## Exercise 14.1

**1.**

| Weekly wages (in `) ($x$) | Frequency ($f$) |
|---|---|
| 150 | 3 |
| 200 | 5 |
| 250 | 4 |
| 300 | 2 |

(a) range in wages (in ₹) = highest value – lowest value 350 150 = ₹ 200
(b) 1 worker gets ₹ 350
(c) 3 workers get the minimum wages i.e. ₹ 150.

**2.**

| Number of member ($n$) | Frequency ($f$) |
|---|---|
| 2 | 1 |
| 3 | 1 |
| 5 | 4 |
| 6 | 6 |
| 7 | 5 |
| 8 | 3 |
| | $f$ 20 |

(a) smallest family size = 2
number of families are smallest size = 1
(b) most common family size is 6.

**3.** (a) highest value of rainfall = 25.6 mm
lowest value of rainfall = 0.0 mm.
(b) range highest value – lowest value (25.6 0.0) mm = 25.6 mm.

**4.**

| Marks | 9 | 12 | 17 | 18 | 19 | 20 | 25 |
|---|---|---|---|---|---|---|---|
| Frequency | 6 | 4 | 4 | 2 | 4 | 3 | 2 |

(a) range of marks highest marks – lowest marks 25 9 16
(b) Highest marks 25
(c) 9 marks is occuring frequently.

**5.** First 11 prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31

Then, mean $\dfrac{\text{Sum of observations}}{\text{Number of observations}}$

$$\frac{2 \quad 3 \quad 5 \quad 7 \quad 4 \quad 13 \quad 17 \quad 19 \quad 23 \quad 29 \quad 31}{11} \quad \frac{160}{11} \quad 14.54$$

**6.** The scores 13, 9, 10, 12, 1, 3, 4, 4

Then, mean $\dfrac{\text{Sum of observations}}{\text{Number of observations}}$

$$\frac{13 \quad 9 \quad 10 \quad 12 \quad 1 \quad 3 \quad 4 \quad 4}{8} \quad \frac{56}{8} \quad 7$$

**7.** First ten odd numbers are 1, 3, 5, 7, 9, 11, 13, 15, 17, 19

Then Mean $\dfrac{\text{Sum of observations}}{\text{Number of observations}}$

$$\frac{1 \quad 3 \quad 5 \quad 7 \quad 9 \quad 11 \quad 13 \quad 15 \quad 17 \quad 19}{10}$$

$$\frac{100}{10} \quad 10$$

**8.** (a) Mean $\dfrac{10 \quad 32 \quad 14 \quad 42 \quad 20 \quad 22 \quad 38 \quad 34 \quad 27 \quad 16 \quad 9 \quad 18 \quad 17 \quad 25 \quad 36}{15}$

$$\frac{360}{15} \quad 24$$

(b) Mean $\dfrac{3.8 \quad 4.2 \quad 3.3 \quad 3.7 \quad 4 \quad 3.7 \quad 4.6 \quad 3.9 \quad 4.4 \quad 4.4}{10} \quad \frac{40}{10} \quad 4$

**9.** Mean 9, Number of observations 6

Mean $\dfrac{\text{Sum of observations}}{\text{Number of observations}}$

$$\frac{9}{1} \quad \frac{5 \quad 7 \quad a \quad 8 \quad 10 \quad 11}{6} \quad \text{(cross multiplication)}$$

$$54 \quad 41 \quad a$$

$a \quad 54 \quad 41 \quad 13$

**10.** Meant 8, number of observations 5

Meant $\dfrac{\text{Sum of observations}}{\text{Number of observations}}$

$$8 \quad \frac{5 \quad 9 \quad 6 \quad x \quad 3}{5} \quad \text{(cross multiplication)}$$

$40 \quad 23 \quad x$

$x \quad 40 \quad 23 \quad 17$

**11.** Average (Mean) $\dfrac{\text{Sum of scores}}{\text{Number of batsman}}$

$$\frac{15 \quad 20 \quad 3 \quad 0 \quad 50 \quad 16 \quad 35 \quad 61 \quad 20 \quad 5 \quad 18}{11}$$

$$\frac{243}{11} \quad 22.09091$$

**12.** Mean of 75 number = 35

If each number is multiplied by 4, then

the new mean became 4 times greater than the previous mean

So, new mean 35 4 140

**13.** Mean = 27 Number of observation = 5

Suppose sum of observation $x$

$\because$ Mean $\dfrac{\text{Sum of observations}}{\text{Number of observations}}$

$$\frac{27}{1} \quad \frac{x}{5}$$

$x \quad 27 \quad 5 \quad 135$

after adding one more number.

New mean = 25 Number of observation $\quad 5 \quad 1 \quad 6$

Suppose the number $\quad y$

then Mean $\dfrac{135 \quad y}{6}$

$$\frac{25}{1} \times \frac{135 \quad y}{6}$$

$135 \quad y \quad 150$

$y \quad 150 \quad 135 \quad 15$

So, the number is 15.

**14.** (Mean) Average runs scored by $A$ $\dfrac{\text{Sum of scores}}{\text{Number of innings}}$

$$\frac{15 \quad 25 \quad 0 \quad 32 \quad 35 \quad 65}{6} \quad \frac{172}{6} \quad 28.66$$

(Mean) Average runs scored by $B$ $\dfrac{24 \quad 36 \quad 12 \quad 14 \quad 18 \quad 30}{6}$

$$\frac{134}{6} \quad 22.33$$

(Mean) Average runs scored by $C$ $\dfrac{18 \quad 45 \quad 37 \quad 3 \quad 40 \quad 32}{6} \quad \dfrac{175}{6} \quad 29.16$

Clearly we can see $29.16 > 28.66 > 22.37$

So, $C$ is the best batsman.

## Exercise 14.2

**1.** Hence the items in ascending order are as follows :

32, 33, 34, 35, 35, 38, 42

The number of items = 7 (odd)

$$\text{Median} \quad \frac{n \quad 1}{2}^{\text{th}} \quad \frac{7 \quad 1}{2} \quad \frac{8}{2} \quad 4^{\text{th}}$$

Hence median = 35.

Here the number 35 has been repeated 2 time (the most number).

Hence, the mode = 35.

**2.** Here the items in ascending order are as follows :

17, 18, 24, 25, 35, 36, 46

Number of items = 7 (odd)

$$\text{Median} \quad \frac{n \quad 1}{2}^{\text{th}} \text{ item} \quad \frac{7 \quad 1}{2} \quad \frac{8}{2} \quad 4^{\text{th}} \text{ item}$$

Hence, median = 25.

**3.** Ascending order of items : 12, 12, 13, 13, 14, 14, 16, 19

Number of items $\quad 9$ (odd)

$$\text{Median} \quad \frac{n \quad 1}{2}^{\text{th}} \text{ item}$$

Hence, median = 14.

Here, the number 14 has been repeated 3 times

Mode is 14.

**4.** Here the items in the ascending order are as follows :

6, 8, 10, 10, 10, 15, 15, 50, 20, 80, 100, 120

Mean $\dfrac{\text{Sum of the scores}}{\text{Number of batsman}}$

$$\frac{6+8+10+10+10+15+15+20+50+80+100+120}{11} = \frac{424}{11} = 38.55$$

Number of items 11 (odd)

$$\text{Median} \quad \frac{n+1}{2}^{\text{th}} \text{ item} \quad \frac{11+1}{2} \quad 6 \text{ item}$$

Median 135

Here the number 10 has been repeated 3 times (the most number).

No, the three values are not same.

**5.** Here the marks in ascending order are as follows :

5, 9, 10, 12, 15, 16, 19, 20, 20, 20, 20, 23, 24, 25, 26

Number of items = 15 (odd)

$$\text{Median} \quad \frac{n+1}{2}^{\text{th}} \text{ item} \quad \frac{15+1}{2} \quad \frac{16}{2} \quad 8\text{th item}$$

Hence, median = 20.

Here the number 20 has been repeated 4 times (the most number).

Yes the median and mode are the same.

**6.** (i) False (ii) True (iii) False (iv) False (v) False.

**7.** (a)

| Size | 9 | 8 | 10 | 6 | 5 | 7 |
|---|---|---|---|---|---|---|
| No. of shoes | 14 | 60 | 8 | 48 | 42 | 65 |

Here, the maximum number of persons in 65, who take shoes of size 7.

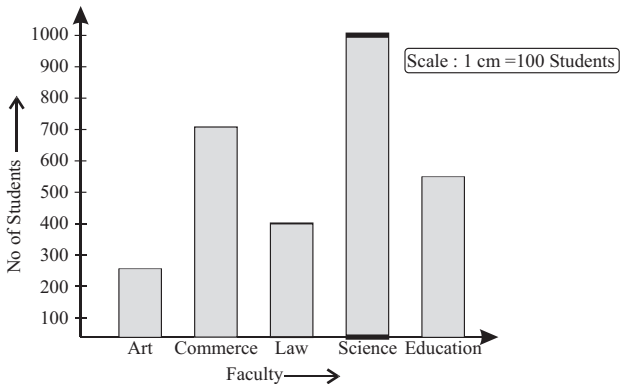
(b)

| Size | 5 | 7 | 4 | 2 | 6 | 3 |
|---|---|---|---|---|---|---|
| Frequency | 15 | 14 | 10 | 12 | 18 | 18 |

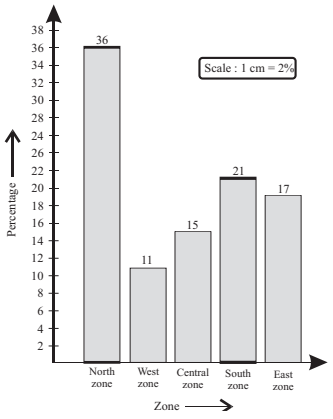
Here the sizes 3 and 6 has maximum frequency 18.

