g) If the perimeter of the rectangle is 34 cm and we increase its length by 2 cm then there will be a difference of ________ cm in its perimeter.

i) 2 ii) 4 iii) 8 iv) 6

h) If the length of one side of the square is 14 cm, then its perimeter will be ______ .

i) 14 cm ii) 56 cm iii) 256 cm iv) 28 cm

2. Find the perimeter and area of the squares of the given lengths by using the formula.

a) 8.2 cm b) 2.6 m c) 12.8 m d) 7.9 cm

e) 16 cm f) 4.3 m g) 5.7 m h) 11 cm

3. Find the perimeter and area of the rectangles of the given lengths and widths by using the formula.

a) L = 6 cm, W= 3.4 cm b) L = 1.2 m, W= 0.3 m

c) L =10 cm, W= 13 cm d) L =17 cm, W= 8.5 cm

4. The perimeter of a book is 100 cm. If it's width is 22 cm, find its length.

5. Laiba wants to tile for the floor of her kitchen. If the length of the kitchen is 12 metres and width is 10 metres then:

a) calculate the area of the kitchen.

b) how many tiles will be required, if length of each square tile is 2 metres?

6. The length of the fence around a square shaped garden is 24m. Find the length of the garden.

7. Daniya took a 42 cm long ribbon and made a rectangle with it. If the length of the rectangle is 15 cm, then find its width.

8. Find the area of the carromboard whose perimeter is 40 cm.

Unit 9

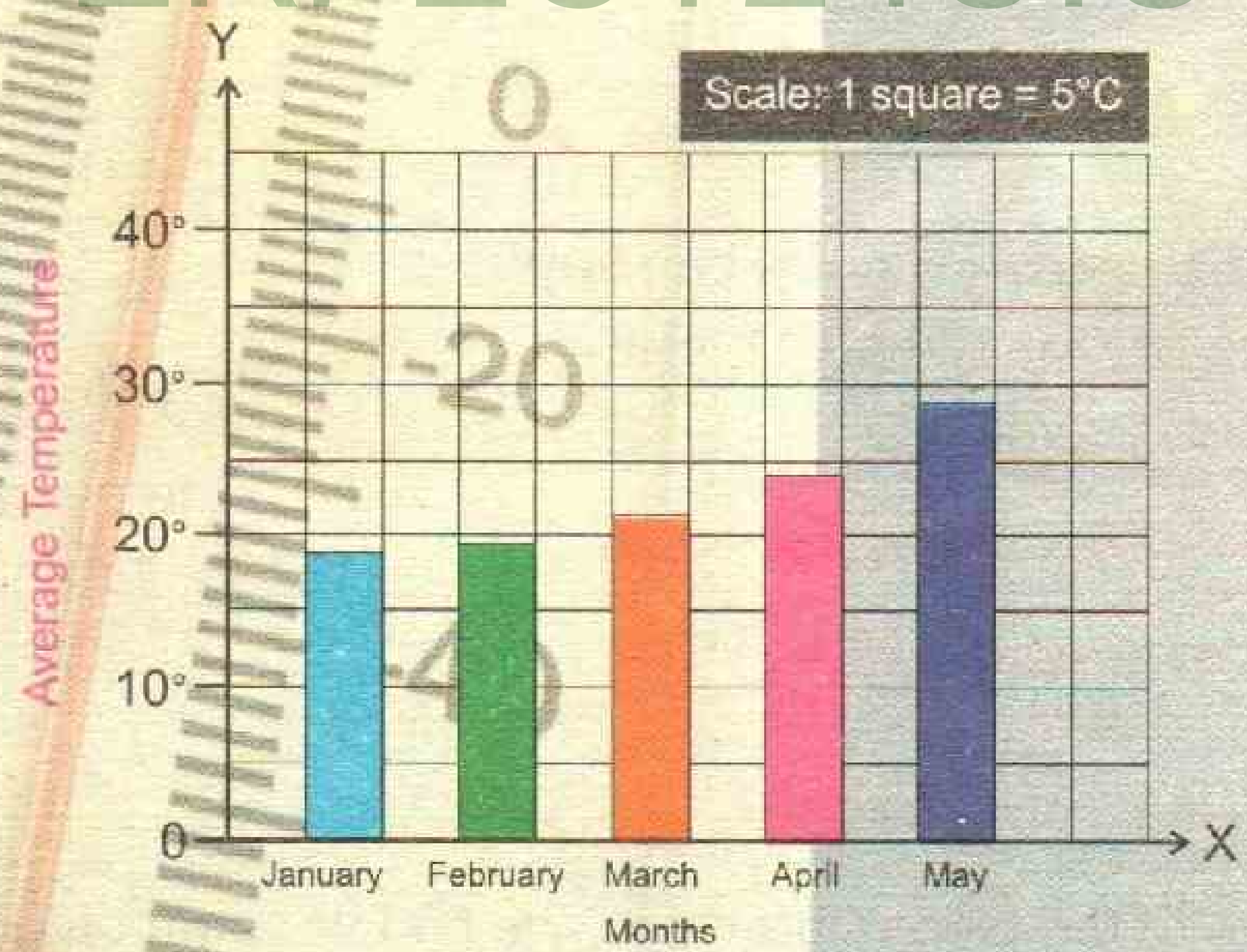
Data Handling

Learning Outcomes

By the end of this unit, you will be able to:

- find and describe average of given quantities in the data
- solve real life situations involving average
- organize the given data using bar graph
- read and interpret a bar graph given in horizontal and vertical form
- draw horizontal and vertical bar graphs for given data
- solve real life situations using data presented in bar graphs.

Months	January	February	March	April	May
Average Temperature	18°C	19°C	21°C	24°C	28°C



Umair made a graph of monthly average temperature capital for the first 5 months of 2020. Is the above graph correct? If not then identify the mistake and correct it.

Average

We went to the seaside yesterday. I collected 16 seashells. My brother collected 12 seashells and my sister collected 11 seashells. How can we divide these seashells equally among us?

We will find the total number of seashells collected. Add then divide the total by the number of persons.

Sum of the seashells

= 16 + 12 + 11

= 39

Number of seashells each of us will get $= \dfrac{39}{3}$

= 13

$$\begin{array}{r|l} & 13 \\ \hline 3 & 39 \\ & -3 \\ \hline & 09 \\ & 9 \\ \hline & 0 \end{array}$$

Every person will get 13 seashells. We can say that 13 is the average of 16, 12 and 11. The average can be one of the values.

Try Yourself

Find the average of 13, 34, 16 and 28.

Key Fact

To find the average of the given quantities, we find the sum of the quantities and divide this sum by the number of quantities.

$$\text{Average} = \frac{\text{Sum of quantities}}{\text{Number of quantities}}$$

The length of 5 ropes is 2.4 m, 0.9 m, 1.6 m, 4.4 m and 3m respectively. Find the average length of the ropes.

$$\text{Average} = \frac{\text{sum of the lengths}}{\text{number of the ropes}}$$

$$\text{Average} = \frac{2.4 + 0.9 + 1.6 + 4.4 + 3}{5}$$

$$\text{Average} = \frac{12.3}{5}$$

$$\text{Average} = 2.46 \text{ m}$$

Thus, the average length of the rope is 2.46m

In the annual exams, Ali got an average of 78 marks in 7 subjects. Find the total marks he got.

$$\text{Average marks obtained} = \frac{\text{Total marks obtained}}{\text{Number of subjects}}$$

Total marks obtained = Average marks × number of subjects

$= 78 \times 7$

$= 546$

He scored 546 marks in 7 subjects.

Try Yourself

Find the average of 11, 23, 37, 55 and 82.

If the sum of quantities is 1,840 and their average is 115, then find the number of quantities.

$$\text{Average} = \frac{\text{sum of quantities}}{\text{number of quantities}}$$

$$\text{Number of quantities} = \frac{\text{sum of quantities}}{\text{average}}$$

$$\text{Number of quantities} = \frac{1840}{115} = 16$$

Try Yourself

If the average of 40 quantities is 215, then find the sum of the quantities.

