**20.** Distance covered by Karan

3 Perimeter of square

3 (4 side)

3 (4 75)

900 m

Distance covered by Mohit

2 (Perimeter of Rectangle)

2 2($l$ $b$)

4 (160 105)

4 (265)

1060 m

Mohit cover more distance than Karan by (1060 900) 160 m

## Exercise-13.2

**1.** The area of rectangular plot

$l$ $b$

35 37

1295 $m^2$

**2.** Diagonal of square $\sqrt{2}$ side

2.8 $\sqrt{2}$ side

$\frac{2.8}{\sqrt{2}}$ side

Area of square side side

$\frac{2.8}{\sqrt{2}}$ $\frac{2.8}{\sqrt{2}}$

$\frac{7.84}{2}$

3.92 $m^2$

**3.** Let length of field $3x$

Breadth " $2x$

Area of field $l$ $b$

$3456$ $3x$ $2x$

$3456$ $6x^2$

$576$ $x^2$

$24^2$ $x^2$

24 $x$

length 3 24 72 m

breadth 2 24 48 m

Fence for the field 2($l$ $b$)

2[72 48]

2(120)

24 m

Cost of fencing 3.50 240

₹ 840

**4.** We have $l$ 240 m

$b$ 75 m

(a) Area of field $l$ $b$

240 75

18000 $m^2$

Cost of turfing ₹ 18000 0.75

₹ 13500

(ii) Perimeter of field 2($l$ $b$)

2[240 75]

2(315)

630 m

Cost of fencing 1.25 630

₹ 787.5

**5.** Perimeterof square field $\frac{\text{total cost}}{\text{cost/m}}$

$\frac{1600}{0.80}$

4 Side of square 2000

Side of square 500 m

$\because$ Area of square $\text{side}^2$

$500^2$

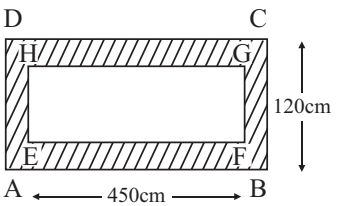
250000 $m^2$

$\because$ cost of reaping 100 $m^2$ ₹ 0.60

" " 250000 $m^2$ ₹ $\frac{0.60}{100}$ 250000

₹ 1500

**6.** We have $ABCD$ is a saree




$AB$ 450 cm, $BC$ 120 cm

$EF$ 450 (25 25)

400

$GF$ 120 (25 25)

70 cm

Area of border

Area $ABCD$ Area $EFGH$

(450 120) (400 70)

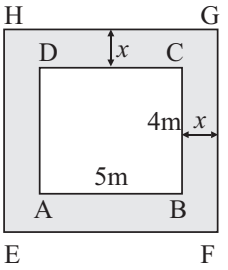
54000 28000

Area of border 26000 $cm^2$

Cost of weaving border

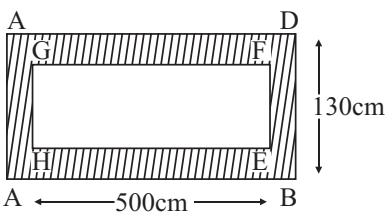
₹ 0.15 26000
₹ 3900

**7.** Let width of Verandah $x$



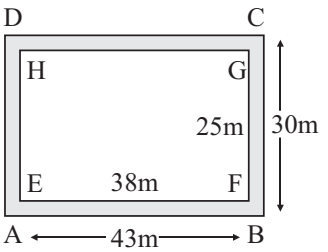

here $ABCD$ is a room
$EF$ (length including Verandah)
5 $2x$
$GF$ 4 $2x$
Area of Verandah
Ar $EFGH$ Ar $ABCD$
$(5 \quad 2x)(4 \quad 2x) \quad 5 \quad 4$
$22 \quad 20 \quad 10x \quad 8x \quad 4x^2 \quad 20$
$22 \quad 20 \quad 18x \quad 4x^2 \quad 20$
$0 \quad 4x^2 \quad 18x \quad 22$
$2x^2 \quad 11x \quad 2x \quad 11 \quad 0$
$x(2x \quad 11) \quad 1(2x \quad 11) \quad 0$
$(2x \quad 11)(x \quad 1) \quad 0$
$x \quad 1\text{m}, \; x \quad \frac{11}{2}$ (Not possible)
Width of verandah 1m

**8.** $ABCD$ is a saree



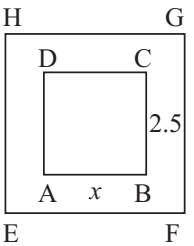

$HE$ 500 (25 25) 450cm
$EF$ 130 (25 25) 80cm
Area of border
Ar $ABCD$ Ar $EFGH$
500 130 450 80
65000 36000
$29000\,\text{cm}^2$
Cost of printing $100\,\text{cm}^2$ ₹ 1
" $29000\,\text{cm}^2$ ₹ $\frac{1}{100}$ 29000
₹ 290

**9.** $EFGH$ is a grassy lawn



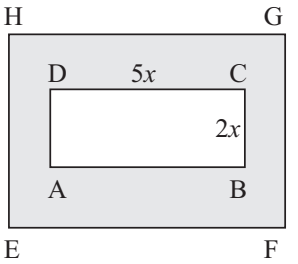

$AB$ 38 (2.5 + 2.5)
43 m
$BC$ 25 (2.5 + 2.5)
30 m
Area of path
Ar $ABCD$ Ar $EFGH$
43 30 38 25
1290 950
Ar of path $340\,\text{m}^2$
Cost of gravelling $1\,\text{m}^2$ ₹ 6.50
" " " $340\,\text{m}^2$ ₹ 6.50 340
₹ 2210

**10.** Let side of square lawn $x$ metre




$AB$ $x$
$EF$ $x$ 2.5 + 2.5
$(x \quad 5)$
Ar $EFGH$ Ar $ABCD$ 165
$(x \quad 5)^2 \quad x^2 \quad 165$
$x^2 \quad 25 \quad 10x \quad x^2 \quad 165$
$10x \quad 140$
$x \quad 14$
Ar of square $x \quad x$
lawn 14 14
$196\,\text{m}^2$

**11.**




Let breadth of park $5x$

breadth of park $2x$

$\because$ $AB$ $5x$, $BC$ $2x$

$EF$ $5x(2.5+2.5)$ $5x$ 5

$FG$ $2x$ $(2.5+2.5)$ $2x$ 5

Ar $EFGH$ Ar of $ABCD$ 305

$(2x \quad 5) \quad (5x \quad 5) \quad 5x \quad 2x \quad 305$

$10x^2 \quad 10x \quad 25x \quad 25 \quad 10x^2 \quad 305$

$35x \quad 305 \quad 25$

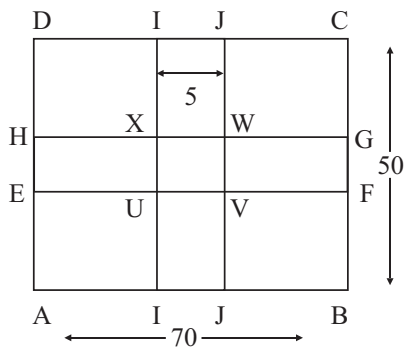
$35x \quad 280$

$x \quad 8$

length of park $5 \quad 8 \quad 40$ m

breadth of park $2 \quad 8 \quad 16$ m

**12.**




Area of Road

(Area $EFGH$ Area $IJHK$ )