## Exercise 14.3

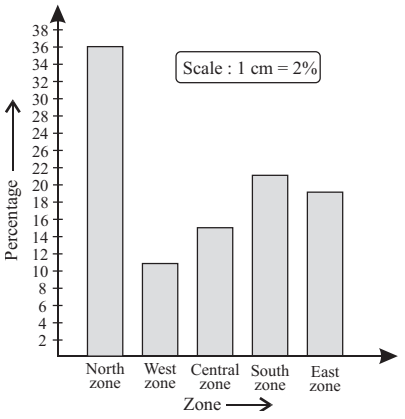
**1.**



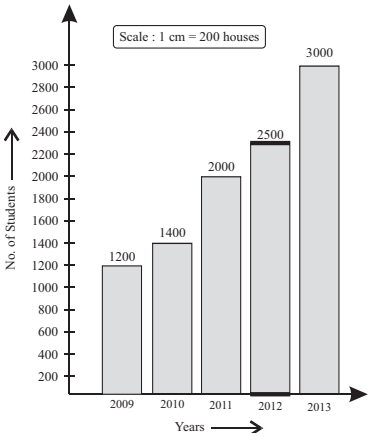
**2.**


Scale : 1 cm = 2%
Percentage
36
11
15
21
17
North zone
West zone
Central zone
South zone
East zone
Zone

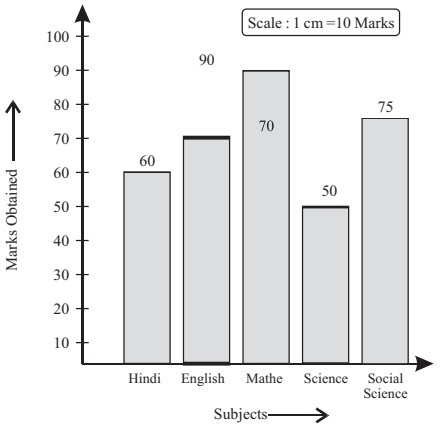
**3.**


Scale : 1 cm = 2%
Percentage
North zone
West zone
Central zone
South zone
East zone
Zone

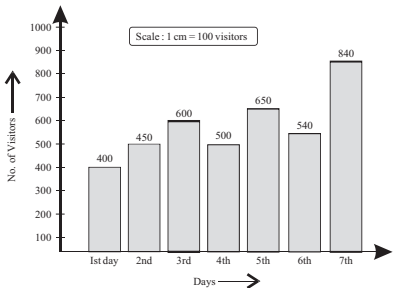
**4.**


Scale : 1 cm = 200 houses
No. of Students
1200
1400
2000
2500
3000
2009
2010
2011
2012
2013
Years

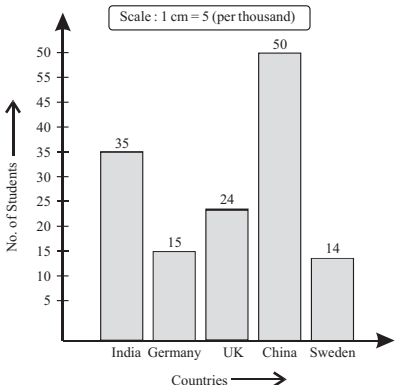
**5.**


Scale : 1 cm =10 Marks
Marks Obtained
60
90
70
50
75
Hindi
English
Mathe
Science
Social Science
Subjects

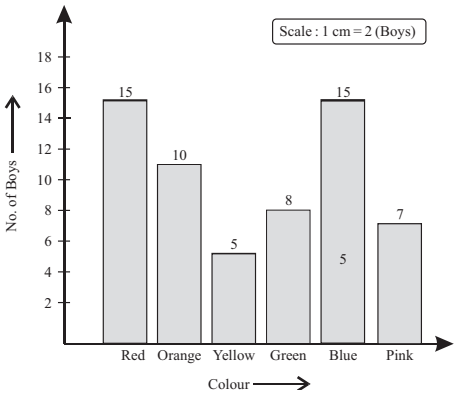
**6.**


Scale : 1 cm = 100 visitors
No. of Visitors
400
450
600
500
650
540
840
Ist day
2nd
3rd
4th
5th
6th
7th
Days

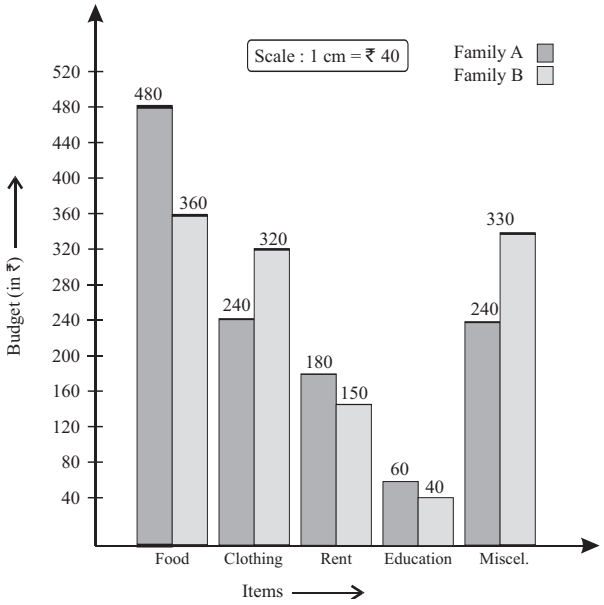
**7.**


Scale : 1 cm = 5 (per thousand)
No. of Students
35
15
24
50
14
India
Germany
UK
China
Sweden
Countries

**8.**


Scale : 1 cm = 2 (Boys)
No. of Boys
15
10
5
8
15
5
7
Red
Orange
Yellow
Green
Blue
Pink
Colour

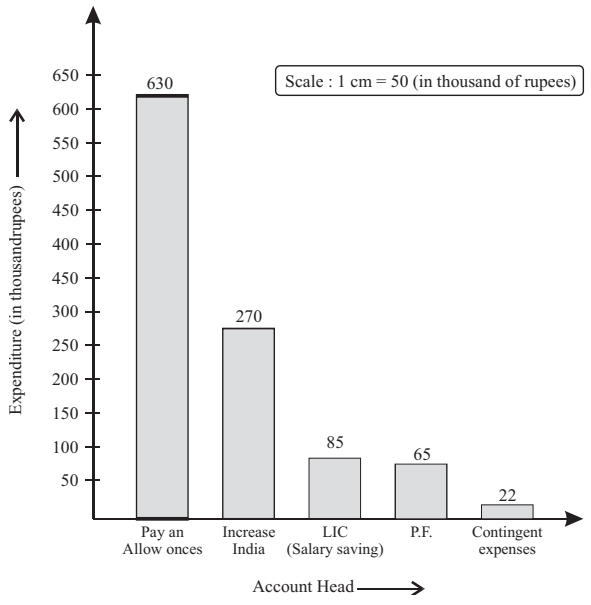
**9.**




(i) Expenditure for food by family *A* ₹ 480
Expenditure for food by family *B* ₹ 360
The difference between expenditure for food by two families = ₹ 480 – ₹ 360
= ₹ 120
So, the family *B* expend ₹ 120 more than family *A* for food.

(ii) Expenditure of family *B* for clothing = ₹ 240
Expenditure of family *A* for clothing = ₹ 320
The difference between the expenditure clothing = ₹ 320 – ₹ 240 = ₹ 80
So, the family *A* expend ₹ 80 more than family *B* per clothing.

**10.** This bar graph shows the annual expenditure of an establishment in the year 1990-91.



## Exercise 14.4

**1.** (a) likely (b) likely (c) unlikely (d) likely
(e) likely (f) unlikely (g) likely.

**2.** (a) certain (b) possible (c) possible (d) certain
(e) possible (f) possible (g) impossible (h) impossible.

**3.** (a) likely (b) impossible (c) impossible (d) likely
(e) even chance (f) even chance (g) certain (h) certain
(i) unlikely (j) unlikely (k) even chance (l) likely.

## Exercise 14.5

**1.**

| S. No. | Number of Total outcomes | Possible Outcomes | Probability of each outcome |
|---|---|---|---|
| 1. | 5 | *A, E, I, O, U* | $\frac{1}{5}$ |
| 2. | 6 | 1, 2, 3, 4, 5, 6 | $\frac{1}{6}$ |
| 3. | 5 | *M, A, R, C, H* | $\frac{1}{5}$ |
| 4. | 2 2 3 7 | *W, W, R, R, B, B, B* | $\frac{1}{7}$ |

## Exercise 14.6

**1.** No. of angel fishes = 9,
No. of gold fishes = 3,
total no. of fishes = 12
Possible outcomes are catching an angel or gold fish.
Catching an angel fish is more likely, because angel fishes are more than gold fishes.

**2.** No. of black balls = 7,
No. of green balls = 3
Possible outcomes are (black ball or green ball)
It is more likely to be black ball, because there are more black balls in the bag.

**3.** No. of chits with name of boys = 30, No. of chits with name of girls = 12
Posible outcomes are name of a boys or name of a girls.
It is more likely to be chosen name of boys, because name of boys are more than name of girls.

**4.** In spinner *X* is the pointer more likely because the coloured part occupied more space in *X*.

**5.** Picking up an apple or a mango. Picking up an apple is more likely, as their number is more.

## Exercise 14.7

**1.** Red balls = 3, Black balls = 2, Total balls = 5
(a) Probability of drawing a red ball $\frac{\text{No.. of red balls}}{\text{Total balls}}$ $\frac{3}{5}$

(b) Probability of drawing a black ball $\frac{\text{No. of black balls}}{\text{Total balls}}$ $\frac{2}{5}$

**2.** No. of red balls = 2,
No. of black ball = 3,
No. of blue ball = 4
Total no. of balls = 2 + 3 + 4 = 9

(a) $P$ (a red ball) $\frac{2}{9}$ (b) $P$ (a black ball) $\frac{3}{9}$ $\frac{1}{3}$ (c) $P$ (a blue ball) $\frac{4}{9}$

**3.** On throwing a die, total no. of possible outcomes = 6

(a) Probability that the upper face will be 3 $\frac{\text{Favourable outcomes}}{\text{Total outcomes}}$ $\frac{1}{6}$

(b) Upper face less than 3 1,2
Probability that the uper face < 3 $\frac{\text{Favourable outcomes}}{\text{Total outcomes}}$ $\frac{2}{6}$ $\frac{1}{3}$

(c) Upper face more than 3 = 4, 5, 6
Probability that the number face more than 3 $\frac{3}{6}$ $\frac{1}{2}$

(d) Upper face will be 8 = 0 (because no face of dice has the number 8).
Probability that the upper face will be 8 $\frac{0}{6}$ 0.

**4.** On throwing a ludo dice, total no. of possible outcomes = 6

(a) $P$ (that the no. of dots on its upper face) $\frac{\text{Favourable outcomes}}{\text{Total outcomes}}$ $\frac{1}{6}$.

(b) $P$ (that no. of dots less than 4 on its upper face) $\frac{3}{6}$ $\frac{1}{2}$.

(c) No. of odd number faces (1,3,5) 3
$P$ (that the no. of dots on its upper face is an odd number).

**5.** No. of boys = 7, No. of chance drawing his own name from the basket = 1
$P$ (drawing his own name from the basket) $\frac{1}{7}$.