TEACHING POINT

Divide the students into groups and ask them to measure the height of each of their group member and find their average height. Also compare their average with the other groups.

Try Yourself

Find the number of quantities if their sum is 5,200 and their average is 650.

Exercise 1

1. Find the average of the following.

a) 4, 13, 25,32, 42, 52

b) 12kg, 16kg, 26kg, 42kg

c) 10cm, 13cm, 17cm,16cm, 19cm

d) 5ℓ, 15ℓ, 30ℓ, 25ℓ, 40ℓ

2. Marwa recites 9, 11, 12, 10 and 8 a'yah of The Holy Quran in 5 days respectively. Find the average number of a'yah she recites in one day.

3. Saad has 16 pencil, Amna has 20, Sara has 15 and Ahmad has 9 pencils. Find the average number of pencils.

4. The average number of students in 18 schools situated in a city is 1,150. Find the total number of students in these schools altogether.

5. On average, Maryam baked 27 cakes a month, for a bakery for 11 months. What is the total number of cakes that she baked in these 11 months?

6. A factory hired a total of 1,240 labourers in 4 years. Find the average number of labourers hired in a year.

7. The runs scored by the students of a class in a cricket match are given below.

Students	Aimen	Haniya	Marwa	Sara	Nadia	Saba	Amna
Runs	21	52	54	33	37	47	28

Find the average runs of the students.

Organize the Data using a Bar Graph

Drawing a Bar Graph

The following table shows the details of the marks obtained out of the 10 marks in the Maths test during last 4 months. I want to show it in a bar graph. What will be the procedure?

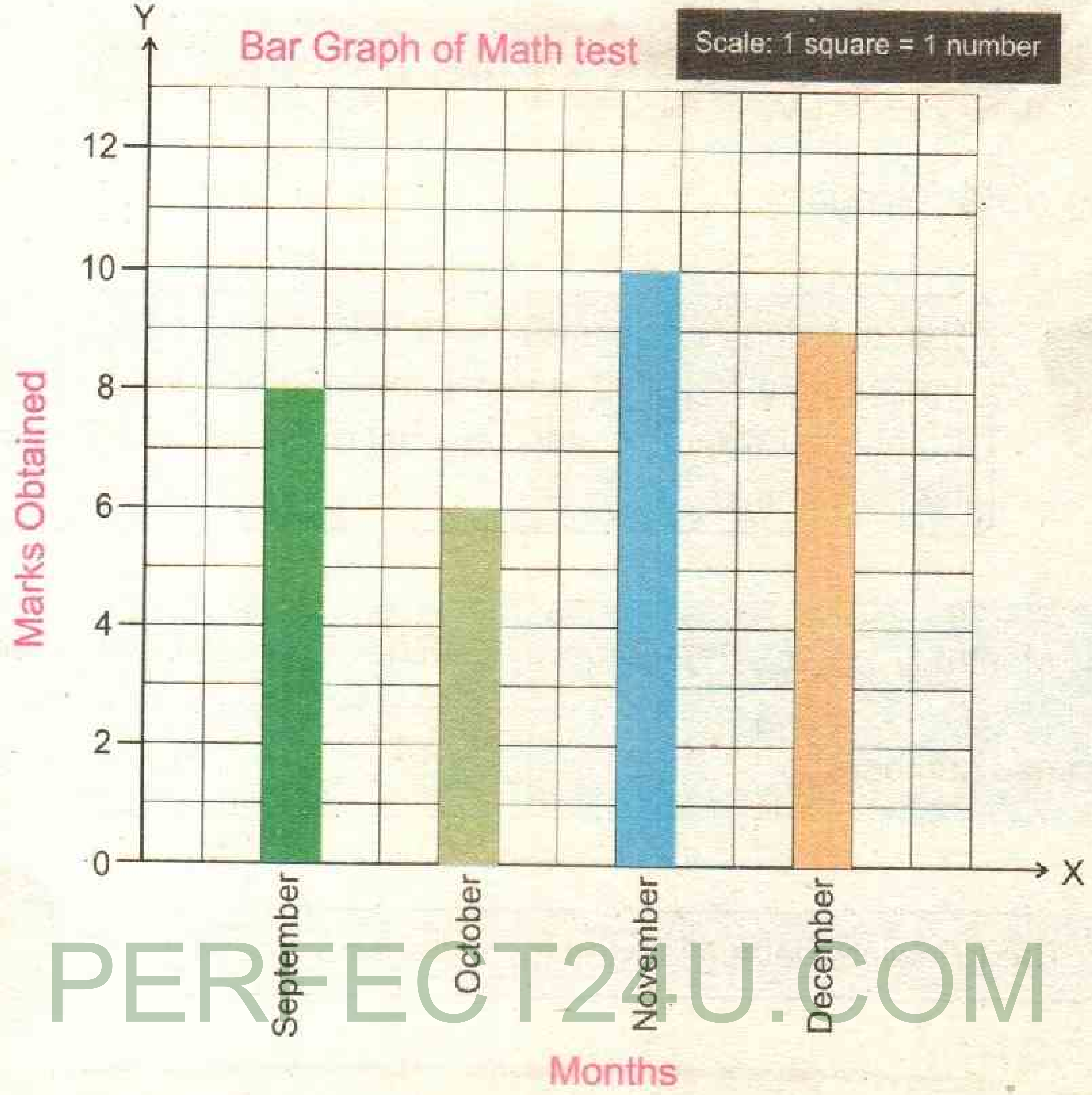
Months	September	October	November	December
Obtained numbers	8	6	10	9

The following method is used to create a bar graph.

- Mark the horizontal line as X-axis and the vertical line as Y-axis.
- Write the names of the months on the X-axis and the marks obtained on the Y-axis.
- One square with Y-axis represents 1 mark.
- 8 marks were obtained in September. So, we will colour 8 squares along the Y-axis.
- Similarly, 6 marks were obtained in October. So, we will colour 6 squares along the Y-axis.
- Complete the bar graph by coloring the number of squares for the marks obtained in all the months.

TEACHING POINT

Ask the students to take a survey of the school. For example the favourite subjects of the students, favourite food, favourite hobbies etc. Ask them to organise this data using bar graph.