(Area of $UVWX$ )

$[(70 \quad 5) \quad (50 \quad 5)] \quad (5 \quad 5)$

$(350 \quad 250) \quad 25$

Area of road $600 \quad 25$

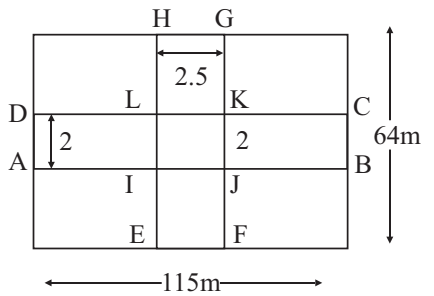
$575\,m^2$

Cost of construction of $1m^2$ road ₹ 20

" " " $575\,m^2$ road ₹ 20 575

₹ 11500

**13.**




Area of roads

Area of $ABCD$ Area $EFGH$

Area of $IJKL$

$115 \quad 2 \quad 64 \quad 2.5 \quad 2 \quad 2.5$

$230 \quad 160 \quad 5$

$390 \quad 5$

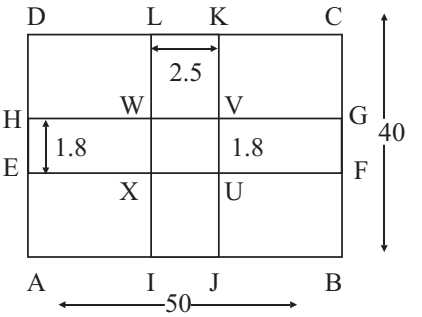
$385\,m^2$

Cost of gravelling 1 m ₹ 4.60

" " " $385\,m^2$ ₹ 4.60 385

₹ 1771

**14.**




Area of Roads

Area of $EGFH$ Area of $IJKL$

– Area of $UVWX$

$50 \quad 1.8 \quad 40 \quad 2.5 \quad 2.5 \quad 1.8$

$90 \quad 100 \quad 4.5$

$190 \quad 4.5$

Area of Raods $185.5\,m^2$

Area of Remaining portion

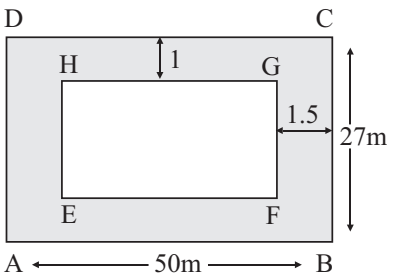
Area of $ABCD$ Area of Roads

$50 \quad 40 \quad 185.5$

$(2000 \quad 185.5)\,m^2$

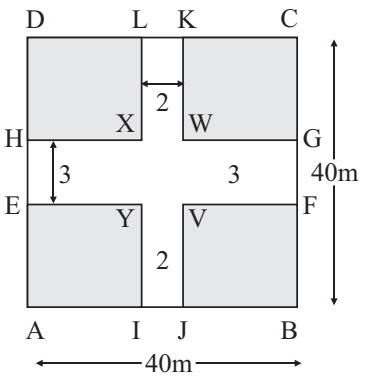
$1814.5\,m^2$

**15.** We have,




$AB$ 43 m, $BC$ 27 m
$EF$ 43 (1.5 + 1.5) 40 m
$FG$ 27 (1 1) 25
Area of shaded portion
Area of $ABCD$ Area of $EFGH$
43 27 40 25
1161 1000
161 $m^2$

(ii) Area of shaded portion




Area of $ABCD$ [(Area of $EFGH$
Area of $IJKL$) – Area of $UVWX$]
40 40 [(40 3 40 2) 3 2]
1600 [(120 80) 6]
1600 [200 6]
1600 194 1406 $m^2$

Area of shaded portion 1406 $m^2$

## Exercise-13.3

**1.** We have,
$a$ 3 cm, $b$ 4 cm, $c$ 5 cm

$$s \quad \frac{a \quad b \quad c}{2} \quad \frac{3 \quad 4 \quad 5}{2} \quad 6$$

$$\because \quad A \quad \sqrt{s(s \quad a)(s \quad b)}$$

$$\sqrt{6(6 \quad 3)(6 \quad 4)(6 \quad 5)}$$
$$\sqrt{6 \quad 3 \quad 2 \quad 1}$$
$$\sqrt{6 \quad 6}$$
$$r \quad 6\,cm^2$$

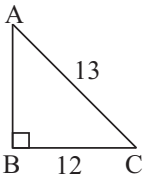
(ii) We have, $a$ 50 cm, $b$ 48 cm, $c$ 14 cm

$$s \quad \frac{a \quad b \quad c}{2} \quad \frac{50 \quad 48 \quad 14}{2}$$
$$\frac{112}{2} \quad 56$$
$$\because \quad A \quad \sqrt{s(s \quad a)(s \quad b)(s \quad c)}$$
$$\sqrt{56(56 \quad 50)(56 \quad 48)(56 \quad 14)}$$
$$\sqrt{56 \quad 6 \quad 8 \quad 42}$$
$$\sqrt{172896}$$
$$A \quad \sqrt{(336)^2}$$
$$A \quad 336\,cm^2$$

(iii) We have, $a$ 12 cm, $b$ 9.6 cm, $c$ 7.2

$$s \quad \frac{a \quad b \quad c}{2} \quad \frac{12 \quad 9.6 + 7.2}{2}$$
$$\frac{28.8}{2} \quad 14.4$$
$$\because \quad A \quad \sqrt{s(s \quad a)(s \quad b)(s \quad c)}$$
$$\sqrt{14.4(14.4 \quad 12)(14.4 \quad 9.6)(14.4 \quad 7.2)}$$
$$\sqrt{14.4 \quad 2.4 \quad 4.8 \quad 7.2}$$
$$\sqrt{\frac{144 \quad 24 \quad 48 \quad 72}{10000}}$$
$$\sqrt{\frac{12 \quad 12 \quad 24 \quad 24 \quad 2 \quad 2 \quad 6 \quad 6}{100 \quad 100}}$$
$$A \quad \frac{12 \quad 24 \quad 2 \quad 6}{100}$$
$$34.56\ cm^2$$

**2.** $AC^2 \quad AB^2 \quad BC^2$



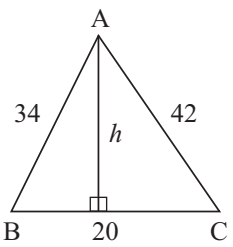

$13^2 \quad AB^2 \quad 12^2$
$169 \quad AB^2 \quad 144$
$169 \quad 144 \quad AB^2$
$25 \quad AB^2$
$5^2 \quad AB^2$
$AB \quad 5\,cm$