**6.** on throwing a dice, Total no. of possible outcomes = 6

(a) no. of dots in upper faces be an odd number = (1, 3, 5) = 3
$P$ (an odd number on its upper face) $\frac{\text{Favourable outcomes}}{\text{Total outcomes}}$ $\frac{3}{6}$ $\frac{1}{2}$

(b) No. of dots in upper faces to an even number = (2, 4, 6) = 3
$P$ (an even number on its upper face) $\frac{3}{6}$ $\frac{1}{2}$

**7.** Number of white marbles = 2
Number of blue marbles = 3
Number of green marbles = 4
Number of red marbles = 5
total no. of marbles in the jar 2 3 4 5 14

(a) $P$ (that the marble is white) $\frac{\text{No. of white marbles}}{\text{Total no. of marbles}}$ $\frac{2}{14}$ $\frac{1}{7}$

(b) $P$ (that the marble is blue) $\frac{\text{No. of blue marbles}}{\text{Total no. of marbles}}$ $\frac{3}{14}$

(c) $P$ (that the marble is green) $\dfrac{\text{No. of green marbles}}{\text{Total no. of marbles}} \quad \dfrac{4}{14} \quad \dfrac{2}{7}$

(d) $P$ (that the marble is red) $\dfrac{\text{No. of red marbles}}{\text{Total no. of marbles}} \quad \dfrac{5}{14}$

**8.** No. of socks in box = 2 (black and white)
No. of black socks = 1, no. of white socks = 1

$P$ (picked out a black sock) $\dfrac{\text{No. of black socks}}{\text{Total no. of socks}} \quad \dfrac{1}{2}$

$P$ (that he will make a pair) $\dfrac{1}{2}$

**9.** Total no. of chances to start the game by both the teams = 2 (A & B)
In tossing a coin, there are two possible outcomes (H or T)
Possible outcomes to start the game for team $A$ 1

$P$ (that team a will start the game) $\dfrac{\text{Chance to start the game by team A}}{\text{Total no. of chance to start the game}} \quad \dfrac{1}{2}$

**10.** In a gift pack of chips, number of cheese & onion = 3
In a gift pack of chips, number of plain salted = 4
In a gift pack of chips, number of masala munch = 5
In a gift pack of chips, number of pudina = 2
Total no. of items in a gift packed chips = 3 + 4 + 5 + 2 = 14

(a) Probability picking Masala $\dfrac{\text{No. of masala munch}}{\text{Total no. of items}} \quad \dfrac{5}{14}$

(b) Probability picking Pudina $\dfrac{\text{No. of Pudina}}{\text{Total no. of items}} \quad \dfrac{2}{14} \quad \dfrac{1}{7}$

(c) Probability plain salted $\dfrac{\text{No. of plain salted}}{\text{Total no. of items}} \quad \dfrac{4}{14} \quad \dfrac{2}{7}$

(d) Probability cheese & Onion $\dfrac{3}{14}$

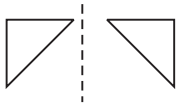
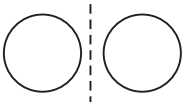
**11.** Probability scale of all the events

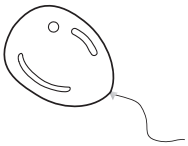
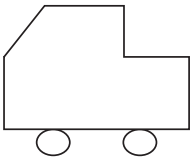
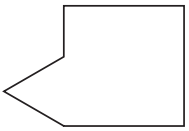
### MCQs

**1.** (b) **2.** (c) **3.** (a) **4.** (d) **5.** (d) **6.** (a)
**7.** (d) **8.** (b) **9.** (a) **10.** (a)

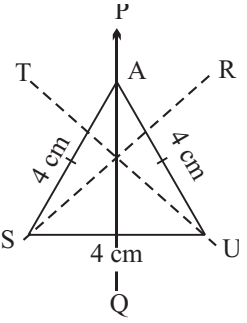
# 15 Symmetry

## Exercise 15.1

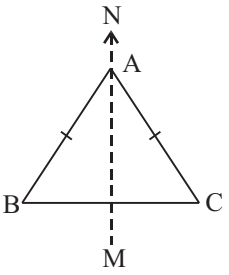
**1.** (a)  (b)  (c)  (d) 

**2.** (a)  (b)  (c) 

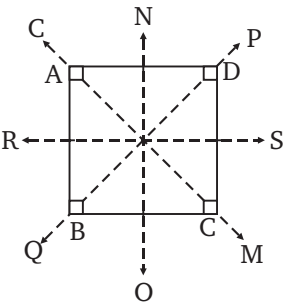
**3.** (a) The lines of symmetry are $PQ, RS$ and $TU$ the three bisectors which are also perpendicular bisectors of the sides of the triangle.
There is no point of symmetry.



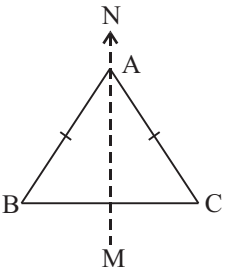

(b) The line of symmetry is $MN$, the bisector of the vertical angle $BAC$.
There is no point of symmetry.



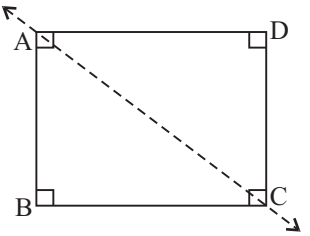

(c) The four line of symmetry are $LM, NO, PQ$ and $RS$.
There is one point of symmetry $E$.



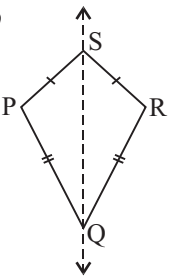

(d) The line of symmetry is $PQ$.
There is no point of symmetry.



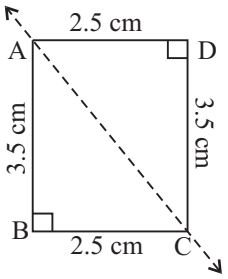

**4.** (i) The sides corresponding to $AB$ and $BC$ are $CD$ and $DA$.
The angle corresponding to $ABC$ is $ADC$.



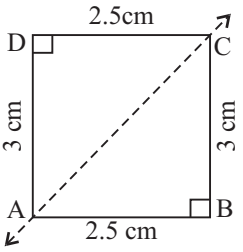

(ii) The sides corresponding to $SP$ and $PQ$ are $SR$ and $RQ$ respectively.



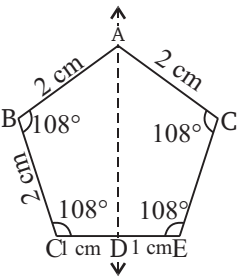

**5.** (a)



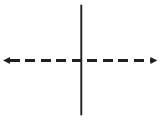

(b)




(c)

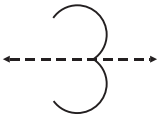


**6.** (a)



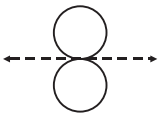
one line of symmetry

(b)



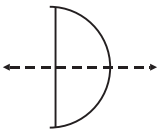
one line of symmetry

(c)



2 lines of symmetry

(d)



1 line of symmetry

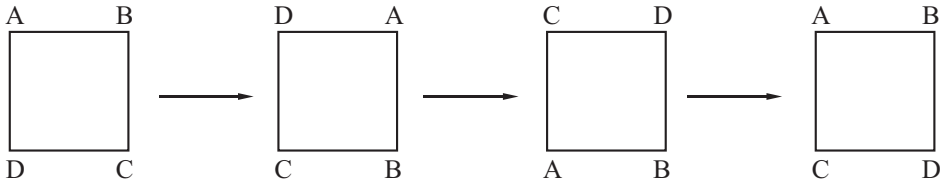
## Exercise 15.2

**1.** No.

**2.** Order of rotation symmetry $\frac{360}{\text{Angle of rotation}}$ $\frac{360}{72}$ 5

Regular pentagon has rotational symmetry of order 5.

**3.**

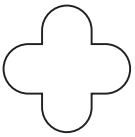



Order of rotational symmetry $\frac{360}{\text{Angle of rotation}}$ $\frac{360}{90}$ 4

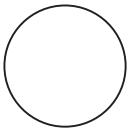
**4.** (i)



(v)

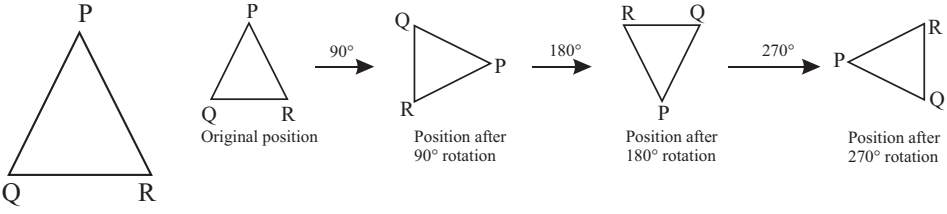


(vi)



These three shapes show rotational symmetry.

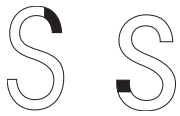
**5.**




Rotation with *P* as fixed point shown as under.

**6.** You could turn (rotate) the letter *S* around to its new position and you would not know it had changed (a blob has put on to show its position).

So, rotational order of length *S* is $\frac{360}{2}$ 2

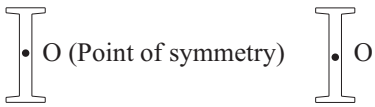


Note that letter *S* has point of symmetry also.

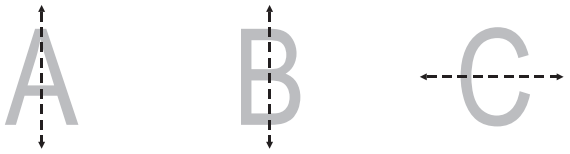
we can turn (rotate) the letter I around to its new position any we would not know. It had changed (a blob has put on to show its position).

So, rotational order of letter I is $\frac{360}{180}$ 2

Letter I has point of symmetry *O*.



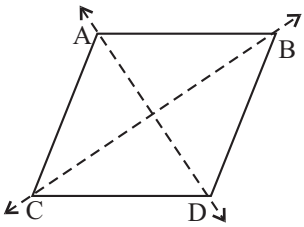
**7.**



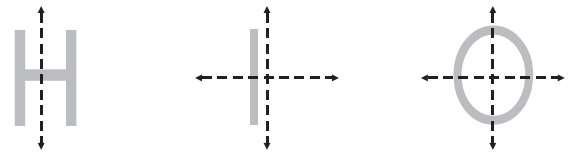

The leters $A, B$ and $C$ has a line of symmetry, but they have no rotational symmetry.

**8.** Parallelogram is a geometrical figure which has no line of symmetry.

Rotaional symmetry of order $\frac{360}{180}$ 2




**9.**




The letters $H, I$ and $O$ has lines of symmetry and the rotational symmetry.

**10. State whether the following statements are True or False :**

(a) False (b) True (c) True (d) False

(e) True (f) False (g) False.