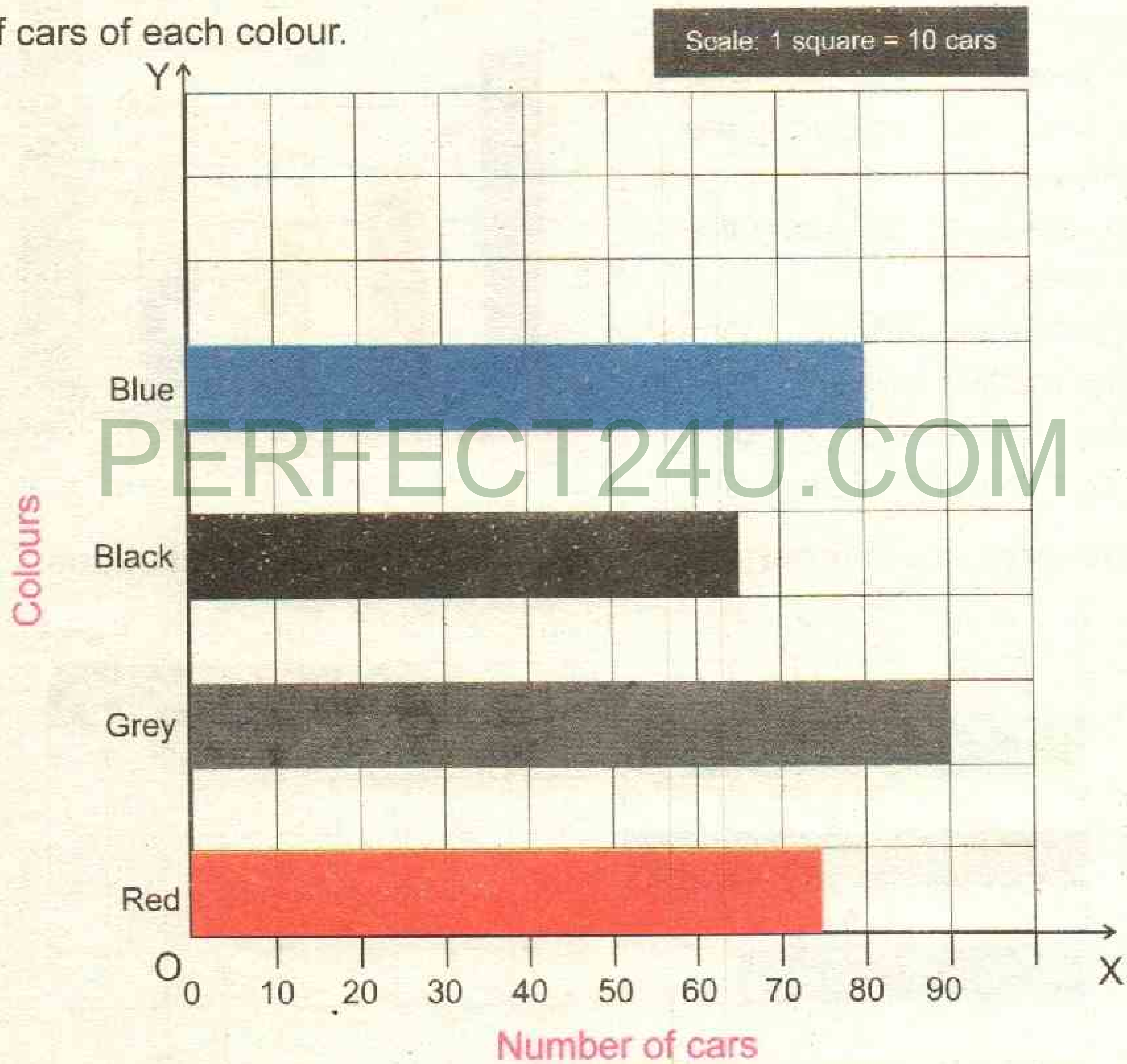
Key Fact

- In a bar graph the width of each bar should be the same.
- The bar graph given above is a vertical bar graph. Similarly, we can draw a horizontal bar graph.

The given table shows the number of cars of different colours in a car parking. Represent this data in a horizontal bar graph.

Colours	Blue	Black	Grey	Red
Number of cars	80	65	90	75

- Mark the horizontal line as X-axis and the vertical line as Y-axis.
- Write the number of cars on the x-axis and the colours of cars on the y-axis.
- One square with x-axis represents 10 cars.
- Complete the bar graph by coloring the number of squares for the number of cars of each colour.



Try It!

Record the information about the favorite hobby of your classmates in a table. Then organize it with the help of horizontal bar graph.

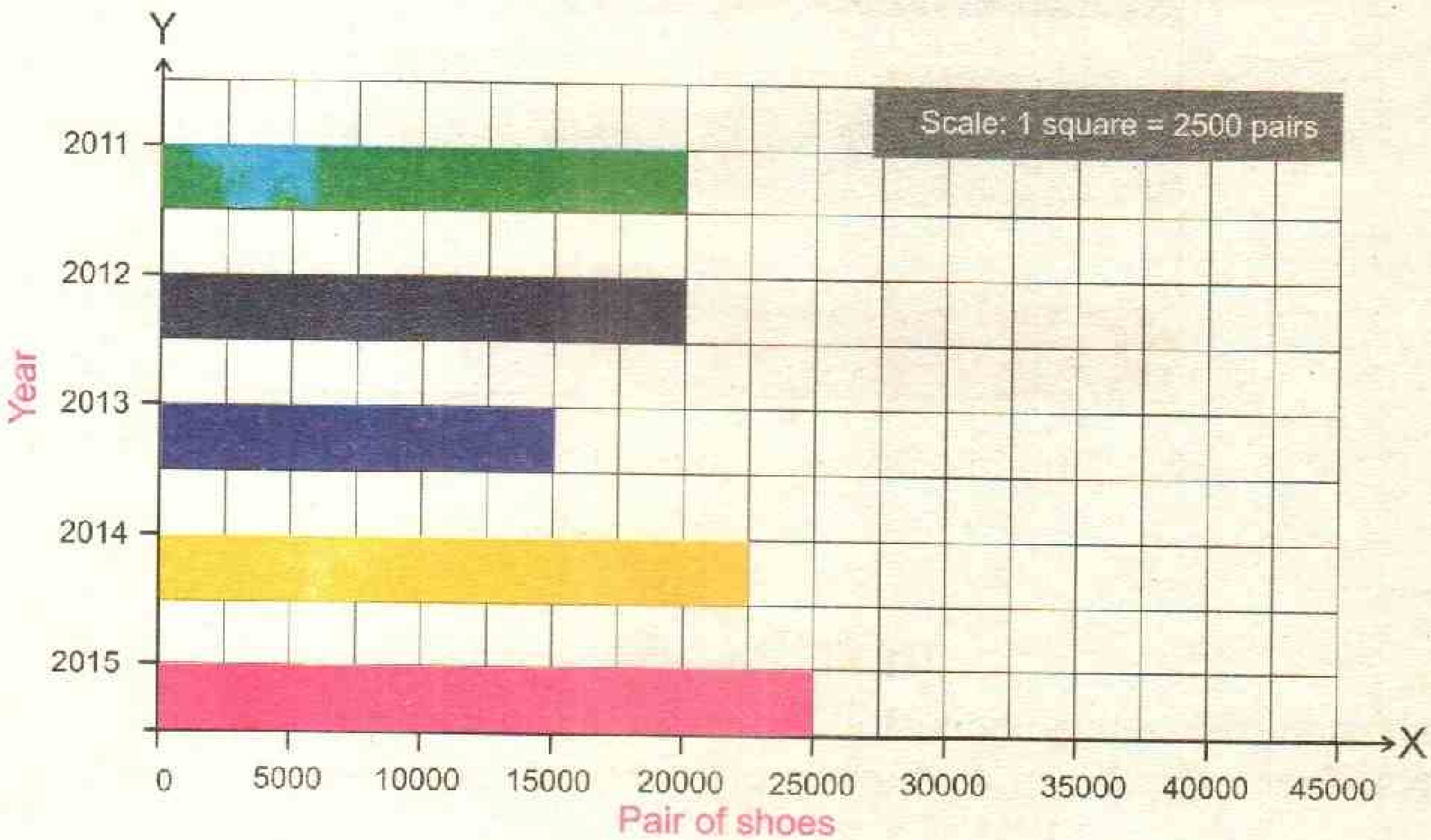
Reading a Bar Graph

The given bar graph shows the number of flowers that bloomed in Huma's garden during five weeks.

We can observe that:

- 6 flowers bloomed during the first week.
- 4 flowers bloomed during the second week.
- 3 flowers bloomed during the third week.
- 2 flowers bloomed during the fourth week.
- 7 flowers bloomed during the fifth week.
- The maximum flowers bloomed during the fifth week.
- Minimum flowers bloomed during the fourth week.

Let us observe another bar graph and answer the given questions.



1. In which year did the factory produce the most pairs of shoes?
2. In which year did the factory produce the fewest pairs of shoes?
3. In which year, the factory made 20,000 pairs of shoes?
4. How many less pairs of shoes were produced in 2011 than in 2015?
5. In which 2 years, the difference in the number of shoes in the factory is 10,000?
6. In which 3 years was the total number of shoes in the factory 55,000?
7. How many pairs of shoes did the factory produce in these 5 years?

Exercise 2

1. Farwa asked about the favourite fruit of each student in her class. The details of the answers given are shown in the table. Draw a horizontal bar graph of this data.

Favourite fruit	Strawberry	Apple	Banana	Mango
Number of students	5	4	8	9

2. The statistics of patients visiting a hospital during 5 months is given below. Draw a vertical bar graph of the given data.