Area of triangle $\frac{1}{2}\ BC\ \ AB$

$\frac{1}{2}\ \ 12\ \ 5$

$30\,\text{cm}^2$

**3.** We have,




$a\ \ 20, b\ \ 42, c\ \ 34$

$s\ \ \frac{a\ \ b\ \ c}{2}\ \ \frac{20\ \ 42\ \ 34}{2}\ \ \frac{96}{2}$

$48$

$\because\ A\ \ \sqrt{s(s\ \ a)(s\ \ b)(s\ \ c)}$

$\sqrt{48(48\ \ 20)(48\ \ 42)(48\ \ 34)}$

$\sqrt{48\ \ 28\ \ 6\ \ 14}$

$\sqrt{112896}$

$A\ \ \sqrt{336^2}$

$A\ \ 336\text{cm}^2$

$\frac{1}{2}\ \ 20\ \ h\ \ 336$

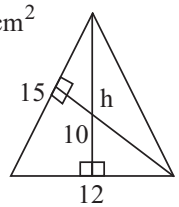
$h\ \ \frac{336\ \ \cancel{2}}{\cancel{20}_{10}}$

$h\ \ 33.6\,\text{cm}$

**4.** Area $\frac{1}{2}$ base $h$

$\frac{1}{\cancel{2}}\ \ \overset{6}{\cancel{12}}\ \ 10\ \ 60\,\text{cm}^2$

Area of $60\,\text{cm}^2$



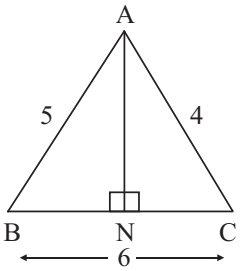

$\frac{1}{2}\ \ 15\ \ h\ \ 60$

$h\ \ \frac{\cancel{60}\ \ 2}{\cancel{15}}$

$h\ \ 8\,\text{cm}$

altitude to the other side is 8 cm.

**5.**




We have,

$a\ \ 6, b\ \ 4, c\ \ 5$

$s\ \ \frac{6\ \ 4\ \ 5}{2}\ \ 7.5$

$A\ \ \sqrt{s(s\ \ a)(s\ \ b)(s\ \ c)}$

$\sqrt{7.5(7.5\ \ 6)(7.5\ \ 4)(7.5\ \ 5)}$

$\sqrt{7.5\ \ 1.5\ \ 3.5\ \ 2.5}$

$\sqrt{98.4375}$

$A\ \ 9.92\ \text{cm}^2$

$\frac{1}{2}\ \ BC\ \ AN\ \ 9.92$

$\frac{1}{2}\ \ 6\ \ AN\ \ 9.92$

$AN\ \ \frac{9.92\ \ 2}{6}$

$AN\ \ 3.3\ \text{cm}$

**6.** Area of equilateral triangle

$\frac{\sqrt{3}}{4}\,\text{side}^2$

$\frac{\sqrt{3}}{4}\ \ 6^2$

$\frac{1.732\ \ 36}{4}$

$\frac{62.352}{4}$

Area of equilateral triangle

$15.588\ \text{cm}^2$

or $\quad = 15.6\ \text{cm}^2$

**7.** Area of equilateral triangle $\quad 81\sqrt{3}$

$\frac{\sqrt{3}}{4}\,\text{side}^2\ \ \ 81\sqrt{3}$

$\text{side}^2\ \ 81\ \ 4$

$\text{side}^2\ \ 9^2\ \ 2^2$

$\text{side}\ \ 9\ \ 2$

side 18

Perimeter of equilateral triangle

3 side

3 18

54 cm

**8.** Perimeter of equilateral triangle 36

3 side 36

side 12

Area of equilateral triangle

$\frac{\sqrt{3}}{4}$ side$^2$

$\frac{\sqrt{3}}{4}$ 12

$\frac{1.732 \quad 144}{4}$

$\frac{249.408}{4}$

62.3 cm$^2$

Height of equilateral triangle

$\frac{\sqrt{3}}{2}$ side

$\frac{1.732 \quad 12}{2}$

10.4 cm

**9.** Let sides of triangle be $3x$, $4x$, $5x$

$3x \quad 4x \quad 5x \quad 48$

$12x \quad 48$

$x \quad 4$

sides are = 3 4, 4 4, 5 4

= 12, 16, 20

$a \quad 12, b \quad 16, c \quad 20$

$s \quad \frac{12 \quad 16 \quad 20}{2}$

$s \quad 24$

Area $\sqrt{s(s \quad a)(s \quad b)(s \quad c)}$

$\sqrt{24(24 \quad 12)(24 \quad 16)(24 \quad 20)}$

$\sqrt{24 \quad 12 \quad 8 \quad 4}$

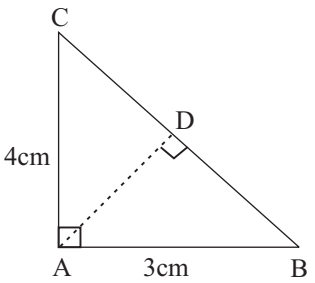
$\sqrt{12 \quad 2 \quad 12 \quad 2 \quad 4 \quad 4}$

12 2 4

96cm$^2$

**10.** $BC^2 \quad AB^2 \quad AC^2$ Pythagoras

$4^2 \quad 3^2$




$BC^2 \quad 25$

$BC^2 \quad 5^2$

$BC \quad 5$

Area of $ABC \quad \frac{1}{2} \quad AB \quad AC$

$\frac{1}{2} \quad BC \quad AD \quad \frac{1}{2} \quad AB \quad AC$

$5 \quad AD \quad 3 \quad 4$

$AD \quad \frac{12}{5}$

$AD$ 2.4 cm

Area of $ABC \quad \frac{1}{2} \quad 3 \quad 4$

6cm$^2$

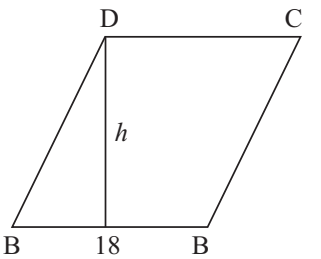
**11.** Area of parallelogram base altitude