### MCQ's

**1.** (c) **2.** (c) **3.** (a) **4.** (c) **5.** (c)

# 16 Perimeter and Area

## Exercise 16.1

**1.**

| S.No. | Length | Breadth | Area | Perimeter |
|---|---|---|---|---|
| (i) | 19 cm | 14 cm | 266 $cm^2$ | 66 cm |
| (ii) | 16.8 cm | 7.2 cm | 120.96 $cm^2$ | 48 cm |

**2.** (a) Side = 4.8 cm

Area of square $(Side)^2$

Area of square $(4.8)^2$

$4.8 \quad 4.8 = 23.04\ cm^2$

Perimeter $4 \times side = 4 \times 4.8 = 19.2$ cm

(b) Side = 35 m

Area of square = $(side)^2$

Area of square = $(35\ m)^2 = 35 \times 35\ m^2 = 1225\ m^2$

Perimeter = $4 \times side = 4 \times 35 = 140$ m

(c) Side = 44 mm

Side $\frac{44}{10}$ cm $\quad \because 1\text{mm} \quad \frac{1}{10}$ cm

Side = 4.4 cm

Area of square $(\text{side})^2 = (4.4\text{ cm})^2$

$4.4 \times 4.4\text{ cm}^2$

$19.36\text{ cm}^2 = 1936\text{ cm}^2$

Perimeter $4 \times$ side $4$ $4.4 = 17.6$ cm $= 176$ mm

(d) Side $2\text{m}\ 50\text{ cm}$ $2\text{m} + 50$ cm

$2\text{m} + \frac{50}{100}$ m $\quad [\because 1\text{cm} \quad 1\text{m} \quad 100]$

$2\text{m} + \frac{1}{2}\text{m} = 2.5$ m

Area of square $(\text{side})^2$

$(2.5)^2 = 2.5 \times 2.5$

Area of square $= 6.25\text{ m}^2$

Perimeter $= 4 \times \text{side} = 4 \times 2.5 = 10$ m

**3.** Given, Area of rectangle $= 24\text{ cm}^2$

width $= 6$ cm

In rectangle, $l$ $\frac{\text{Area}}{\text{width}}$ $\frac{24}{6}$ $4$ cm

**4.** Let the length and breadth be $l$ and $b$ respectively.

Then Area $l$ $b$

Now, length and breadth become double.

$l_2$ $2l$ and $b_2$ $2b$

Now, the area of rectangle length $\times$ breadth

$2l$ $2b$ $4lb$

4 (Area of previous rectangle)

Hence, double both the sides of a rectangle, the new Area will become four times the previous rectangle.

**5.** Given, length of a rectangular field $180$ m

Breadth of a rectangular field $650$ m

Area $l$ $b$ $180\text{m} \times 650\text{ m}$

$117000\text{m}^2$ $\quad [1\text{hectare} \quad 10{,}000\text{m}^2]$

$\frac{117000}{10}\text{m}^2$

$11.7 \times 10000\text{ m}^2 = 11.7$ hectares

**6.** Length of a playground = 200 m

breadth of a playground = 150 m

Athlete want to run 7 km around this field.

So, he will cover 7 round of this field.

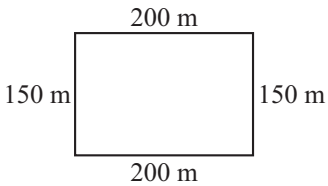
Now, distance covered by the Athlete in 1 round

= Perimeter of the playground

$2(l \quad b) \quad 2(200 \quad 150)$

$2 \quad 350 \quad 700\text{m}$

Total distance covered by the Athlete $7$ km



$7 \times 1000\ \text{m} = 70000\ \text{m}$

required time to go around this field $\frac{7000}{700}$ 10 times

Hence, the Athlete should go 10 times around this field.

**7.** Length of the floor = 16 m,
Breadth of the floor = 12 m
Athlele want to run 7 km around this field. So, he will cover 7 round of this field.

Area of the rectangular floor $l \quad b = 16\ \text{m} \times 12\ \text{m} = 192\ \text{m}^2$

$\because$ The cost of carpetting the rectangular floor of $1\ \text{m}^2 = ₹\ 225$

The cost of carpetting the rectangular floor of $192\ \text{m}^2 = ₹\ (225 \times 192) = ₹\ 43200$

**8.** Area of greeting cards $l \quad b \quad 10\ \text{cm} \times 6\ \text{cm} = 60\ \text{cm}^2$

Area of a sheet of paper $l \quad b \quad 1 \quad 0.96 = 0.96\,\text{m}^2$

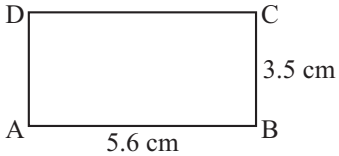
$0.96 \quad 100 \quad 100\,\text{cm}^2 \qquad [\because 1\text{m}^2 \quad 100 \quad 100\text{cm}]$

$\frac{96}{100} \quad 100 \quad 100\,\text{cm}^2 = 9600\ \text{cm}^2$

no. of greeting cards $\frac{\text{Area of a sheet of paper}}{\text{Area of greeting cards}}$

$\frac{9600\text{cm}^2}{60\text{cm}^2} \quad 160$

**9.** length of room $= 5.6$ m
breadth of room $= 3.6$ m




Area of room $l \quad b \quad 5.6 \quad 3.6\,\text{m}^2$

$= 20.16\ \text{m}^2$

Area of one square marble side × side

$10 \times 10 = 100\ \text{cm}^2$

$\frac{100}{100 \quad 100}\,\text{m}^2$

$[\because 1\text{m} \quad 100\text{cm}]$

$\frac{1}{100}\,\text{m}^2$

$= 0.01\ \text{m}^2 \qquad 1\text{cm}^2 \quad \frac{1}{100 \quad 100}\,\text{m}^2$

required number of tiles to be laid in the room

$\frac{\text{Area of the room}}{\text{Area of one square marble}}$

$\frac{20.16\text{m}^2}{0.01\text{m}^2} \quad \frac{20.16}{0.01}$

$\frac{2016}{1} = 2016$

$\because$ Cost of laying 2 files = ₹ 5

Cost of laying 2 tile = $₹\ \frac{5}{2}$

and cost of laying 2016 files $= ₹\frac{5}{2}$ 2016

₹ 5 × 1008 = ₹ 5040

**10.** Length ($l$) 2.6 m,

breadth ($b$) 1.1 m

Area of the door $l$ $b$ 2.6 m × 1.1 m

= 2.86 $m^2$

∵ cost of painting 1 $m^2$ the area of door = ₹ 20

cost of painting 2.86 $m^2$ area of the door on both sides = ₹ 20 × (2 × 2.86)

= ₹ 114.40

**11.** length ($l$) 400 m, breadth ($b$) 225 m

Area of farmer's rectangular plot $l$ $b$

400 m × 225 m = 90,000 $m^2$

We know that, 1 hectare = 10,000 $m^2$

Let he should buy $x$ $m^2$ more area of the land.

then, we have $x$ 90,000 10 hectare

$x$ 90,000 10 10,000 $m^2$

$x$ 90,000 100000

$x$ 100000 90000

$x$ 10,000 $m^2$

Hence, he should buy 10,000 $m^2$ more area of land to make the area of his field equal to be hectare.

**12.** Area of the square plot = 400 m × 400 m = 160000 $m^2$

he keeps the area of the square plot with him 9 hectares

9 10,000 $m^2$ [∵ 1 hectare 10,000 $m^2$ ]

= 90,000 $m^2$

remaining sold plot (160000 90000) $m^2$ = 70,000 $m^2$

Now, since cost of selling the remaining plot of 1 $m^2$ ₹ 900

cost of selling the remaining plot of 70,000 $m^2$ ₹ 900 × 70,000

₹ 63,000,000

₹ 6 crore 30 lakh.

**13.** The area of four walls of a room 144 $m^2$

Let breadth of the room $x$ m

Then length of the room $(3x)$

and height of the room = 3 m

Area of 4 walls 2 $(l$ $b)$ $h$

2 $(3x$ $x)$ 3 144

6 $4x$ 144

$x$ $\frac{144}{24}$ 6

breadth ($b$) $x$ 6 m

length ($l$) 3 $x$ 3 6 18 m

Now, Area of the floor $l$ $b$

18 6 108 $m^2$

**14.** Given, Area of the square $= 18050\ m^2$

but area of the square $= (\text{side})^2$

$18050 \quad a^2 \quad \ldots(1)$

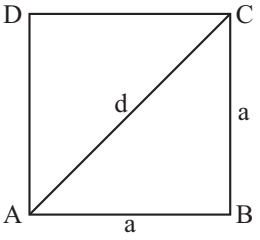
Now, length of the diagonal $(d) \quad \sqrt{a^2 \quad a^2} \quad \sqrt{2a^2}$

$d \quad \sqrt{2 \quad 18050}$

[by equation (1)]

$\sqrt{36100\,m^2}$

$190\,m$




**15.** Length $(l) \quad 9.5$ m, breadth $(b) \quad 7.5$ m, height $= 2.5$ m

Area of 4 walls of the room $\quad 2(l \quad b) \quad h$

$2 \quad (9.5 \quad 7.5) \quad 2.5$

$85\,m^2 \quad \ldots(1)$

Area of 1 door $\quad 2\,m \times 3\,m \quad 6\,m^2 \quad \ldots(2)$

Area of 2 windows $\quad 2 \quad (l \quad b)\ 2 \quad (3.5 \quad 2) \quad 14\,m^2 \quad \ldots(3)$

Total area of 1 door and 2 windows $\quad 6 \quad 14 \quad 20\,m^2 \quad \ldots(4)$

Area to be painting $\quad 85 \quad 20 \quad 65\,m^2$

$\because$ cost of painting $1\ m^2$ Area $= ₹\ 5.60$

cost of painting $65\ m^2$ area $= ₹\ (65 \quad 5.60) = ₹\ 364$

Hence, the total cost of painting the 4 walls $= ₹\ 364$

## Exercise 16.2

**1.** Let $ABCD$ is the field and shaded portion is the path

Then, $EF \quad 130 \quad 4 \quad 4 \quad 138\,m$

$FG \quad 85 \quad 4 \quad 4 \quad 93\,m$

Area of the field $\quad (l \quad b)\,m^2$

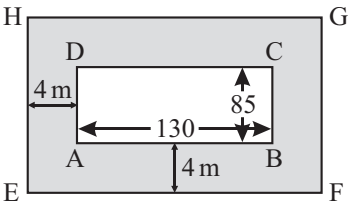
$ABCD \quad (130 \quad 85)\,m^2 = 11050\ m^2$

Area of $EFGH \quad (l \quad b)\,m^2$

$138 \quad 93 \quad 12834\,m^2$

Area of the path = Area of $EFGH$ – Area of $ABCD$

$12834 \quad 11050 \quad 1784\,m^2$




**2.** Let $ABCD$ be a square field.

Whose sides $AB \quad BC \quad CD \quad DA \quad 72$ cm

Area of square fieild $ABCD \quad (\text{side})^2$

$(72)^2$

$72 \quad 72 \quad 5184\,m^2$

length of the square $EFGH \quad 72 \quad 2 \quad 2 \quad 68\,m$

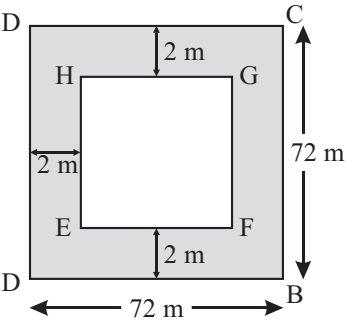
breadth of the square $EFGH \quad 72 \quad 2 \quad 2 \quad 68\,m$