Months	February	March	April	May	June
Number of patients	2	6	10	12	15

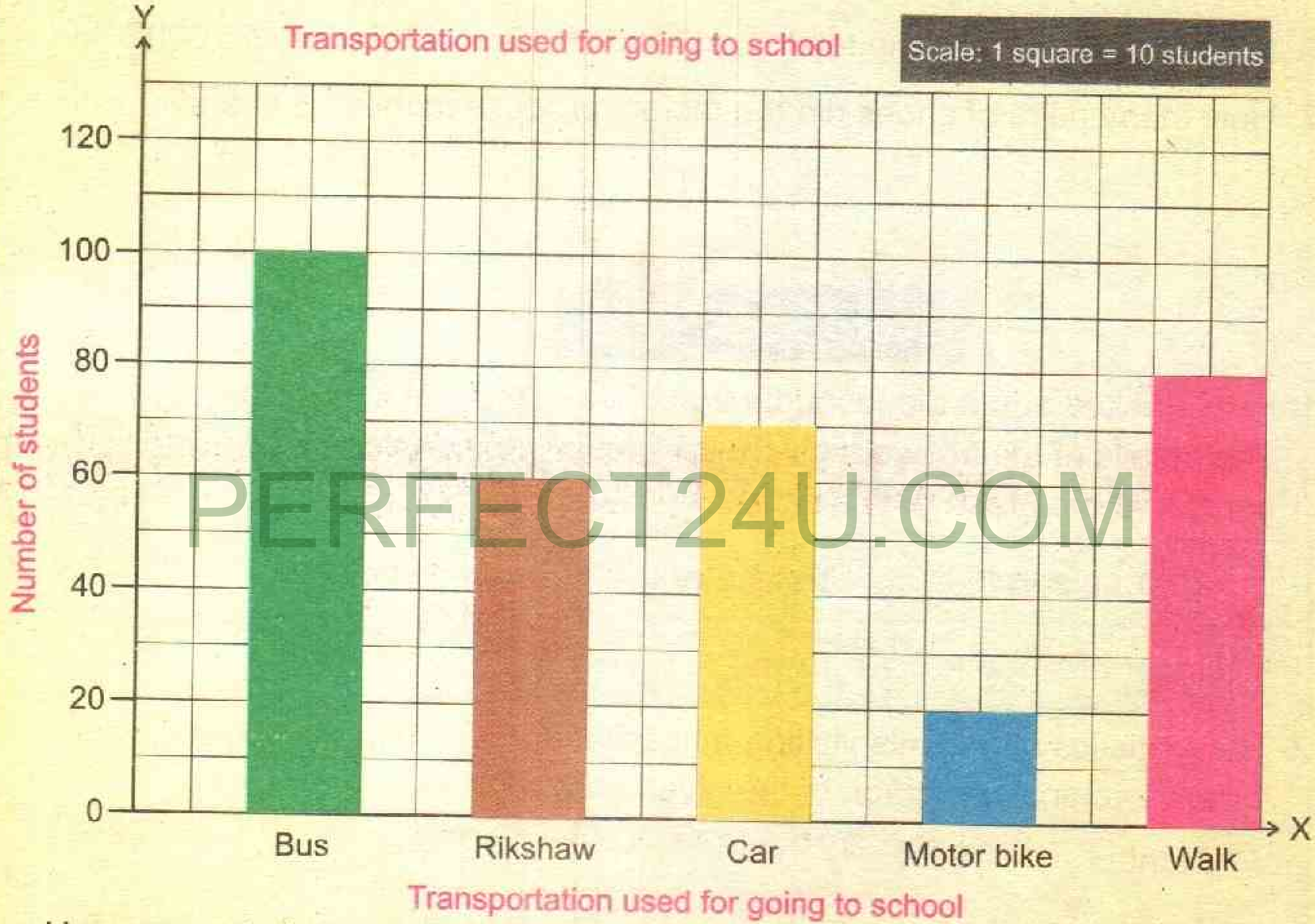
3. During a visit to a zoo the children saw different number of animals, the detail of which is given below. Draw its vertical bar graph to represent this data.

Animals	Lion	Elephant	Monkey	Cheeta	Snake	Giraffe	Zebra
Number of animals	4	2	8	3	12	6	10

4. In the following table the values of temperature in Lahore during a week of August, are given. Draw a horizontal bar graph to represent this data.

Days of week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Temperature (°C)	32	33	30	32	36	40	38

5. Study the graph carefully to answer the given questions.



a. How many students come to school by car?

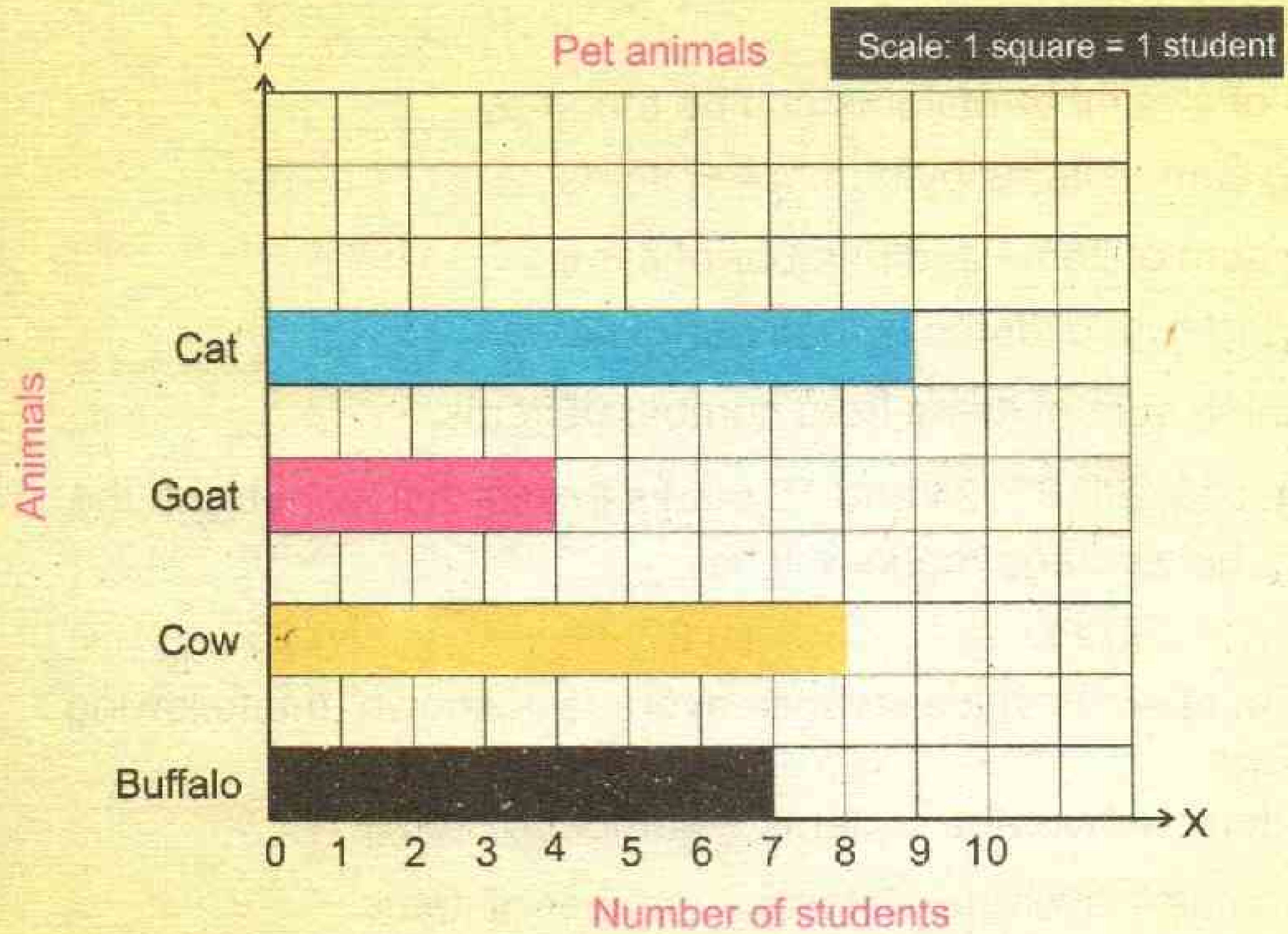
b. Is the number of students coming to school on the motorcycle less than those coming by rikshaw? If yes, then how much less?

c. Which means of transport do most students use? What is the number of students coming to school by this means?

d. What is the total number of students coming by car, rikshaw and bus altogether?

e. Write the number of students coming to school on foot.