54 15 altitude

$\frac{54}{15}$ altitude

3.6 cm altitude

**12.**




Area of parallelogram base height

153 18 height

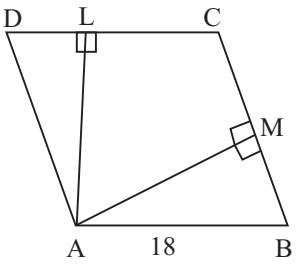
$\frac{153}{18}$ $h$

8.5 cm $h$

8.5cm $h$

distance from opposite side 8.5 cm

**13.**




Area of parallelogram $BC \quad AM$

" " $DC \quad AL$

$BC \quad AM \quad DC \quad AL$

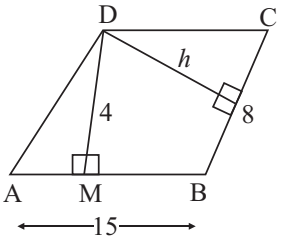
$12 \quad AM \quad 18 \quad 6.4$

$AM \quad \dfrac{18 \quad 6.4}{12}$

$AM \quad \dfrac{115.2}{12}$

$AM \quad 9.6$ cm

**14.**




Area of parallelogram $AB \quad DM$

" " $BC \quad h$

$AB \quad DM \quad BC \quad h$

$15 \quad 4 \quad 8 \quad h$

$\dfrac{15 \quad 4}{8} \quad h$

$2$

$7.5$ cm $\quad h$

distance between shorter sides is 7.5 cm

**15.** Let base of parallelogram $x$

height of parallelogram $\dfrac{1}{3}x$

Area of parallelogram $108$

base $\quad$ height $\quad 108$

$x \quad \dfrac{1}{3}x \quad 108$

$x^2 \quad 108 \quad 3$

$x^2 \quad 324$

$x^2 \quad 18^2$

$x \quad 18$

base $\quad 18$ cm

height $\quad \dfrac{1}{3} \quad 18 \quad 6$ cm

base $\quad 18$ cm

height $\quad \dfrac{1}{3} \quad 18 \quad 6$ cm

## Exercise-13.4

**1.** (i) We have, $r \quad 7$ cm

Circumference $\quad 2 \quad r$

$2 \quad \dfrac{22}{7} \quad 7$

$44$ cm

(ii) $r \quad 21$ cm

$c \quad 2 \quad r$

$2 \quad \dfrac{22}{7} \quad 24^3$

$132$ cm

(iii) We have, $r \quad 3.5$ cm,

$c \quad 2 \quad r$

$2 \quad \dfrac{22}{7} \quad 3.5$

$2 \quad 22 \quad 0.7$

$44 \quad 0.7$

$c \quad 30.8$ cm

**2.** We have, $r \quad \dfrac{21}{2}$ cm

Area of ring $\quad r^2$

$\dfrac{22}{7} \quad \dfrac{21}{2}^{\,2}$

$\dfrac{22}{7} \quad \dfrac{21}{2} \quad \dfrac{21}{2}$ cm$^2$

$\dfrac{4851}{14}$

Area of Ring $\quad 346.5$ cm$^2$

**3.** We have radius of clock $\quad 1.4$ m

Area of swept in 1 hour

Area of circle

$r^2$

$\dfrac{22}{7} \quad (1.4)^2$

$\dfrac{22}{7} \quad 1.4 \quad 1.4$

$22 \quad 0.2 \quad 1.4$

$8.8 \text{ m}^2$

**4.** We have radius of earth $\quad 6398$

Length of equator of earth

Circumference

$2 \quad r$

$2 \quad \frac{22}{7} \quad \overset{914}{\cancel{6398}}$

$2 \quad 22 \quad 914$

$40216 \text{ km}$

**5.** We have, $c \quad 44 \text{ cm}$

$2 \quad r \quad 44$

$2 \quad \frac{22}{7} \quad r \quad 44$

$r \quad \frac{\cancel{2} \quad 44 \quad 7}{\cancel{2} \quad \cancel{22}}$

$r \quad 24 \text{ cm}$

diameter $\quad 14 \text{ cm}$

**6.** We have, $c \quad 18 \text{ cm}$

$2 \quad r \quad 18$

$2 \quad r \quad 18$

$r \quad \frac{18}{2}$

$r \quad 9 \text{ cm}$

Area $\quad r^2$

$(9)^2$

$81 \text{ cm}^2$

**7.** Area of circle $\quad 144$

$r^2 \quad 144$

$r^2 \quad 144$

$r^2 \quad 12^2$

$r \quad 12 \text{ cm}$

Area of circle $\quad r^2$

$\frac{22}{7} \quad (12)^2$

$\frac{22}{7} \quad 144$

$\frac{3168}{7}$

$452.57 \text{ cm}^2$

**8.** Total length of the thread

$1200 \quad$ circumference

$1200 \quad 2 \quad r$

$1200 \quad 2 \quad \frac{22}{7} \quad 1.4$

$1200 \quad 4 \quad 0.2$

$10560 \text{ cm}$

Total length of the bread

$105.60 \text{ m}$

**9.** We have radius of wheel $\quad 2 \quad r$

$2 \quad \frac{22}{7} \quad 28$

$2 \quad 22 \quad 4$

$176 \text{cm}$

Number of revolutions

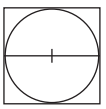
$$\frac{\text{total distance}}{\text{circumference}}$$

$$\frac{80000}{176}$$

Total revolution made by the wheel

$50000$

**10.** Largest circle in a square carboard is the circle whose diameter is equalto the side of the square.



diameter $\quad 21$

$r \quad \frac{21}{2}$

Area of circle $\quad r^2$

$\frac{22}{7} \quad \frac{21}{2}^{\,2}$

$11 \quad 3 \quad \frac{21}{2}$

$346.5 \text{ cm}^2$

**11.** Perimeter of square $\quad$ Perimeter of circle

$4 \quad \text{side} \quad 2 \quad r$

$4 \quad 27.5 = 2 \quad \frac{22}{7} \quad r$

$\frac{4 \quad 27.5 \quad 7}{2 \quad 22} \quad r$

$r \quad 17.5 \text{ cm}$

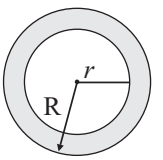
Area of circle $\quad r^2$

$\frac{22}{7} \quad (17.5)^2$

$\frac{22}{\cancel{7}} \quad 17.5 \quad \overset{2.5}{\cancel{17.5}}$

Area of circle $\quad 912.5 \text{ cm}^2$

**12.** We have, $R = \frac{11}{2}$




$r = \frac{3}{2}$

Area of shaded portion

Area of ring

$[R^2 - r^2]$

$\frac{22}{7}\left[\left(\frac{11}{2}\right)^2 - \left(\frac{3}{2}\right)^2\right]$

$\frac{22}{7}[(5.5)^2 - (1.5)^2]$

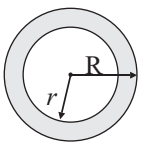
$\frac{22}{7}(30.25 - 2.25)$

$\frac{22}{\cancel{7}} \times \cancel{28}^{4}$

$22 \times 4$

Area of shaded portion $= 88\,cm^2$

**13.** We have, $R = 21$,




$r = ?$

$\because$ Area of shaded portion $= 770 cm^2$

$(R^2 - r^2) = 770$

$\frac{22}{7}[21^2 - r^2] = 770$

$[441 - r^2] = \frac{770 \times 7}{22}$

$441 - r^2 = 245$

$441 - 245 = r^2$

$196 = r^2$

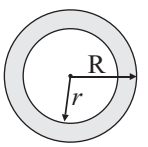
$14^2 = r^2$

$14 = r$

radius of inner circle $= 14$ cm

**14.** We have,

Circumfernece of inner circle $= 88$




$2\pi r = 88$

$2 \times \frac{22}{7} \times r = 88$

$r = 7 \times 2$

$r = 14$ cm

Area of shaded portion $= 346.5\ cm^2$

$(R^2 - r^2) = 346.5$

$\frac{22}{7}[R^2 - 14^2] = 346.5$

$(R^2 - 196) = \frac{346.5 \times 7}{22}$

$= \frac{2425.5}{22}$

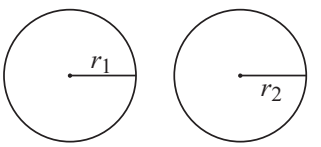
$R^2 - 196 = 110.25$

$R^2 = 306.25$

$R^2 = (17.5)^2$

$R = 17.5$ cm

**15.**




We have,

$2r_1 + 2r_2 = 2.8$

$r_1 + r_2 = 1.4$ cm …(1)