Area of square $EFGH \quad (\text{side})^2 \quad (68)^2$

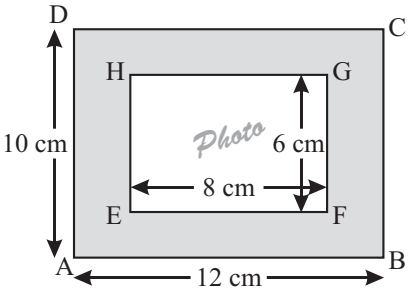
$68 \quad 68 \quad 624\,m^2$

Area of the path $\quad$ Area of square field $ABCD \quad$ Area ofsquare field $EFGH$

$(5184 \quad 4624)\,m^2 \quad 560\,m^2$



**3.** Let $ABCD$ be a cardboard




Area of the cardboard $l \quad b$

$= 12 \text{ cm} \times 10 \text{ cm}$

$= 120 \text{ cm}^2$

again, let $EFGH$ be the photo which is placed in the middle of the cardboard.

length of the photo = 8 cm

breadth of the photo = 6 cm

Area of the mounted photo on a cardboard

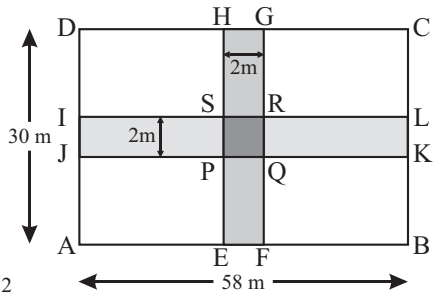
$l \quad b \quad 8 \quad 6 \quad 48 \text{ cm}^2$

Now, area of cardboard that is visible outside the photo

= Area of the cardboard $ABCD$ – Area of the mounted photo on a cardboard

$(120 \quad 48) \text{ cm}^2 \quad 72 \text{ cm}^2$

**4.** Let $ABCD$ represent the field and $EFGH$ and $IJKL$ represent the two cross roads.




length of the field ($l$) 58 m

breadth of the field ($b$) 30 m

Area of the field $l \quad b$

$58 \quad 30 \quad 1740 \text{ m}^2$

Area of the road $IJKL$ $l \quad b$

$58 \quad 2 = 116 \text{ m}^2$

Area of the road $EFGH$ $l \quad b \quad 30 \quad 2 \quad 60 \text{ m}^2$

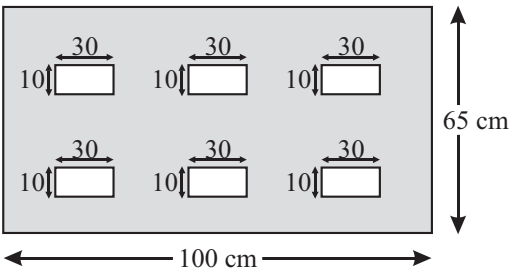
Area of the square $PQRS$ $= (\text{side})^2 \quad (2)^2 \quad 4 \text{ m}^2$

Area of square $PQRS$ occurs in both these roads.

In order to get the area of the roads, we subtract the area of $PQRS$ once from their sum, i.e.,

Area of the roads $116 \quad 60 \quad 4 \quad 172 \text{ m}^2$

**5.** Let $ABCD$ be a retangular park in while length ($l$) 100 m, breathe ($b$) 65 m




Area of the rectangular park $ABCD$

$l \quad b \quad 100 \quad 65 \quad 6500 \text{ m}^2$

Area of 1 flower bed

$l \quad b \quad 20 \quad 10 \quad 200 \text{ m}^2$

$\because$ Area of such 6 flower beds

$6 \quad 200 \quad 1200 \text{ m}^2$

Area of the path remaining portion of the park

= Area of $ABCD$ – Area of 6 flower beds

$(6500 \quad 1200) \text{ m}^2 = 5300 \text{ m}^2$

$\because$ Cost of laying the path in the remaining portion of the park 1 $\text{m}^2$ area = ₹ 20

cost of laying the path in the remaining portion of the park of 5300 $\text{m}^2$ area

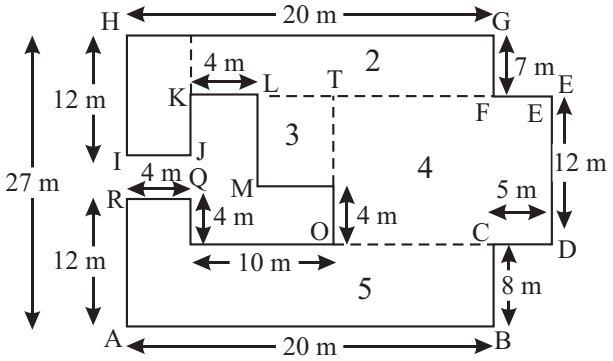
= ₹ $(20 \times 5300)$ = ₹ 106000 = ₹ 1 lakh 6 thousand

**6.** (i) Area of $ABCS$ $l \quad b \quad 20 \quad 8 = 160 \text{ m}^2$ …(1)

Area of $DETO$ $l \quad b \quad (6 \quad 5) \quad 12 \quad 11 \quad 12 \quad 132 \text{ m}^2$ …(2)

Area of $FGK$ $l \quad b \quad (10 \quad 6) \quad 7 \quad 16 \quad 7 \quad 132 \text{ m}^2$ …(3)

Area of $WHIJ$ $l \quad b \quad 12 \quad 4 \quad 48 \text{ m}^2$ …(4)




Area of $LMNT$ $l$ $b$ $TN$ $MN$ 8 6 48 m$^2$ …(5)

Area of $PQRS$ $l$ $b$ $SP$ $PQ$ 4 4 16 m$^2$ …(6)

Adding all the equation (1) to (6), we get

Area of the required

= Area of ($WHIJ$) + Area of ($FGWK$) + Area of ($LMNT$)

Area of ($DETO$) + Area of ($ABCS$) + Area of ($PQRS$)

(48 112 48 132 160 16) m$^2$ = 516 m$^2$

(ii) Area of $DEMN$ $l$ $b$ 17 4

68 m$^2$ …(1)

Area of $MFGH$ $l$ $b$ 11 4

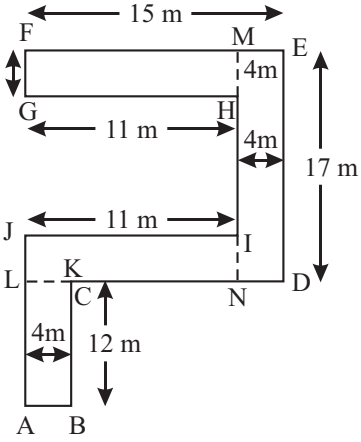
44 m$^2$ …(2)

Area of $IJLN$ $l$ $b$ 11 4

44 m$^2$ …(3)

Area of $ABKL$ $l$ $b$ 12 4

48 m$^2$ …(4)




Adding all the equations (1) to (4), we get

Area of the required Fig. (ii)

= Area of $DEMN$ + Area of $MFGH$

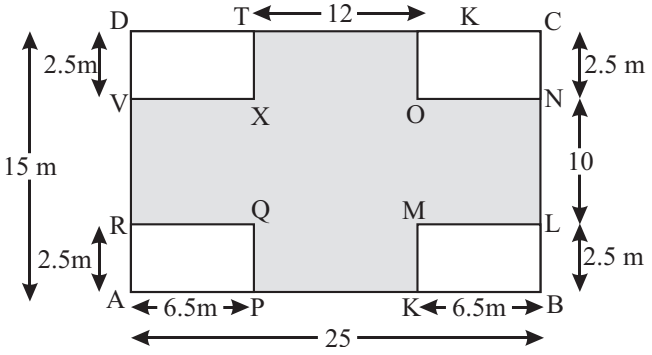
+ Area of $IJLN$ + Area of $ABKL$

(68 44 44 48) m$^2$ = 204 m$^2$

**7.** (i) Let $AB$ $DC$ 25 m, $AD$ $BC$ 15 m

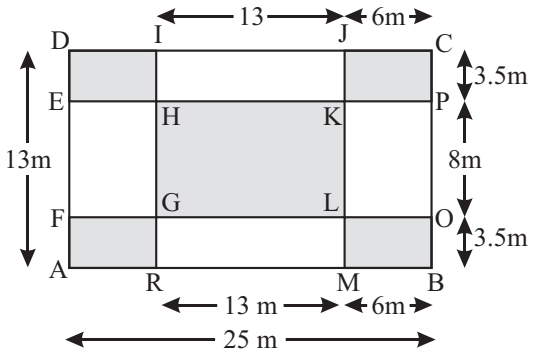
Area of $ABCD$ $l$ $b$ 25 25 = 375 m$^2$

From the fig. it is clear that $AP$ $RQ$ 6.5 m, $KB$ $ML$ 6.5 m



Similarly, $ON = KC = 6.5$ and $VX = DT = 6.5$ m
$AR = PQ = 2.5$ m, $KM = BL = 2.5$ m
and $NC = OK = 2.5$ m, $DV = TX = 2.5$ m
Now, area of one corner $= l \times b = 6.5 \times 2.5 = 16.25\ m^2$
Area of 4 corner $= 4 \times (l \times b) = 4 \times 16.25 = 65\ m^2$
Area of the shaded portion = Area of $ABCD$ − Area of 4 corners
$= 375 - 65 = 310\ m^2$

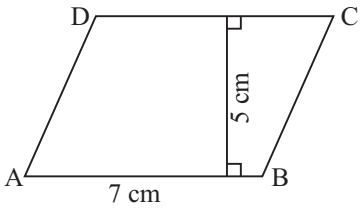
(ii) Given $AB = DC = 25$ m, $AD = BC = 15$ m, $AN = AB - (NM + MB)$
$= 25 - (13 + 6)$
$AN = 25 - 19 = 6$ m
$AN = FG = EH = DI = 6$ m
$CP = JK = IH = DE = 3.5$ m
$FA = AD - (DE + EF) = 15 - (3.5 + 8)$
$= 15 - 11.5 = 3.5$ m
Area of whole $ABCD$ part $= l \times b = 25 \times 15 = 375$ m …(1)
Area of 1 corner part $= l \times b = 6 \times 3.5 = 21.0\ m^2$
Area of 4 corner part $= 4 \times 21 = 84\ m^2$ …(2)
Area of inner part $GLKH = l \times b = 13 \times 8 = 104$ …(3)



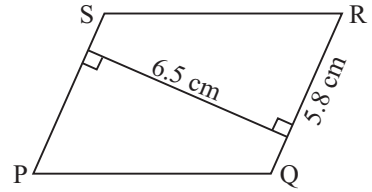

Now, area of shaded parts = Area of 4 corners + Area of inner part $GLKH$

## Exercise 16.3

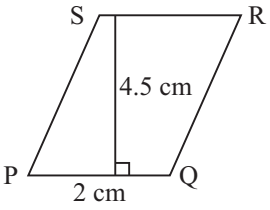
**1.** (i) Area of the parallelogram
Base × altitude
$AB \times h_1$
7 cm × 5 cm
$35\ cm^2$