6. Study the graph carefully to answer the given questions



a) How many students have a cat as a pet?
b) How many students have a goat as a pet?
c) Which is the most popular pet?
d) In total, how many students have a pet at home?
e) If the total number of students in the class is 35, find out how many students do not have any pets in their home.

I Have Learnt

- finding and describing average of given quantities in the data
- solving real life situations involving average
- organizing the given data using bar graph
- reading and interpreting a bar graph given in horizontal and vertical form
- drawing horizontal and vertical bar graphs for given data
- solving real life situations using data presented in bar graphs.

Vocabulary

average
data
bar graph
horizontal bar graph
vertical bar graph

Review Exercise

1. Encircle the best option.

a) The average of a number of items can be found by ______

i) Dividing sum of items by number of items

ii) Adding sum of items and number of items

iii) Multiplying sum of items by number of items

iiv) Subtracting sum of items from number of items

b) If a student got 19, 21, 22, 24 and 19 marks in different subjects in the monthly test, his average marks will be_______.

i) 19 ii) 21 iii) 22 iv) 25

c) To find the sum of some values whose average is known ,the following formula is used

i) sum of items = average of items + number of items

ii) sum of items = average of items – number of items

iii) sum of items = average of items × number of items

iiv) sum of items = $\dfrac{\text{average of items}}{\text{number of items}}$

d) If the sum of some quantities is 600 and the average is 50, then number of quantities will be_____

i) 15 ii) 12 iii) 10 iv) 5

E) Ahmed jumped 12 time in the first minute, 9 times in the second minute and 15 time in the third minute. What will be the average of number of jumps Ahmed did in the three minutes.

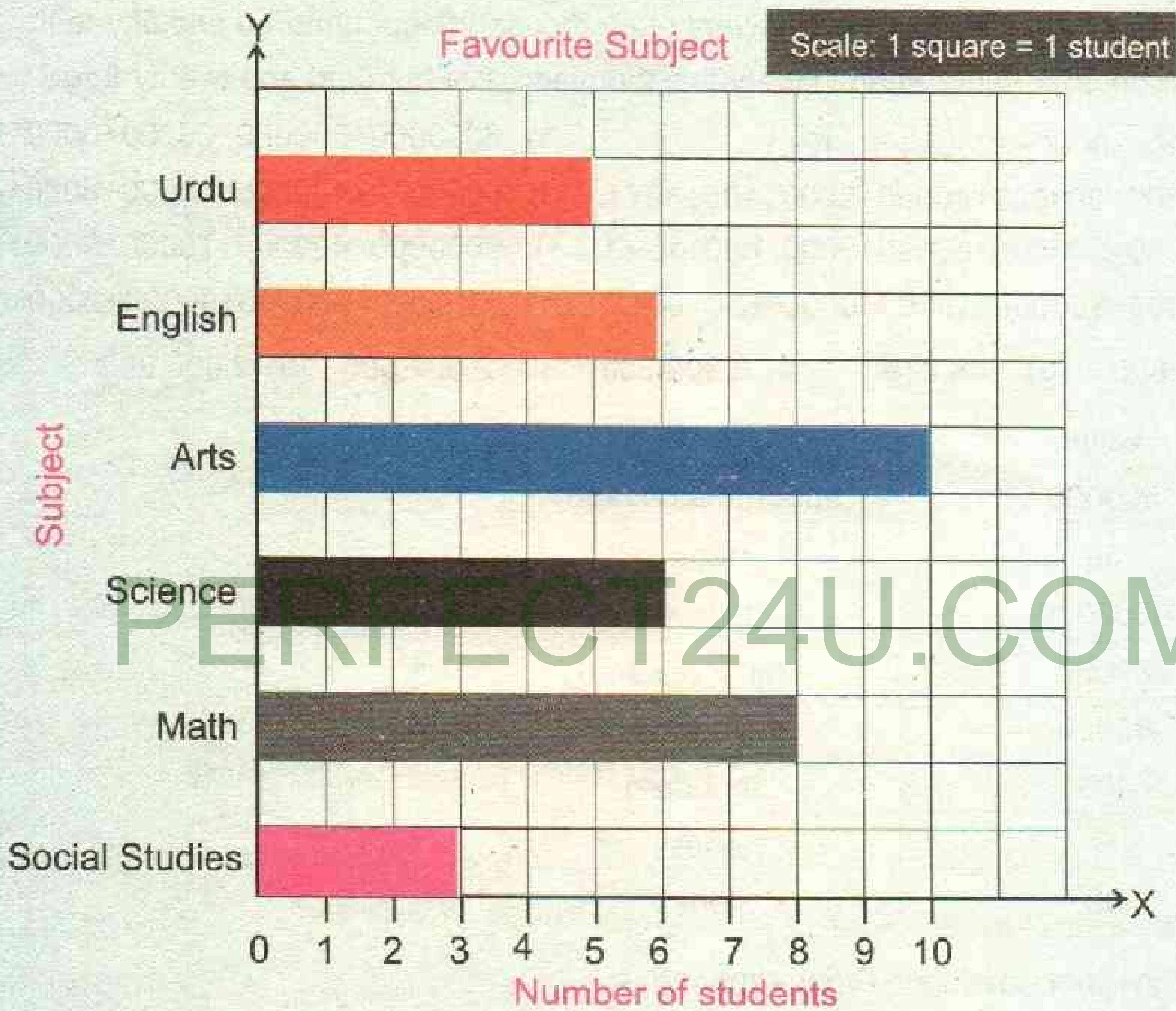
i) 9 ii) 11 iii) 12 iv) 15

2. A labour earned Rs.1,200 on the first day, Rs.1,000 on the second day, Rs.1,500 on the third day, Rs.1,300 on the fourth day and Rs.1,200 on the fifth day. Find out how many rupees he earned on average in these five days?

3. Find the average of six odd numbers from 1 to 11, and also find the average of six even numbers from 2 to 12.Which of these two average is greater in value, the even one or odd one?

4. A pharmacy earned a profit of Rs.50,000 in the first month, Rs.62,000 in the second month, Rs.68,000 in the third month, Rs.78,000 in the fourth month and Rs. 65,000 in the fifth month. Draw a vertical bar graph of the profit of the company for the five months.

5. Fifth graders were asked to vote for their favourite subjects. The following bar graph shows their responses. Read the graph carefully to answer the given questions.



a) A total of how many students choose Science and Mathematics?

b) How many students choose Arts?

c) How many more students choose Math than science as their favourite subject?

d) Which subjects are liked by the same number of students and what is their number?

e) Study the graph to find the total number of students in grade 5.

f) Find the most favourite and the least favourite subject of grade 5 students.

Answers

Unit 1 Whole Numbers and Operations

Exercise 1

1. a) Two hundred and ninety thousand and fourteen
   b) Four hundred and thirty three thousand, four hundred ad fifty-three
   c) One million, ten thousand and nine
   d) Nine million, eight hundred and seventy-one thousand, six hundred and fifty-three
   e) One million, two hundred and fifty-two thousand, one hundred and forty.
   f) Two million, six hundred and eighty-eight thousand adn sixty-one
   g) One million, eight hundred and seventy-four thousand, four hundred and fifty-four
   h) Six million, four hundred and ninety-five thousand, five hundred and twenty-three

2. a) 100000+30000+1000+400+40+1 b) 6000000+000000+00000+0000+900+00+0
   c) 4000000+900000+40000+9000+100+80+1 d) 6000000+400000+60000+6000+400+50+6
   e) 7000000+200000+80000+6000+000+10+9 f) 9000000+400000+70000+9000+300+20+1
   g) 8000000+500000+10000+0000+600+00+2 h) 1000000+200000+00000+2000+000+00+1

3. a) 8,007,800 b) 278,078 c) 8,808,808 d) 2,007,505 e) 2,006,002

4.