$c_1 + c_2 = 0.88$

$2\pi r_1 + 2\pi r_2 = 0.88$

$2\pi (r_1 + r_2) = 0.88$

$2 \times \frac{22}{7}(r_1 + r_2) = 0.88$

$r_1 + r_2 = \frac{0.88 \times 7}{44}$

$r_1 + r_2 = 0.14$ …(2)

Adding (1) + (2)

$(r_1 + r_2) + (r_1 + r_2) = 1.4 + 0.14$

$2r_1 = 1.54$

$r_1 = 1.54$

$r_1 = 0.77$ m

Putting in (1)

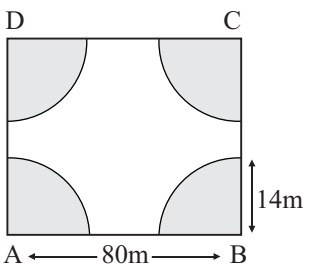
$0.77 + r_2 = 1.4$

$r_2 = 1.4 - 0.77$

$r_2 = 0.63$

radius of circles are 0.77m and 0.63 m.

**16.**



Area of remaining portion

Area of square – Area of 4 quadrant

$$80^2 \quad 4 \quad \frac{r^2}{4}$$

$$6400 \quad r^2$$

$$6400 \quad r^2$$

$$6400 \quad \frac{22}{7} \quad (14)^2$$

$$6400 \quad \frac{22}{7} \quad 14 \quad 14^2$$

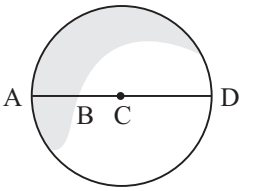
$$6400 \quad 22 \quad 14 \quad 2$$

$$6400 \quad 616$$

Area of remaining portion $5784\ m^2$

**17.** $\because$ $AB \quad BC \quad CD \quad \frac{12}{3} \quad 4$ cm

Area of shaded portion




[Area of semicircle of $r \quad 6$ – Area of semicircle of $r \quad 4$] + [Area of semicircle of $r \quad 2$]

$$\frac{(6)^2}{2} \quad \frac{(4)^2}{2} \quad \frac{(2)^2}{2}$$

$$\frac{6}{2} \quad \frac{16}{2} \quad \frac{4}{2}$$

$$[18 \quad 8 \quad 2]$$

$$(12)$$

$$\frac{22}{7} \quad 12$$

$$37.71\ cm^2$$

# 14 Three Dimensional Shapes

## Exercise-14

**1.**

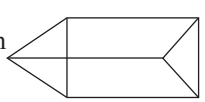
| | |
|---|---|
| Quadrilateral | 2D |
| Hexagon | 2D |
| Sphere | 3D |
| Prism | 3D |
| Circle | 2D |
| Pyramid | 3D |
| Triangle | 2D |
| Cylinder | 3D |
| Square | 2D |

**2.**

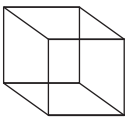
| | |
|---|---|
| Tube light | cylinder |
| A playing circle | cube |
| Match box | cuboid |
| An orange | sphere |
| Joker's cap | cone |
| A Kalidascope | triangular prism |

**3.** (i) Cube
(ii) Rectangulr pyramid
(iii) Cuboid
(iv) Triangular prism
(v) Cone

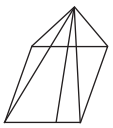
**4.** (i) Prism



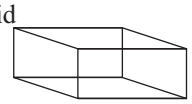
(ii) Cube



(iii) Pyramid



(iv) Cuboid



**5.** (i) $LM$ is joined to $OP$
(ii) $RS$ is joined to $LY$

**7.** 6

**10.** $A \quad 2, B \quad 3, C \quad 1$

**13.** Cuboid $8$ cm $\quad 4$ cm $\quad 4$ cm

**14.** Cuboid $10$ cm $\quad 3$ cm $\quad 2$ cm

**15.** 24 cubes

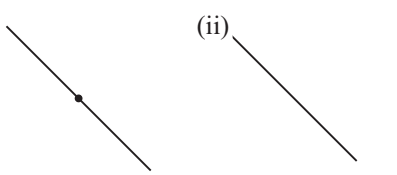
## 15 Symmetry

### Exercise-15.1

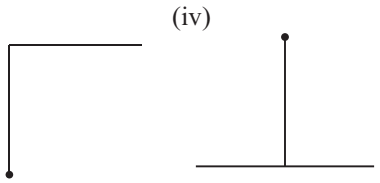
1. H, I,N have rational symmetry.
2. (ii), (iii), (iv), (vi), (vii), (viii) have rational symmetry.
3. (i) 4 order (ii) 3 order (iii) 2 order (iv) 3 order (v) 6 order (vi) 4 order

### Exercie-15.2

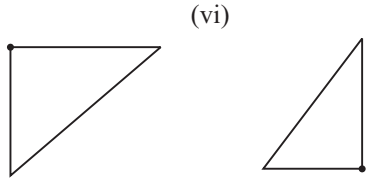
1. (i), (iv) (vi), (vii), (viii) have point symmetry.
2. (i) The mid point of the line segment
   (ii) The point of intersection of diagonals.
   (iii) The point of intersection of the diagonals.
   (iv) The point of intersection of the diagonals.
   (v) The centre of regular hexgon.
   (vi) Centre of circle.
3. (i) (ii)



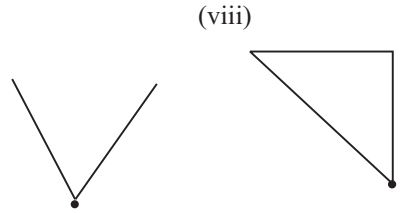
(iii) (iv)



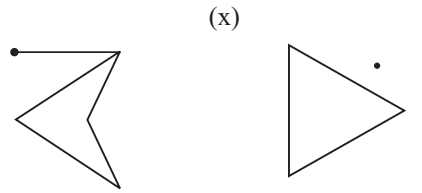
(v) (vi)



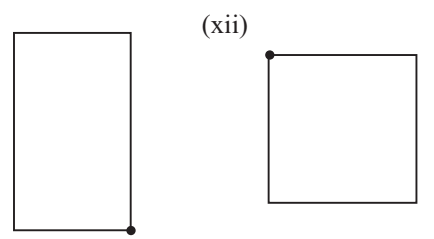
(vii) (viii)



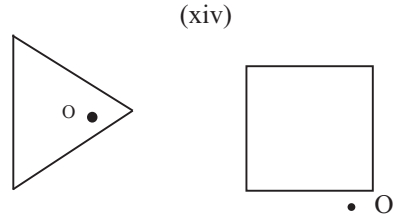
(ix) (x)