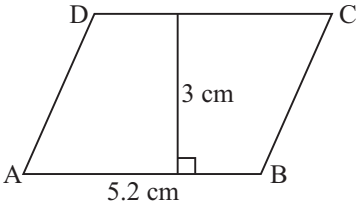

(ii) Area of the parallelogram $= b \times h$
$= 5.8 \times 6.5$
$37.7\ cm^2$



(iii) Area of the parallelogram
= Base × altitude
= 2 × 4.5
= 9 cm$^2$




(iv) Area of the parallelogram
= Base × Altitude
5.2 3
= 15.6 cm$^2$

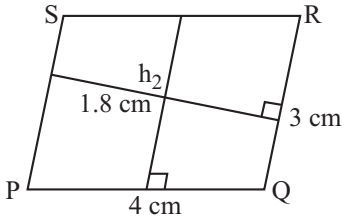



**2.** (a) Given : base = 5.6 cm, height = 4.2 cm
Area = base × height
5.6 4.2 = 23.52 cm$^2$

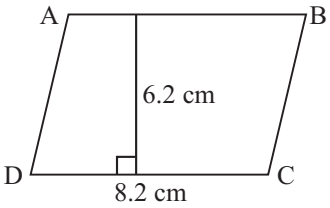
(b) Given : base = 6.4 cm, height = 3.6 cm
In Area = base × height
= 6.4 × 3.6 = 23.04 cm$^2$

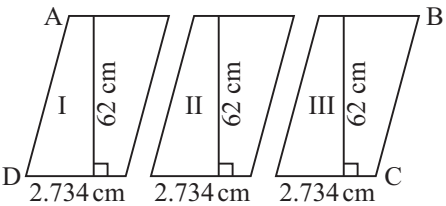
**3.** Given : Area of paralelogram = 6.25 m$^2$
altitude (height) = 5.0 m
base = ?
Area = base × altitude
6.25 = base × 5.0
base $\frac{6.25}{5.0}$ 1.25 m

**4.** Let *PQRS* be the parallelogram
whose side are *PQ* 4 cm, *QR* 3 cm
Area of parallelogram = Base × Altitude
4 1.8 = 3 $h_2$
7.2 = 3 $h$
or 3$h$ 7.2
$h$ $\frac{7.2}{3}$ 2.4 cm

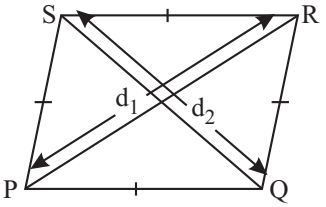



**5.** Side of parallelogram = 8.2
Altitude = 6.2
Area of parallelogram = base × altitude
= 8.2 × 6.2
= 50.84 sq. cm.
It is divided in 3 equal parts.
Then, Length of base = 8.2 ÷ 3
= 2.734 cm (aprox)
altitude = 6.2 cm
So, area of each parallelogram
= base × altitude
(2.734 6.2) sq. cm.
= 16.950 sq. cm.



**6.** Let $ABCD$ is the rhombus whose diagonals are $d_1$ 8 cm 8 mm and $d_2$ 6 cm 5 mm




Now, $d_1$ 8 cm 8 mm = 8 cm + 8 mm

= 8 cm $\frac{8}{10}$ mm

= 8 cm + 0.8 cm [$\because$ 1cm 10 mm]

= 8.8 cm

and $d_2$ 6 cm 5 mm = 6 cm + 5 mm

= 6 cm + $\frac{5}{10}$ cm

= 6 cm + 0.5 cm = 6.5 cm

Area of rhombus $\frac{1}{2}$ $d_1$ $d_2$

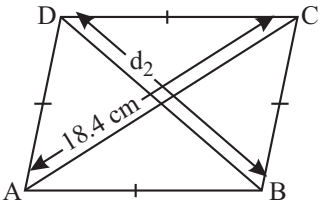
$\frac{1}{2}$ 8.8 6.5 = 4.4 6.5 = 28.6 cm$^2$

= 28.6 × 100 mm = 2860 mm

**7.** Area of rhombus = 202.4 cm$^2$

one diagonal ($d_1$) 18.4 cm

other diagonal ($d_2$) ?




Area of rhombus $\frac{1}{2}$ $d_1$ $d_2$

202.4 = $\frac{1}{2}$ 18.4 $d_2$

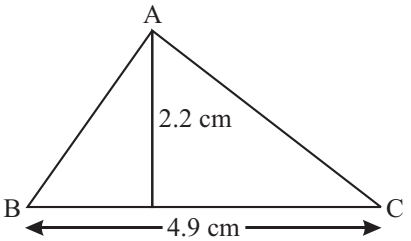
202.4 = 9.2 $d_2$

$d_2$ $\frac{202.4}{9.2}$ 22

Hence, other diagonal ($d_2$) 22 cm.

## Exercise 16.4

**1.** (i) Area of the triangle $ABC$



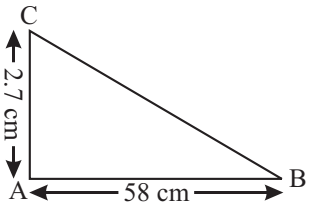

$\frac{1}{2}$ Base × Altitude

$\frac{1}{2}$ 4.9 2.2

4.9 1.1

= 5.39 cm$^2$

(ii) Area of $PQR$




$\frac{1}{2}$ Base × Altitude

$\frac{1}{2}$ 5.8 2.7

2.9 2.7

= 7.83 cm$^2$

**2.** (a) given, Area = 4.83 cm$^2$, altitude = 2.3 cm, base = ?

Area $\frac{1}{2}$ base × altitude

4.83 $\frac{1}{2}$ base 2.3

base $\frac{4.83 \quad 2}{2.3}$

base $\frac{9.66}{2.3}$ 4.2 cm.

(b) Area = 9.38 $m^2$, altitude = 2.8 m, base = ?

Area $\frac{1}{2}$ × base × altitude

9.38 $\frac{1}{2}$ base × 2.8

base $\frac{2 \quad \overset{3.35}{9.38}}{2.8}$

2 3.35 = 6.7 m.

(c) Area = 11.4 $cm^2$, altitude = 4 cm, base = ?

Area $\frac{1}{2}$ base × altitude

$11.4 = \frac{1}{2}$ base × 4

11.4 = base × 2

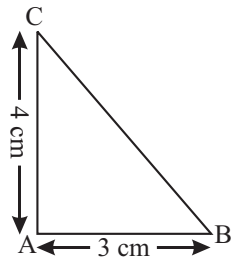
base $\frac{11.4}{2}$ 5.7 cm.

**3.** Area of right triangle = 6 $cm^2$, base = 3 cm

but, Area $\frac{1}{2}$ × base × height

6 $\frac{1}{2}$ 3 $h$

$h$ $\frac{6 \quad 2}{3}$ 4 cm.




Let $ABC$ is the right triangle.

Then by Pythagoras theorem, we have.

$BC^2$ $AC^2$ $AB^2$

$4^2$ $3^2$ 16 9 25

$BC$ $\sqrt{25}$ 5 cm.

Hence, the other two sides are 4 cm and 5 cm.

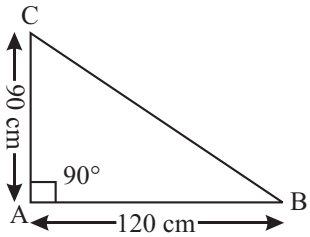
**4.** Let $ABC$ be field in the form of a right triangle whose sides are $AB$ 120 m, $AC$ 90 cm

Area of triangular field $\frac{1}{2}$ × base × height

$\frac{1}{2}$ 120 90

60 90 5400 $m^2$

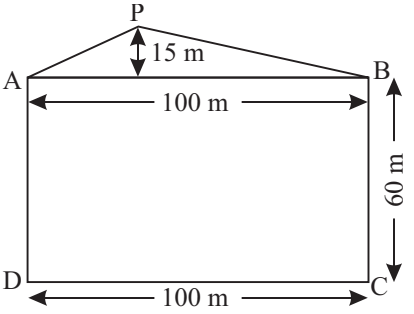
cost of levelling the 1 $m^2$ field = ₹ 12



cost of levelling the 5400 $m^2$ = ₹ 12 5400

= ₹ 64800.

**5.** Let *PADCBP* is the wall




Area of the wall = Area of rectangle *ABCD* Area of triangle *ABP*

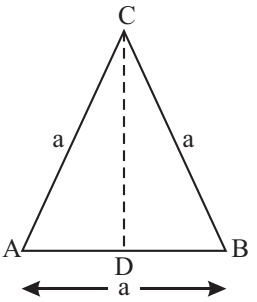
$(l \quad b) \quad \frac{1}{2} \quad b \quad h$

$(100 \quad 60) \quad \frac{1}{2} \quad (100 \quad 15)$

$6000 \quad 50 \quad 15$

$= 6750 \text{ m}^2$

**6.** Area of equilateral $\frac{\sqrt{3}}{4}a^2$




$\frac{\sqrt{3}}{4}a^2 \quad 9\sqrt{3}$

$a^2 \quad 9 \quad 4 \quad 36$

$a \quad \sqrt{36} \quad 6 \text{ cm}$

altitude $\frac{\sqrt{3}}{2}a$

$\frac{\sqrt{3}}{2} \quad 6$

altitude $3\sqrt{3}$ cm.

**7.** Let $a \quad 17$ cm, $b \quad 10$ cm, $c \quad 9$ cm

$2S \quad a \quad b \quad c \quad 17 \quad 10 \quad 9 \quad 36$

$S \quad \frac{36}{2} \quad 18 \text{ cm}$

by Heron's formula, we know that

Area of the triangle $\sqrt{S.(S \quad a)(S \quad b)(S \quad c)}$

$\sqrt{18 \quad (18 \quad 17)(18 \quad 10)(18 \quad 9)}$

$\sqrt{18 \quad 1 \quad 8 \quad 9} \quad \sqrt{2 \quad 9 \quad 8 \quad 9}$

$\sqrt{16 \quad 81} \quad \sqrt{4 \quad 4 \quad 9 \quad 9}$

$4 \quad 9 \quad 36 \text{ cm}^2$

**8.** Let $a \quad 40$m, $b \quad 37$ m, $c \quad 13$ m

$S \quad \frac{a \quad b \quad c}{2} \quad \frac{40 \quad 37 \quad 13}{2} \quad \frac{90}{2} \quad 45 \text{ m}$

by Heron's formula, we know that

Area of the triangle $\sqrt{S\,(S \quad a)\,(S \quad b)\,(S \quad c)}$

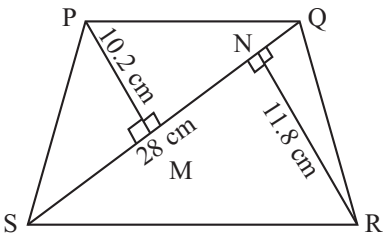
$\sqrt{45 \quad (45 \quad 40) \quad (45 \quad 37) \quad (45 \quad 13)}$

$\sqrt{45 \quad 5 \quad 8 \quad 32} \quad \sqrt{225 \quad 256}$

$\sqrt{15 \quad 15 \quad 16 \quad 16} \quad 15 \quad 16 \quad 240 \text{ m}^2$

**9.** Let *PQRS* be the given quadrilateral.

$QS$ is the given diagonal and $PM$ $QS$, $RN$ $SQ$.
$SQ$ 28 cm, $PM$ 10.2 cm, $RN$ 11.8 cm.
Area of quadrilateral $PQRS$




Area of $PSQ$ Area of $RSQ$

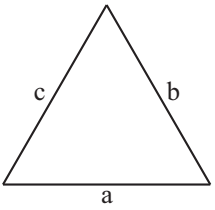
$\frac{1}{2}$ $SQ$ $PM$ $\frac{1}{2}$ $SQ$ $RN$

$\frac{1}{2}$ $SQ$ $(PM$ $RN)$

$\frac{1}{2}$ 28 (10.2 11.2) 14 22 = 308 cm$^2$

Hence, the area of the quadrilateral $PQRS$ is 308 cm$^2$.