Value	Place value
500000	hundred thousand
30	tens
6000000	million
80000	ten thousand
90000	ten thousand
400	hundred
6	ones
30	tens

5. a) 1000000+000000+10000+4000+800+20+5
   b) One million, fourteen thousand, eight hundred and twenty-five.
   c) 1millions, 0 hundred thousands, 1 ten thousands, 4 thousands, 8 hundreds, 2 tensm 5 ones

6. a) 200000+90000+9000+700+90+2
   b) Two hundred and ninety-nine thouisand, seven hundred and ninety-two.
   c) 2 hundred thousands, 9 ten thousands, 9 thousands, 7 hundreds, 9 tensm, 1 ones

Exercise 2

1. a) 392262 b) 726582 c) 1294656 d) 748786 e) 1377664 f) 1163417
2. a) 4196 b) 582921 c) 229669 d) 16665 e) 353565 f) 179106
3. Rs 1459813 4. Rs 331455 5. a) 785733 b) 133895 6. 555581 kg 7. 411176
8. Rs 819288 9. a) 886865 b) in 2nd year Rs 10875 less 10. Rs 214010

Exercise 3

1. a) 3810, 38100, 381000 b) 40900, 409000, 4090000 c) 975090, 9750900, 97509000

   d) 2694720, 26947200, 269472000 e) 8521180, 85211800, 852118000

2. a) 4900, 490, 49 b) 7800, 780, 78 c) 6500, 650, 65
   d) 59700, 5970, 597 e) 21000, 2100, 210

3. a) 14352 b) 221040 c) 1071252 d) 3848607 e) 25357761
   f) 38049552 g) 508549986 h) 35978119

4. a) 896 b) 2981 c) 581 d) 981 e) 2839 f) 267 g) 6710 h) 2014 (r 6)

5. Rs 1254 (r 8) 6. Rs 1819988 7. 1142 8. 32256672 9. Rs 897100 10. a) 725 b) 485

Exercise 4

1.

	Next three terms	Rule
a)	2560, 10240, 40960	Multiplication by 4
b)	22000, 220000, 2200000	Multiplication by 10
c)	44, 22, 11	Division by 2
d)	1080, 1180, 1280	Adding 100
e)	480, 460, 440	Subtracting 20

3. a) multiplication by 3 b) subtracting 5 c) adding 9 d) division by 2

Review exercise

1. a) 3 b) 20 c) 6 d) 1000 e) division

2. a) Eight million, seven hundred and thirty-four thousand, one hundred and twenty three

   b) Six million, nine hundred and sixty-five thousand, one hundred and twenty-nine

   c) Four million, nine hundred and eighty-two thousand and nine.

   d) Nine million, twelve thousand and eleven.

3. a) 268355 b) 120691 c) 820112 d) 387434 e) 632489 f) 327108

4. a) 644509 b) 921324 c) 38740 d) 255020 e) 104227 f) 407461

5. a) 1507432 b) 6578100 c) 137194650 d) 434695716

6. a) 2021 b) 852 (r 64) c) 363 (r 64) d) 28 e) 5858 f) 1003 (r 20)

7.

	Next three terms	Rule
a)	250, 300, 350	Adding 50
b)	120, 105, 90	Subtracting 15
c)	11250, 56250, 281250	Multiplication by 5
d)	6100,610,61	Division by 10

8. a) 1,10,100,1000 b) 10000,10000,10000,10000 9. Rs 1444397 10. 311332

11. a) Rs 259780 b) 2734140 12. a) 1260 b) 8 c) 699300

13. a) Rule: Multiplication by 20 b) Rule: Division by 5

Unit 2 HCF and LCM

Exercise 1

1. a) 2 b) 3 c) 14 d) 45 e) 7 f) 1 g) 2 h) 6 i) 12 j) 2 k) 5 l) 13
2. a) 13 b) 25 c) 14 d) 2 e) 4 f) 19 g) 16 h) 20 i) 4 j) 24 k) 1 l) 13
3. 2 4. 13 5. 8 6. 15

Exercise 2

1. a) 21 b) 240 c) 60 d) 80 e) 54 f) 140 g) 300 h) 90 i) 144 j) 900 k) 19992 l) 4615
2. a) 70 b) 30 c) 90 d) 2100 e) 147 f) 4275 g) 96 h) 1120 i) 1092 j) 100 k) 42 l) 672
3. 3825cm, 51 pieces 4. 6384 5. 1:35 p.m 6. 3850cm 7. After 18 days

Review exercise

1. a) 4 b) 1 c) $2 \times 2 \times 2 \times 2$ d) 1782 e) product
2. a) 3 b) 10 c) 5 d) 8 e) 2 f) 2 g) 2 h) 3
3. a) 10 b) 15 c) 10 d) 2 e) 11 f) 2 g) 5 h) 13
4. a) 10 b) 21 c) 40 d) 80 e) 100 f) 1710 g) 1120 h) 66
5. a) 36 b) 77 c) 182 d) 40 e) 168 f) 60 g) 684 h) 210
6. among 7 kids 7. a) 6 b) 2 times, 4 times, 7 times 8. 1760 9. 60 stickers

Unit 3 Fractions

Exercise 1

1. a) 1 b) $\frac{176}{21}$ c) $4\frac{18}{35}$ d) $5\frac{9}{20}$ e) $3\frac{19}{36}$ f) $10\frac{3}{8}$ g) $8\frac{3}{8}$ h) $6\frac{1}{16}$
2. a) $1\frac{5}{12}$ b) $1\frac{2}{9}$ c) $2\frac{11}{42}$ d) $\frac{19}{66}$ e) $3\frac{2}{9}$ f) $\frac{19}{20}$ g) $2\frac{23}{72}$ h) $4\frac{19}{24}$
3. $3\frac{15}{24}$ 4. a) in math $1\frac{1}{4}$ h more b) $3\frac{3}{4}$ h 5. a) $2\frac{5}{9}$ m b) $16\frac{1}{3}$ m

Exercise 2

1. a) 6 b) $3\frac{8}{9}$ c) $2\frac{4}{7}$ d) 3 e) $3\frac{1}{3}$ f) $7\frac{1}{2}$
2. a) $\frac{1}{5}$ b) $\frac{1}{3}$ c) $6\frac{1}{4}$ d) $\frac{29}{300}$ e) $\frac{24}{245}$ f) $\frac{5}{28}$
   g) $14\frac{4}{7}$ h) $411\frac{39}{55}$ i) $517\frac{22}{27}$
3. a) $1\frac{1}{2}$ b) $\frac{3}{5}$ c) $\frac{5}{21}$ d) $\frac{89}{126}$ e) $\frac{350}{621}$ f) $\frac{37}{40}$
   g) $\frac{51}{76}$ h) $7\frac{7}{8}$ i) $\frac{1}{20}$ 4. $38\frac{1}{2}$ 5. 4 6. $\frac{1}{32}$
7. a) $3\frac{11}{12}$ m b) $23\frac{1}{96}$ m 8. $\frac{82}{111}$ 9. a) 10 b) $39\frac{3}{4}$

Review exercise

1. a) $\frac{11}{15}$ b) $\frac{1}{9}$ c) 1 d) (iv) e) addition and multiplication

2. a) $4\frac{13}{20}$ b) 8 c) $\frac{23}{25}$ d) $3\frac{3}{4}$ e) $5\frac{2}{3}$ f) $4\frac{11}{14}$ g) $7\frac{1}{2}$ h) $33\frac{1}{3}$ i) $2\frac{6}{37}$