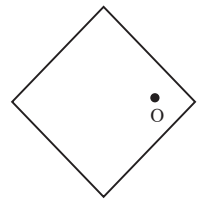
(xi) (xii)



(xiii) (xiv)




(xv)




## 16 Data Handling

### Exercise-16.1

1. Refer to text book.
2. Ascending order

1, 1, 2, 2, 2, 2, 2, 3, 4, 4,4, 4, 5, 5, 5, 5, 5, 5, 6, 6

| Number | Tally Mark | Frequency |
|---|---|---|
| 1 | \|\| | 2 |
| 2 | 𝍸 | 5 |
| 3 | \| | 1 |
| 4 | \|\|\|\| | 4 |
| 5 | 𝍸 \| | 6 |
| 6 | \|\| | 2 |
| | | 20 |

**3.** Ascending order
130, 130, 150, 150, 150, 150, 180, 180, 180, 180, 180, 180, 200, 200, 200

| Wages | Tally Mark | Frequency |
|---|---|---|
| 130 | \|\| | 2 |
| 150 | \|\|\|\| | 4 |
| 180 | 𝍸 \| | 6 |
| 200 | \|\|\| | 3 |

**4.** Ascending order
5, 5, 6, 6, 6, 6, 7, 7,7, 7, 7, 7, 7, 8, 8, 8, 8, 8, 9, 9, 10, 10

| Data | Tally Mark | Frequency |
|---|---|---|
| 5 | \|\| | 2 |
| 6 | \|\|\|\| | 4 |
| 7 | 𝍸 \|\| | 7 |
| 8 | 𝍸 | 5 |
| 9 | \|\| | 2 |
| 10 | \|\| | 2 |
| | | 22 |

**5.** (i) Descending order
29, 28, 28, 25, 25, 21, 19, 18, 18, 15, 15, 12, 12, 7, 7,6, 5,4, 4, 2
(ii) Maximum value 29
(iii) Minimum value 2

(iv)

| Data | Tally Mark | Frequency |
|---|---|---|
| 29 | \| | 1 |
| 28 | \|\| | 2 |
| 25 | \|\| | 2 |
| 21 | \| | 1 |
| 19 | \| | 1 |
| 18 | \|\| | 2 |
| 15 | \|\| | 2 |
| 12 | \|\| | 2 |
| 7 | \|\| | 2 |
| 6 | \| | 1 |
| 5 | \| | 1 |
| 4 | \|\| | 2 |
| 2 | \| | 1 |

**6.** First five natural numbers are 1, 2, 3, 4, 5

Mean $\frac{1 \quad 2 \quad 3 \quad 4 \quad 5}{5} \quad \frac{15}{5} \quad 3$

**7.** First six odd numbers are
1, 3, 5, 7, 9, 11

Mean $\frac{1 \quad 3 \quad 5 \quad 7 \quad 9 \quad 11}{6} \quad \frac{36}{6}$

Mean 6

**8.** First seven even numbers are
2, 4, 6, 8,10,12, 14

Mean $\frac{2 \quad 4 \quad 6 \quad 8 \quad 10 \quad 12 \quad 14}{7}$

$\frac{56}{7}$

Mean 8

**9.** First five prime numbrs are
2, 3, 5, 7, 11

Mean $\frac{2 \quad 3 \quad 5 \quad 7 \quad 11}{5}$

$\frac{28}{5}$

Mean 5.6

**10.** First six multiplies of 5 are
5, 10, 15, 20, 25, 30

Mean $\dfrac{5 \quad 10 \quad 15 \quad 20 \quad 25 \quad 30}{6}$

$\dfrac{105}{6}$

Mean 17.5

**11.**

| Weight (kg) ($x$) | Number of workers ($f$) | $f \quad x$ |
|---|---|---|
| 60 | 4 | 240 |
| 63 | 3 | 189 |
| 66 | 2 | 132 |
| 69 | 2 | 138 |
| 72 | 1 | 72 |
| | 12 | 771 |

Mean $\dfrac{f_i x_i}{f_i}$

$\dfrac{771}{12}$

Mean 64.250 kg

**12.**

| No. of misprint ($x$) | No. of pages ($f$) | $f \quad x$ |
|---|---|---|
| 0 | 154 | 0 |
| 1 | 95 | 95 |
| 2 | 36 | 72 |
| 3 | 7 | 21 |
| 4 | 6 | 24 |
| 5 | 2 | 10 |
| | 300 | 222 |

Mean $\dfrac{fx}{f}$

$\dfrac{22}{300}$

Mean 0.74

**13.**

| Height (in cm) ($x$) | Numbers of plants ($f$) | $f \quad x$ |
|---|---|---|
| 58 | 20 | 1160 |
| 60 | 25 | 1500 |
| 62 | 15 | 930 |
| 64 | 8 | 512 |
| 66 | 12 | 792 |
| 74 | 10 | 740 |
| | 90 | 5634 |

Mean $\dfrac{fx}{f} \quad \dfrac{5634}{90}$

Mean 62.6 cm

**14.**

| Ages (in years) ($x$) | No. of Players ($f$) | $f \quad x$ |
|---|---|---|
| 14 | 15 | 210 |
| 15 | 14 | 210 |
| 16 | 10 | 160 |
| 17 | 8 | 136 |
| 18 | 3 | 54 |
| | 50 | 770 |

Mean $\dfrac{fx}{f} \quad \dfrac{770}{50}$

Mean 15.4

**15.**

| Variable ($x$) | Frequency ($f$) | $f \quad x$ |
|---|---|---|
| 3 | 6 | 18 |
| 5 | 8 | 40 |
| 7 | 15 | 105 |
| 9 | $p$ | $9p$ |
| 11 | 8 | 88 |
| 13 | 4 | 52 |
| | 41 $p$ | 303 $9p$ |

Mean $\frac{fx}{f}$

$8 \quad \frac{303 \quad 9p}{41 \quad p}$

$328 \quad 8p \quad 303 \quad 9p$

$328 \quad 303 \quad p$

$25 \quad p$

## Exercise-16.2

**1.** (i) Arrange in Ascending order
2, 2, 3, 5, 7,9,9, 10, 11 (odd terms)

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

$\frac{9 \quad 1}{2}^{th}$ term

$5^{th}$ term

Median 7

(ii) Arrange in ascending oder
6, 8, 9, 15, 16, 18, 21, 22, 25
(9 terms) odd

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

$\frac{9 \quad 1}{2}^{th}$

$5^{th}$ term

Median 16

(iii) Arrange in Ascending order
6, 8, 9, 13, 15, 16, 18, 20, 21, 22, 51 ( 11 terms odd)

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

$\frac{11 \quad 1}{2}^{th}$ term

$6^{th}$ term

Median 16

**2.** (i) Arrange in ascending order
9, 10,17, 19, 21, 22, 32, 35,
(8 terms even)

Median

$\frac{1}{2} \quad \frac{n}{2}^{th}$ term + $\frac{n}{2} \quad 1^{th}$ term

$\frac{1}{2}[4^{th}$ term + $5^{th}$ term]