**10.** Given, perimeter of triangle = 24 cm
Sides = 3 : 4 : 5,
Let $a$ $3x, b$ $4x, c$ $5x$
then $P$ sum of all the sides $a$ $b$ $c$




24 $3x$ $4x$ $5x$

24 $12x$

$\frac{24}{12}$ $x$ $x$ 2

Hence, $a$ $3x$ 3 2 6 cm,
$b$ $4x$ 4 2 8 cm,
$c$ $5x$ 5 2 10 cm.
Now, $2S$ $a$ $b$ $c$ 6 8 10 24

$S$ $\frac{24}{2}$ 12

by Heron's formula, we know that
Area of $\sqrt{S(S \quad a)(S \quad b)(S \quad c)}$

$\sqrt{12 \quad (12 \quad 6) \quad (12 \quad 8) \quad (12 \quad 10)}$

$\sqrt{12 \quad 6 \quad 4 \quad 2}$ $\sqrt{12 \quad 12 \quad 4}$ 12 2 24 cm$^2$.

## Exercise 16.5

**1.** (a) Here : $d$ 35 cm
We know that circumference 2 $r$

$\frac{22}{7}$ 35cm

(b) Here : $d$ 4.2 cm
We know that circumference 2 $r$

$\frac{22}{7}$ 4.2 = 13.2 cm

(c) Here : $d$ 2.8 cm
We know that circumference 2 $r$

$\frac{22}{7}$ 2.8 8.8 cm

**2.** Circumference of a circle 26.4 m
We know that, circumference 2 $r$

26.4 $\frac{2 \quad 22}{7}$ $r$

$r \quad \frac{26.4 \quad 7}{2 \quad 22} \quad 4.2 \text{ cm}$

radius of circle $4.2 \text{ cm}$

Diameter of circle $4.2 \quad 2 \quad 8.4 \text{ cm}$

**3.** Diameter of a circle $5.6 \text{ m}$

radium $\frac{5.6 \text{ m}}{2} \quad 2.8 \text{ m}$

circumference $2 \quad r$

$2 \quad \frac{22}{7} \quad 2.8 \quad 17.6 \text{ m}$

**4.** Radius of first circle $77 \text{ cm}$

circumference $2 \quad r$

$2 \quad \frac{22}{7} \quad 77 \text{ cm} \quad 484 \text{ cm}$

Radius of second circle $91 \text{ cm}$

circumference $2 \quad r$

$2 \quad \frac{22}{7} \quad 91 \text{ cm} \quad 572 \text{ cm}$

Difference between first and second circle

$572 \quad 484 \text{ cm} \quad 88 \text{ cm}$

**5.** Length of shape of rectangle $35 \text{ cm}$

Width of shape of rectangle $20 \text{ cm}$

Perimeter (circumference) of rectangle $2(l \quad b)$

$2(35 \quad 20) \text{ cm}$

$2 \quad 55 \text{ cm}$

$110 \text{ cm}$

Perimeter of rectangle circumference of circle

$110 \quad 2 \quad r$

$110 \quad \frac{22}{7} \quad 2r$

$2r \quad 110 \quad \frac{7}{22} \quad 35 \text{ cm}$

**6.** Diameter of the park $700 \text{ cm}$

$2r \quad 700$

$r \quad \frac{700}{2} \quad 350 \text{ m}$

Circumference of park $2 \quad r$

$700 \quad \frac{22}{7} \quad 2200 \text{ m}$

Man covered distance in daily $2200 \quad 5 \quad 11000 \text{ m}$

**7.** Let radius of one circle $4x$

radius of second circle $5x$

circumferences of one circle $2 \quad r$

$2 \quad 4x \quad 8 \quad r$

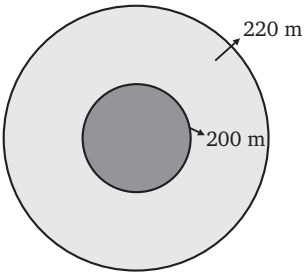
circumferences of second circle $2 \quad r$

$2 \quad 5x \quad 10 \quad r$

Ratio of circumferences of both circles $8 \quad r : 10 \quad r.$

$4 : 5.$

**8.** circumference of inner.




circular track $200\,\text{m}$

$2\ r_1 \quad 200$

$2\ \frac{22}{7}\ r_1 \quad 200$

$r_1 \quad \frac{200\ \ 7}{2\ \ 22} \quad 31082$

Circumference of outer circular track $220\,\text{m}$

$2\ (r_1 \quad r_2) \quad 220$

$31.81 \quad r_2 \quad \frac{220\ \ 7}{2\ \ 22}$

$r_2 \quad 35 \quad 31.81 \quad 3.19\ \text{cm}$

Width of the track is 3.19 cm.

**9.** Circumference of one circle $121\,\text{cm}$

$2\ r_1 \quad 121\,\text{cm}$

$2\ \frac{22}{7}\ r_1 \quad 121$

$r_1 \quad \frac{121\ \ 7}{22\ \ 2} \quad 19.25\ \text{cm}$

Circumference of second circle $154\,\text{cm}$

$2\ (r_1 \quad r_2) \quad 154\,\text{cm}$

$2\ \frac{22}{7}(19.25 \quad r_2) \quad 154\,\text{cm}$

$r_2 \quad 24.5 \quad 19.25\ \text{cm}$

$5.25\ \text{cm}$

**10.** Diameter of the wheel of a cart $140\ \text{cm}$

radius of the wheel of a cart $\frac{140}{2} \quad 70\,\text{cm}$

circumference of wheel of a cart $2\ r$

$2 \quad 70 \quad 2\ \frac{22}{7} \quad 70$

$440\,\text{cm or } 4.4\ \text{m}$

Distance cover by wheel $4.4 \quad 40 \quad 176\,\text{m}$

## Exercise 16.6

**1.** (a) Given, Area $(A) \quad 616\,\text{m}^2$

$A \quad r^2 \quad \frac{22}{7}r^2 \qquad r \quad \sqrt{\frac{7\ \ A}{22}}$

$r \quad \sqrt{\frac{7\ \ 616}{22}} \quad \sqrt{7\ \ 28} \qquad r \quad \sqrt{196} \quad 14\ \text{m.}$

(b) $A \quad 2 \quad \text{cm}^3$

$r \quad \sqrt{\frac{A}{}} \quad \sqrt{\frac{2}{}} \quad \sqrt{2} = 1.414\ \text{cm.}$

**2.** (a) $A \quad 50.24\ 24\ \text{m}^2$

$$r \quad \sqrt{\frac{A}{\quad}} \quad \sqrt{\frac{50.24}{3.14}} \qquad [\because \quad 3.14]$$

$$\sqrt{16} \quad 4$$

$$d \quad 2r \quad 2 \quad 4 \quad 8\,\text{cm}$$

(b) $A \quad 314\,\text{m}^2$

$$r \quad \sqrt{\frac{A}{\quad}} \quad \sqrt{\frac{314}{3.14}} \qquad [\because \quad 3.14]$$

$$\sqrt{\frac{314 \quad 100}{314}}\,\text{m} \quad \sqrt{100} \quad 10\,\text{m}$$

$$d \quad 2r \quad 2 \quad 10 \quad 200\ \text{m}$$

**3.** (a) Given, $d \quad 7\,\text{m}$

$$r \quad \frac{d}{2} \quad \frac{7}{2}\,\text{m}$$

$$A \quad r^2 \quad \frac{22}{7} \quad \frac{7}{2}^{\,2}$$

$$\frac{22}{7} \quad \frac{7 \quad 7}{2 \quad 2} \quad \frac{154}{4} \quad 38.5\,\text{m}^2$$

(b) $d \quad 12.6\ \text{cm}$

$$r \quad \frac{d}{2} \quad \frac{12.6}{2} \quad 6.3\ \text{m}$$

$$A \quad r^2 \quad \frac{22}{7} \quad (6.3)^2\ \text{cm}^2$$

$$\frac{22}{7} \quad 6.3 \quad 6.3\,\text{cm}^2$$

$$124.74\ \text{cm}^2$$

**4.** (a) Given, $r \quad 2.1$

$$\text{Area}\ (A) \quad r^2 \quad \frac{22}{7} \quad (2.1)^2$$

$$\frac{22}{7} \quad 2.1 \quad 2.1 = 13.86\ \text{m}^2$$

(b) Given, $r \quad 14\ \text{cm}$

$$\text{Area}\ (A) \quad r_2 \quad \frac{22}{7} \quad (14)^2$$

$$\frac{22}{7} \quad 14 \quad 14 = 616\ \text{cm}^2$$

**5.** Area $= 6.16\ \text{cm}^2$

$$\text{Area} \quad r^2$$

$$6.16 \quad r^2$$

$$6.16 \quad \frac{22}{7} \quad r^2$$

$$r^2 \quad \frac{7 \quad 6.16}{22} \quad 7 \quad 0.28 = 1.96$$

$$r \quad \sqrt{1.96} \quad 1.4\ \text{cm}$$

Circumference $2\ r\ 2\ \frac{22}{7}\ 1.4 = 8.8$ cm.