3. 99 4. 9 5. $4\frac{41}{45}$ 6. $2\frac{16}{35}\ell$ 7. $7\frac{1}{4}$kg 8. 66h 9. $7\frac{1}{2}$m 10. $11\frac{5}{6}$m

Unit 4 Decimals and Percentage

Exercise 1

1. a) < b) < c) < d) < e) = f) < g) > h) < i) =

2. a) 3.81, 3.31, 3.01, 2.51, 2.47 b) 4.68, 4.32, 4.31, 4.23, 0.31 c) 6.77, 6.60, 6.33, 6.31, 6.21
   d) 1.66, 1.62, 1.61, 1.6, 1.03

3. a) 7.2, 9.4, 10.8, 12.4, 18.2 b) 8.05, 8.06, 8.5, 8.51, 8.52, 8.56
   c) 3.04, 3.14, 3.4, 3.45, 3.54, 3.55 d) 9.05, 9.09, 9.45, 9.5, 9.52, 9.55

Exercise 2

1. a) 12.431 b) 5.071 c) 92.231 d) 77.461 e) 52.047 f) 8.255
   g) 10.892 h) 5.07 i) 4.772 j) 23.071 k) 35.448 l) 72.35

2. a) 7.018 b) 8.59 c) 0.862 d) 4.079 e) 0.71 f) 2.477
   g) 5.245 h) 1.354 i) 0.911 j) 0.278 k) 1.59 l) 0.44

3. Rs162.62 4. In car 20.61km more 5. 7.46km 6. 3.7m

7. a) 79.05g b) In cake 22.05g more

Exercise 3

1. a) 15.9 b) 248 c) 4370 d) 543 e) 303 f) 3060
   g) 354 h) 87.3 i) 310.3 j) 47.2 k) 3420 l) 244

2. a) 439.52 b) 20.52 c) 166.94 d) 63.72 e) 2.46 f) 126.27
   g) 223.39 h) 244 i) 89.06 j) 100.87 k) 107.5 l) 355.18

3. a) 13.4 b) 6.486 c) 31.0788 d) 184.605 e) 13.3532 f) 13.5256
   g) 12.6238 h) 7.7792 i) 6.5278 j) 20.6016 k) 22.2662 l) 37.8852

4. 2412.5km 5. a) 255m b) 2550m c) 25500m 6. 50.76kg 7. Rs 3633

Exercise 4

1. a) 4.18 b) 0.0459 c) 0.00548 d) 0.0643 e) 0.414 f) 0.00617
   g) 0.0243 h) 7.14 i) 0.0424

2. a) 1.7 b) 1.91 c) 1.01 d) 0.04 e) 1.22 f) 1.7
   g) 20.15 h) 0.455 i) 1.2

3. a) 1.825 b) 2.2 c) 2.3 d) 0.8 e) 2.1 f) 2.7 g) 3.5 h) 9.2 i) 8.4

4. 0.75kg 5. a) 15 bottles b) 27 bottles

Exercise 5

1. a) 22.5 b) 0.76 c) 0.175 d) 0.33 e) 12.125 f) 9.75 g) 1.36
   h) 0.4 i) 3.4375 j) 2.3 k) 1.6 l) 1.8
2. 0.125

Exercise 6

1. a) 47.1, 47.13 b) 4.7, 4.73 c) 2.3, 2.32 d) 0.9, 0.94 e) 45.7, 45.68 f) 2.2, 2.15
   g) 91.5, 91.55 h) 94.2, 94.17 i) 5.2, 5.18 j) 3.8, 3.77 k) 4.2, 4.17 l) 90.3, 90.27
2. a) 70.88 b) 911.0 c) 77.88 d) 664.8 e) 771.3 f) 1242.0
   g) 89.72 h) 104.40 i) 187.90 j) 1778.2 k) 691.2 l) 1459.0
3. a) 4.31 b) 9.81 c) 44.97 d) 74.8 e) 266.7 f) 110.2
   g) 248.4 h) 242.6 i) 27.63 j) 502.65 k) 1.4 l) 2.039

Exercise 7

1. a) 4% b) 35% c) 76% d) 12% e) 28% f) 47%
   g) 45% h) 66% i) 89% j) 1%

2. a) $\frac{13}{100}$ b) $\frac{24}{100}$ c) $\frac{46}{100}$ d) $\frac{55}{100}$ e) $\frac{68}{100}$ f) $\frac{72}{100}$ g) $\frac{87}{100}$ h) $\frac{98}{100}$ i) $\frac{11}{100}$ j) $\frac{10}{100}$
3. a) 0.15 b) 0.26 c) 0.47 d) 0.52 e) 0.63 f) 0.74 g) 0.85 h) 0.96 i) 0.17 j) 0.18
4. a) 10% b) 40% c) 40% d) 36% e) 15% f) 42% g) 20% h) 35% i) 90% j) 24%
5. 6% 14% 23% 34% 43% 55% 63% 71% 98% 30%
6. 73% 7. a) 2 b) 38 8. 90 9. 0.12, $\frac{3}{25}$ 10. 0.6, 60%, $\frac{3}{5}$

Review exercise

1. a) 0 b) right c) % d) 108 e) 100
2. a) < b) > c) < d) > e) = f) <
3. a) 14.245 b) 26.593 c) 94.48 d) 99.69 e) 64.688 f) 31.721
   g) 61.6 h) 3.28 i) 3.42 j) 20.919 k) 4.569 l) 14.149
4. Rs 46.21 5. a) 73.2m b) In 2nd roll 40.44m more
6. a) 29 pieces b) 18m

7. a) 328.5 b) 439 c) 5980 d) 137.34 e) 178.02 f) 46.605
g) 161.007 h) 10.6653 i) 25.2756 j) 0.826 k) 2.4 l) 1.684

8. a) 65.919 b) 78.0 c) 1001.0 d) 38.9 e) 83.0 f) 409.6

9. a) 2.2, 2.23 b) 3.2, 3.17 c) 5.4, 5.37 d) 9.5, 9.52

10.

	Percentage	Decimal	Fractions
a)	42%	0.42	$\frac{21}{50}$
b)	82%	0.82	$\frac{82}{100}$
c)	28%	0.28	$\frac{7}{25}$
d)	65%	0.65	$\frac{65}{100}$
e)	25%	0.25	$\frac{25}{100}$

11. 0.72, 72%, $\frac{72}{100}$ 12. a) 8 b) 24 13. a) 12 b) 0.4, $\frac{8}{20}$

Unit 5 Distance and Time

Exercise 1

1. a) 34000m b) 74930m c) 0.97km d) 5km890m e) 6700cm f) 65046cm
g) 8.4m h) 1070mm i) 996mm j) 7cm k) 48cm5mm l) 90000cm

2. 1114cm 3. 1400mm 4. a) 62cm 7mm b) 985 mm 5. 966 m 18 cm

6. Ahmer's home is neaerer to ali's home by 1km102m. 7. 1097m

Exercise 2

1. a) 2700min b) 14456min c) 16h d) 7h 20min e) 3840sec f) 10800sec
g) 9min4 sec h) 10min

2. a) 672 months b) 418 months c) 4 years 4) 4 years 8 months e) 546 days
f) 90days g) 7 weeks h) 6 months i) 2010 days j) 1349 days

Exercise 3

1. a) 9h 3min b) 28min 31sec c) 74 years 7 months d) 10 weeks 4 days e) 124 months
f) 10 months 26 days

2. a) 12h 56min b) 8min 28sec c) 5 weeks 5 days d) 6 months18 days
e) 2 months 11 days

3. 12h 18min
4. 6 days more in first project
5. 15 months
6. a) 5h 2min b) 1h 22min in maths