$\frac{1}{2}(9 \quad 21)$

$\frac{1}{2}(40)$

Median 20

(ii) Arrange in ascending order
29, 35, 51, 55, 60, 63, 72, 82, 85, 91

Median

$\frac{1}{2} \quad \frac{n}{2}^{th}$ term + $\frac{n}{2} \quad 1^{th}$ term

$\frac{1}{2}[5^{th}$ term + $6^{th}$ term]

$\frac{1}{2}(60 \quad 63) \quad \frac{1}{2}(123)$

Median 61.5

**3.** First 15 odd number are
1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29

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

$\frac{15 \quad 1}{2}^{th}$ term

$8^{th}$ term

Median 15

**4.** First 10 even numbers are
2, 4, 6, 8, 10, 12,14,16, 18, 20
Median

$\frac{1}{2} \quad \frac{1}{2}^{th}$ term + $\frac{n}{2} \quad 1^{th}$ term

$\frac{1}{2}[5^{th}$ term + $6^{th}$ term]

$\frac{1}{2}(10 \quad 12)$

Median 11

**5.** First 50 whole numbers are
0, 11, 2, 4, ..... 49
Median

$\frac{1}{2} \quad \frac{1}{2}^{th}$ term + $\frac{n}{2} \quad 1^{th}$ term

$\frac{1}{2}[25^{th}\ \text{term} + 26^{th}\ \text{term}]$

$\frac{1}{2}(24 \quad 25)$

$\frac{1}{2}(49)$

Median 24.5

**6.** Arrange is ascending order

17, 17, 19, 19, 20, 21, 22, 23, 24, 25, 26, 29, 31, 40

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

$\frac{15 \quad 1}{2}^{th}$ term

$8^{th}$ term

Median 23

**7.** Arrange in ascending order

31, 34, 36, 37, 40, 43, 46, 50, 52, 53

Median

$\frac{1}{2} \quad \frac{1}{2}^{th}$ term + $\frac{n}{2} \quad 1^{th}$ term

$\frac{1}{2}[5^{th}\ \text{term} + 6^{th}\ \text{term}]$

$\frac{1}{2}(40 \quad 43)$

$\frac{1}{2}(83)$

Median 41.5 years

**8.** (i) We have,

10, 8, 4, 7, 8,11, 15, 8, 6, 8

In the given data 8 is repeated more number of times than any other number

Mode 8

(ii) We have,

27, 23, 39, 18, 27, 21, 27,27, 40, 36, 27

In the given data 27 is repeated more number of times than anyother number

Mode 27

**9.** We have,

28, 34, 32, 41, 36, 32, 36, 38, 32, 40, 31

In the given data 32 is repeated more number of times than any other number

Model age 32 years

**10.** We have,

| Marks | 15 | 17 | 20 | 22 | 25 |
|---|---|---|---|---|---|
| No. of students | 6 | 6 | 12 | 18 | 8 |

In the given data marks 22 is obtained by maximum number of students

Mode 22

**11.** We have 1, 1, 2, 2, 3, 3, 3, 6

Median

$\frac{1}{2} \quad \frac{1}{2}^{th}$ term + $\frac{n}{2} \quad 1^{th}$ term

$\frac{1}{2}[4^{th}\ \text{term} + 5^{th}\ \text{term}]$

$\frac{1}{2}(2 \quad 3)$

$\frac{5}{2}$

Median 2.5

**Mode :** In the given data 3 occures maximum number of times.

Mode 3

Mean $\frac{1 \quad 1 \quad 2 \quad 2 \quad 3 \quad 3 \quad 3 \quad 6}{8}$

$\frac{21}{8}$

Mean 2.625

**12.** We have, 1, 2, 3, 3, 3, 4, 5, 5, 6, 7

$\frac{1}{2} \quad \frac{1}{2}^{th}$ term + $\frac{n}{2} \quad 1^{th}$ term

$\frac{1}{2}[5^{th}\ \text{term} + 6^{th}\ \text{term}]$

$\frac{1}{2}(3 \quad 4)$

Median 3.5

**Mode :** inthe given data 3 occures maximum numberof times

Mode 3

Mean

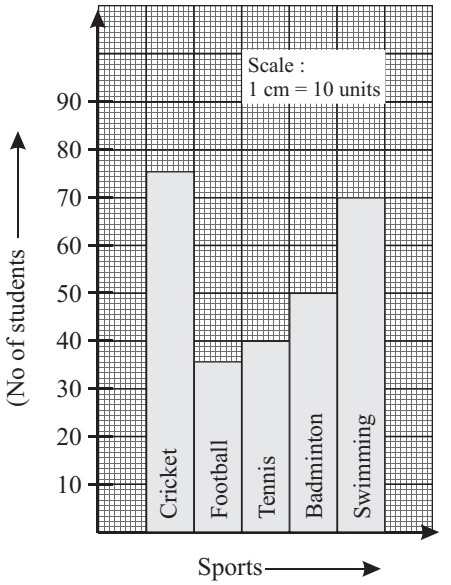
$\frac{1 \quad 2 \quad 3 \quad 3 \quad 3 \quad 4 \quad 5 \quad 5 \quad 6 \quad 7}{10}$