**6.** Perimeter of square $4\ a$

$$a\ \frac{132}{4}\ 33\text{ cm}$$

Area of square $(a)^2\ (33)^2\ 1089\text{ cm}^2$

Circumference of circle $132$ cm

$$2\ r\ 132 \qquad 2\ \frac{22}{7}\ r\ 132$$

$$r\ \frac{\overset{6}{132}\ 7}{2\ \underset{1}{22}}\ 3\ 7\ 21\text{ cm}$$

Area of the circle $r^2\ \frac{22}{7}\ (2)^2\ \frac{22}{\underset{1}{7}}\ \overset{3}{21}\ 21$

$22\ 21\ 3\ 1386\text{ cm}^2 \qquad \ldots(2)$

Clearly, circle has a greater area and by $1386\ 1089\ 297\text{ cm}^2$

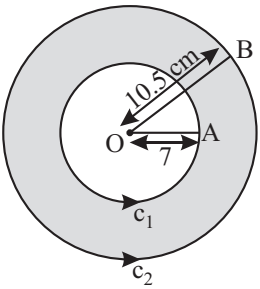
**7.** Given, circumference of circle = perimeter of square

$$2\ r\ 4\ \text{side} \qquad 2\ \frac{22}{7}\ r\ 4\ 11\text{ cm}$$

$$\frac{44}{7}\ r\ 44\text{ cm}$$

Area of circle $r^2\ \frac{22}{7}\ (7)^2\ \frac{22}{7}\ 7\ 7 = 154\text{ cm}^2$

**8.** Let $C_1$ and $C_2$ be two concentric circles whose radii are $r_1\ 7$ cm, $r_2\ 10.5$



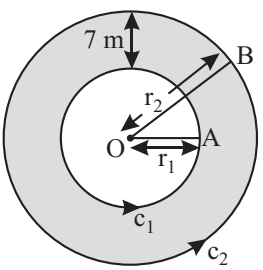

Area of inner circle $r_1^2$

Area of outer circle $r_2^2$

Area of ring lying between the circumference of both the circles

$$r_2^2\ \ r_1^2$$
$$[r_2^2\ \ r_1^2\ ]$$
$$\frac{22}{7}\ [(10.5)^2\ \ (7)^2\ ]$$
$$\frac{22}{7}\ (110.25 - 49)$$
$$\frac{22}{7}\ 61.25 = 192.5\text{ cm}^2$$

**9.** Inner circumference of circular track $242$ m




$$2\ r_1\ 242$$
$$2\ \frac{22}{7}\ r_1\ 242$$
$$r_1\ \frac{\overset{11}{242}\ 7}{2\ 22}\ \frac{77}{2}\ 38.5\text{ m}$$

$r_2 \quad r_1 \quad 7 \quad 38.5 + 7 = 45.5\,\text{m}$

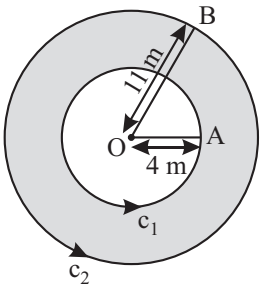
Area of the track $(r_2^2 \quad r_1^2)$

$\frac{22}{7}[(45.5)^2 \quad (38.5)^2]$

$\frac{22}{7}[2070.25 \quad 1482.25]$

$\frac{22}{7} \quad 588 \quad 22 \quad 84 \quad 1848\,\text{m}^2$

**10.** Let $C_1$ and $C_2$ be two concentric circle with centre $O$ and radii are $r_1 \quad 4$ m, $r_2 \quad 11$ m




Area of inner circle $r_1^2$

Area of outer circle $r_2^2$

Area of circular ring formed by the circumference of two concentric circles

$r_2^2 \quad r_1^2 \quad [r_2^2 \quad r_1^2]$

$\frac{22}{7} \quad [(11)^2 \quad (4)^2]$

$\frac{22}{7} \quad [121 \quad 16]$

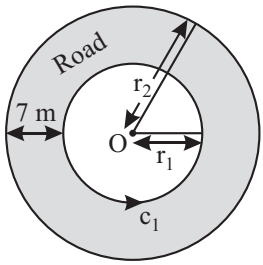
$\frac{22}{7} \quad 105$

$22 \quad 15 \quad 330\,\text{m}^2$

$\because$ Cost of painting this ring of 1 $\text{m}^2$ Area of = ₹ 21

Cost of painting this ring of 330 $\text{m}^2$ Area = ₹ 21 330 = ₹ 6930

**11.** Circumference of the park = 352 m




$2 \quad r_1 \quad 352$

$2 \quad \frac{22}{7} \quad r_1 \quad 352$

$r_1 \quad \frac{352 \quad 7}{2 \quad 22} \quad 8 \quad 7$

$r_1 \quad 56\,\text{m}$

$r_2 \quad r_1 \quad 7 \quad 56 \quad 7 \quad 63\,\text{m}$

The Area of th road $r_2^2 \quad r_1^2 \quad [r_2^2 \quad r_1^2]$

$\frac{22}{7} \quad [(63)^2 \quad (56)^2] \quad \frac{22}{7} \quad [3969 \quad 3136]$

$\frac{22}{7} \quad [833] \quad 22 \quad 119 \quad 2618\,\text{m}^2$

**12.** Given, $C \quad r \quad 37\,\text{cm}$, or $2 \quad r \quad r \quad 37\,r(2 \quad 1) \quad 37$

$r \quad 2 \quad \frac{22}{7} \quad 1 \quad 37$

$r \quad \frac{44 \quad 7}{7} \quad 37\,r \quad \frac{37}{7} \quad 37$

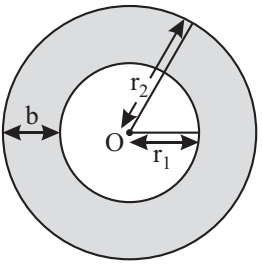
$$r \quad \frac{7 \quad 37}{37} \quad 7\,\text{cm}$$

Area of the circle $r^2$

$$\frac{22}{7} \quad (7)^2 \quad \frac{22}{7} \quad 7 \quad 7$$

$$= 154\ \text{cm}^2$$

**13.** Given, $A_1 \quad 1386\,\text{cm}^2$ $A_2 \quad 1886.5\,\text{cm}^2$




$$r_1^2 \quad 1386$$

$$\frac{22}{7} \quad r_1^2 \quad 1386$$

$$r_1^2 \quad \frac{1386 \quad 7}{22} \quad 63 \quad 7 \quad 441\,\text{cm}^2$$

$$r_1 \quad \sqrt{441} \quad 21\,\text{cm}$$

again, $A_2 \quad 1886.5$

$$r_2^2 \quad 1886.5\,\text{cm}$$

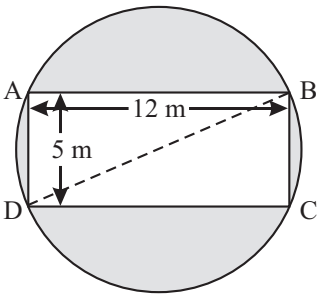
$$\frac{22}{7} \quad r_2^2 \quad 1886.5\,\text{cm}$$

$$r_2^2 \quad \frac{1886.5 \quad 7}{22} \quad \frac{13205.5}{22} \quad 600.25\,\text{cm}^2$$

$$r_2 \quad \sqrt{600.25} \quad 24.5\,\text{cm}$$

width of the ring $r_2 \quad r_1 \quad 24.5 \quad 21 = 3.5$ cm

**14.** Area of $ABCD \quad l \quad b \quad 12 \quad 5 \quad 60\,\text{m}^2$




Draw $D$ to $B$.

Thus, we get 2 triangles, $ABD$ and $BCD$

Now, In $ABD$, $A \quad 90$ ,

by Pythagoras theorem

$$BD^2 \quad AB^2 \quad AD^2$$

$$12^2 \quad 5^2$$

$$144 \quad 25 \quad 169$$

$$BD \quad \sqrt{169} \quad 13\,\text{m}$$

diameter of the circle ($d$) $DB \quad 13\,\text{m}$

$$r \quad \frac{d}{2} \quad \frac{13}{2} \quad 6.5\ \text{m}$$

Now, Area of the circle $r^2$

$$3.14 \quad \frac{13}{2}^{\,2} \quad 3.14 \quad \frac{169}{4}$$

$$\frac{530.66}{4} \quad 132.665\,\text{m}^2$$

Area of rectangle $ABCD \quad l \quad b$

$$5 \quad 12\,\text{m}^2 \quad 60\,\text{m}^2$$

Area of the shaded region = Area of circle – Area of rectangle $ABCD$

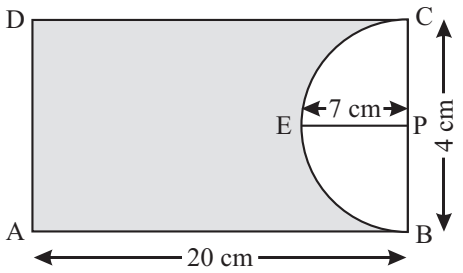
$$132.665 \quad 60\,\text{cm}^2$$

$$= 72.665\ \text{m}^2$$

**15.** Area of paper $ABCD$ $l$ $b$

$20$ $14\,\text{cm}^2$

$280\,\text{cm}^2$




Area of semi circle portion $\frac{1}{2}$ $r^2$

$\frac{1}{2}$ $\frac{22}{7}$ $7$ $7$

$11$ $7$ $77\,\text{cm}^2$

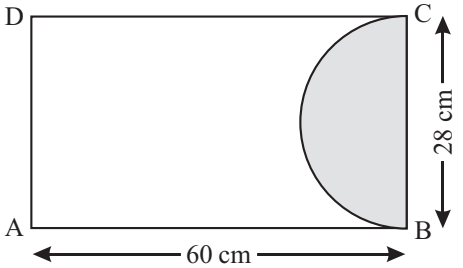
Area of the remaining part Area of rectangle $ABCD$ – Area of semi circle

$280$ $77$ $203\,\text{cm}^2$

**16.** Area of rectangle $ABCD$ $l$ $b$ $60$ $28$ $1680\,\text{cm}^2$

Diameter of semi-circle $28\,\text{cm}$

$r$ $\frac{d}{2}$ $\frac{28}{2}$ $14\,\text{cm}$




Area of semi-circle $\frac{1}{2}$ $r^2$

$\frac{1}{2}$ $\frac{22}{7}$ $(14)^2$

$\frac{11}{7}$ $14$ $14^2$ $11$ $14$ $2$ $308\,\text{m}^2$

Area of the plot without grass (i.e. remaining portion)

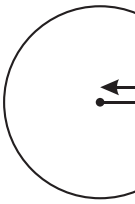
Area of rectangle $ABCD$ – Area of semicircle

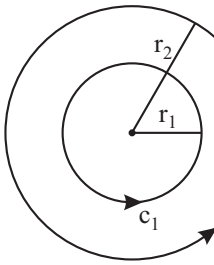
$1680 - 308$ $1372\,\text{cm}^2$

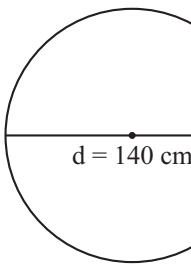
## MCQs

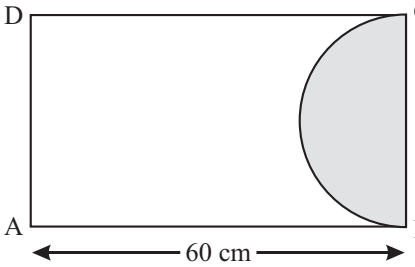
**1.** (b) **2.** (c) **3.** (a) **4.** (b)

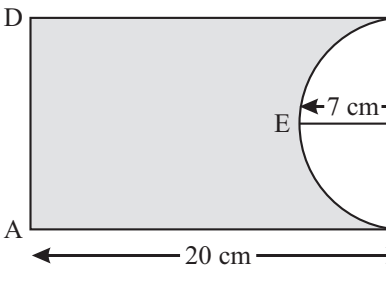
**5.** (b) **6.** (b) **7.** (c)




r2
r1
c1


d = 140 cm


D
A
60 cm


D
E
7 cm
A
20 cm