Review exercise

1. a) 2000 b) time c) 6 d) 300 e) 300 f) 49
2. a) 52000m b) 21103m c) 1.05km d) 6km e) 19800cm f) 50066cm g) 6.4m h) 980mm
3. a) 1386min b) 6h c) 9h 40min d) 3840 sec e) 13min 15sec f) 3.3min
4. a) 936 months b) 174 months c) 2 years 2 months d) 65 days e) 5 weeks f) 14 months
5. a) 16h 4min b) 57min 56sec c) 89 years 4 months d) 21min 25sec e) 18 weeks 3 days f) 104 months 19 days g) 10 months 27 days h) 4 weeks 6 days
6. a) 27m 55cm b) 2m 71cm
7. a) First shirt 1h 24 min more b) 6h 6min

Unit 6 Unitary Method

Exercise 1

1. Rs 1976
2. Rs 935
3. Rs 2627
4. 315kg
5. 37
6. Rs 45
7. Rs 18210
8. Rs 145

Exercise 2

1. 7350
2. Rs 1010041
3. 13.2kg
4. 5310km
5. Rs 14528020
6. Rs 1680
7. Rs 81250

Review exercise

1. a) Rs 1250 b) Rs 3255 c) 5550 d) Rs 576 e) Rs 3440
2. Rs 6600
3. Rs 1500
4. a) 10625 b) 42500
5. a) Rs 443832 b) Rs 184930

Unit 7 Geometry

Exercise 1

1. a) right angle b) Reflex angle c) straight angle d) acute angle e) obtuse angle

3. ∠1 and ∠2, ∠2 and ∠3, ∠3 and ∠4, ∠4 and ∠1

4. a) 82^0 b) 0^0 c) 65^0 d) 177^0 e) 102^0 f) 45^0 g) 90^0

5. a) 78^0 b) 2^0 c) 0^0 d) 80^0 e) 28^0 f) 50^0 g) 20^0

Exercise 2

1. a) Scalene triangle b) Isosceles triangle c) equilateral triangle d) Isosceles triangle

2. a) acute-angled triangle b) Obtuse angled triangle
   c) acute angled triangle d) right angled triangle

Exercise 4

1. a, b, d, e, f, h

2. a) 2 d) 4 e) 4 g) 4

Exercise 5

	a	b	c
	Cube	Pyramid	Cuboid
a)	6	5	6
b)	6 square faces	3 triangular faces 1 square face	6 rectangular aces

2. a, c, d
3. a) cuboid b) pyramid c) cube d) pyramid e) cuboid

Review exercise

1. a) 215° b) 160° c) straight angle d) 180° e) iii f) 2 g) i
   h) 2 i) i

3. a, c, d 10. b, c, d 11. a) 4 b) 2 d) 4

Unit 8 Perimeter and Area

Exercise 1

1. a) 28m b) 52cm c) 16m 2. a) 28cm b) 22m c) 28m

3. 116m 4. 18cm

5. a) 20cm b) 48cm c) 24m d) 76cm e) 104m f) 10cm
   g) 38.8m h) 60m i) 66.4cm j) 40m k) 28.4cm l) 10.8cm

6. a) 10cm b) 15m c) 20cm d) 20.4m e) 31.8m f) 54cm

7. 48m 8. 10m 9. 39.2m 10. a) 40cm b) Rs 200

11 a) 449m b) Rs 211030

Exercise 2

1. a) $6.25m^2$ b) $484cm^2$ c) $1823.29m^2$
2. a) $13.5cm^2$ b) $12m^2$ c) $10m^2$
3. $32m^2$
4. a) $20.25m^2$ b) $86.49cm^2$ c) $77.44m^2$ d) $225cm^2$ e) $169cm^2$ f) $9m^2$
   g) $36m^2$ h) $8.41m^2$ i) $25cm^2$ j) $84.64m^2$ k) $196m^2$ l) $1.21cm^2$
5. a) $9.5cm^2$ b) $12m^2$ c) $24cm^2$ d) $35cm^2$ e) $94.5cm^2$ f) $340m^2$
6. $13176m^2$
7. a) 8.5m b) Rs5376.25
8. a) 726m b) Rs7573500
9. $192cm^2$

Review exercise

1. a) 14.8cm b) 4L c) 2(L + W) d) 3m e) L × L f) L × W
   g) 4cm h) 56 cm

2.

	Area (cm^2/m^2)	Perimeter (cm/m)
a)	67.24	32.8
b)	6.76	10.4
c)	163.84	51.2
d)	62.41	31.6
e)	256	64
f)	18.49	17.2
g)	32.49	22.8
h)	121	44

3.

	Area (cm^2/m^2)	Perimeter (cm/m)
a)	20.4	18.8
b)	0.36	3
c)	130	46
d)	144.5	51

4. 28cm 5. a) $120m^2$ b) 30 6. 6m 7. 6cm 8. $100cm^2$

Unit 9 Data Handling

Exercise 1

1. a) 28 b) 24 kg c) 15 cm d) 23 ℓ

2. 10 3. 15 4. 20700 5. 297 6. 310 7. 38.85

Exercise 2

5. a) 70 b) yes, 40 c) Bus, 100 d) 230 e) 80

6. a) 9 b) 4 c) cat d) 28 e) 7

Review exercise

1. a) i b) ii c) iii d) ii e) iii

2. Rs 1240 3. 6, 7 Even numbers have greater average

5. a) 14 b) 10 c) 2 d) 6, English and Science e) 38

f) Most favourite: Arts
Least favourite: Social Studies

Glossary

Acute angled-triangle: A triangle in which all angles are acute, is called an acute angled triangle.

Adjacent angles: Two angles will be called adjacent angles, if they have a common vertex and a common arm.

Area: The space covered by the surface of any two dimensional shape, is called its area.

Average: To find the average of the given quantities, we find the sum of quantities and then divide this sum by the number of quantities.

Complementary angles: Two angles will be called complementary angles if their sum is 90°.

Degree: The unit to measure angle is degree"°".

Equilateral triangle: A triangle in which all the three sides are equal is called an equilateral triangle. Every angle of an equilateral triangle is equal to 60°.

Expanded form: Writing a number as the sum of the place value of its digits is called its expanded form.

HCF: The greatest number which divides 2 or more numbers simultaneously is called their HCF.

LCM: The LCM of two or more numbers is the smallest number which divides each of the given number completely.

Net: A net is a two dimensional shape which can be folded in a specific pattern to get a three dimensional solid.

Obtuse angle triangle: A triangle in which one angle is obtuse is called an obtuse angle triangle.

Percentage: Percentage is a special kind of fraction whose denominator is always 100.

Perimeter: The total length of the boundary of a closed region is called its perimeter.

Reflective Symmetry: The shapes whose two halves are the mirror image of each other, have reflective symmetry in them.

Rotational symmetry: A figure will have rotational symmetry if it is rotated around a center point and looks exactly the same at least two times during the full rotation

Rule of a number Pattern: The rule of a number pattern tells us how the next number in the pattern is obtained.

Scalene triangle: A triangle in which no side is equal is called a scalene triangle.

Straight angle: An angle, measuring exactly 180° is called straight angle.

Supplementary angles: Two angles will be will be called supplementary angles if their sum is equal to 180°.

Appendix

LCM = product of common prime factors × product of non-common prime factors

Perimeter of a square = 4 × length of one side

Perimeter of rectangle: 2 × (Length + Width)

Area of a square = Length × Length

Area of rectangle = Length × width

$$\text{Average} = \frac{\text{Sum of quantities}}{\text{Number of quantities}}$$

Web Links

www.mathworksheets4kids.com/triangles.html

www.ixl.com/math/grade-5/types-of-triangles

www.mathsisfun.com/geometry/triangles-interac_ve.html

www.bbc.co.uk/schools/teachers/ks2_ac_vi_es/maths/angles

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6.	Activities, projects and additional work is suggested for reinforcement of concepts.	
7.	Assessment achievements are thought provoking and comprise cognitive, psychomotor and effective skills.	
8.	The textbook is easy to be covered within academic year.	

Page No.	Observation/comments	Suggested amendment along with rationale

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