$\frac{39}{10}$

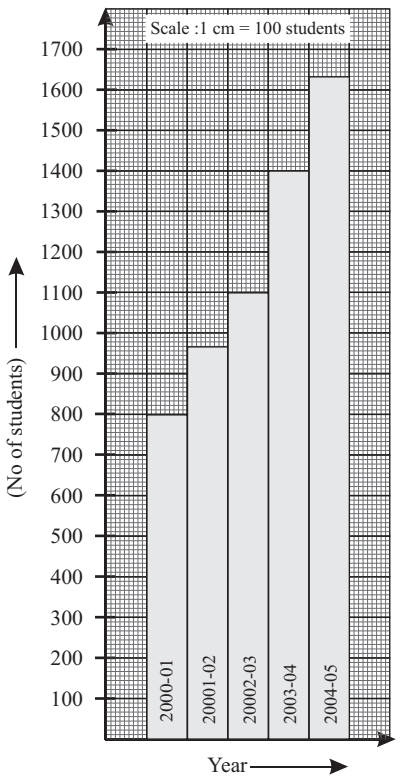
Mean 3.9

## Exercise-16.3

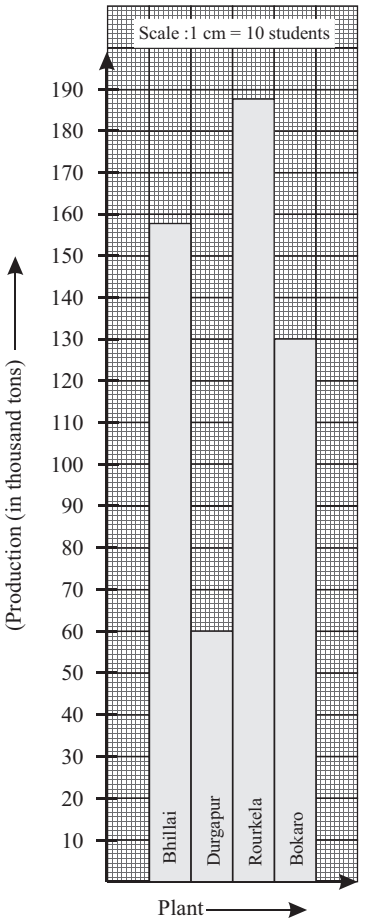
**1.**



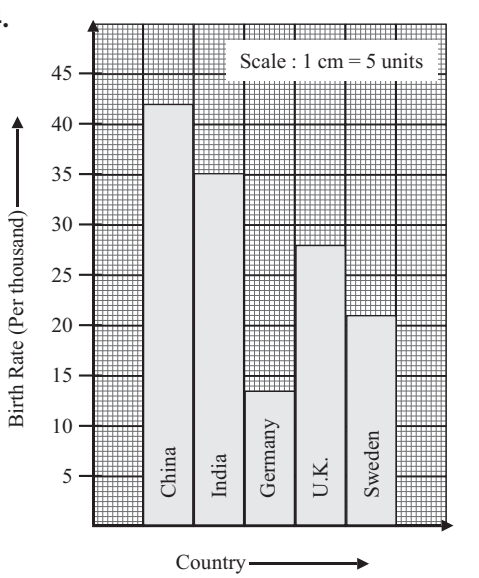

**2.**



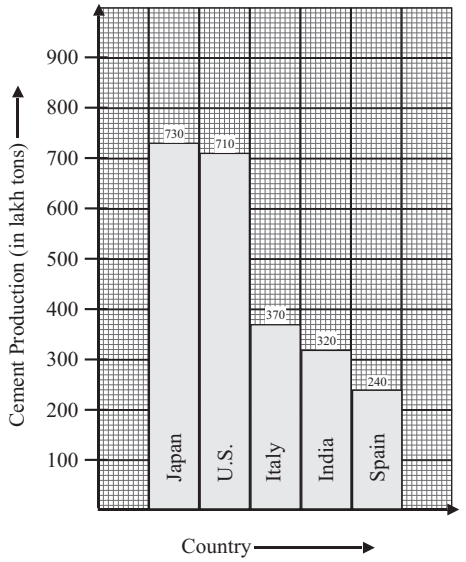

**3.**



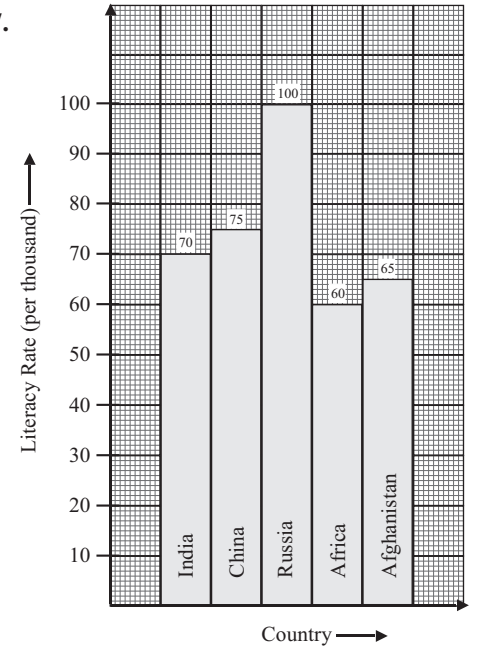

**4.**



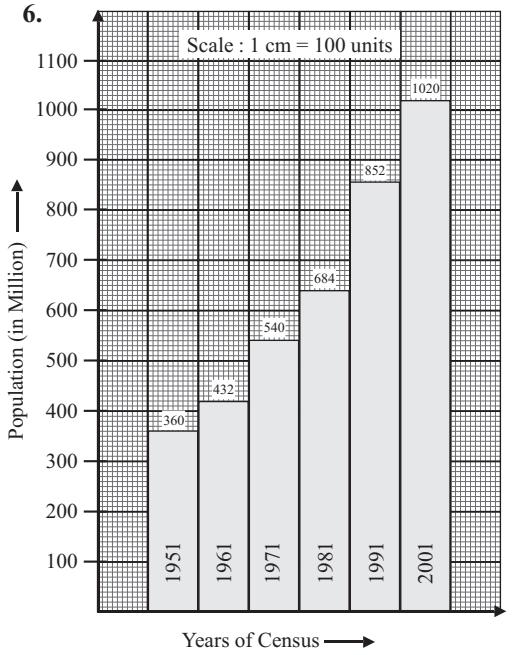
**5.**


Cement Production (in lakh tons)
900
800
700
600
500
400
300
200
100
730
710
370
320
240
Japan
U.S.
Italy
India
Spain
Country

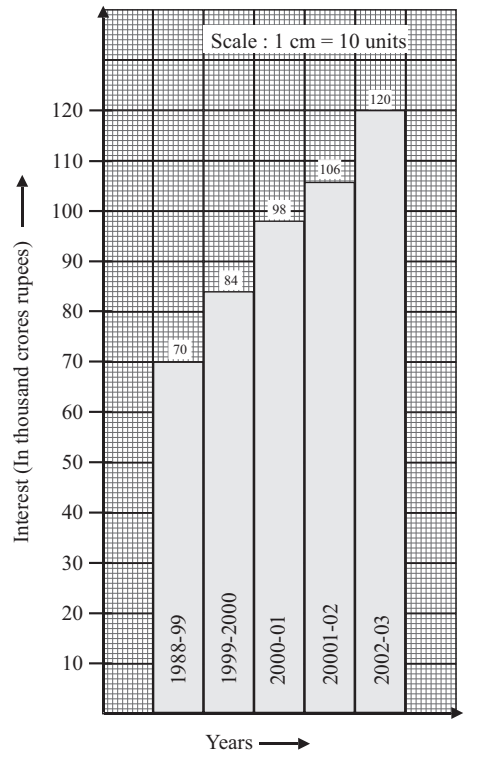
**7.**


Literacy Rate (per thousand)
100
90
80
70
60
50
40
30
20
10
100
70
75
60
65
India
China
Russia
Africa
Afghanistan
Country

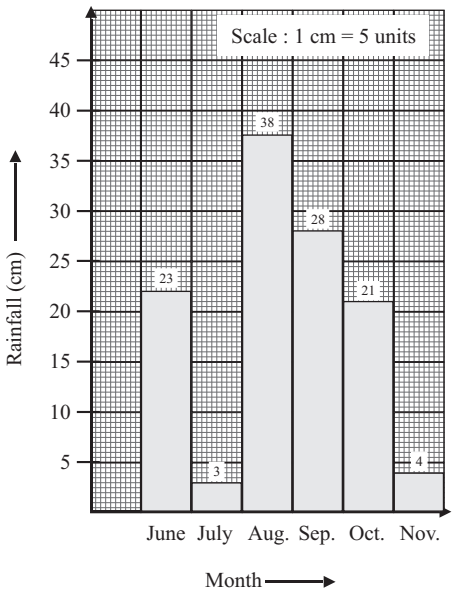
**6.**


Scale : 1 cm = 100 units
Population (in Million)
1100
1000
900
800
700
600
500
400
300
200
100
360
432
540
684
852
1020
1951
1961
1971
1981
1991
2001
Years of Census

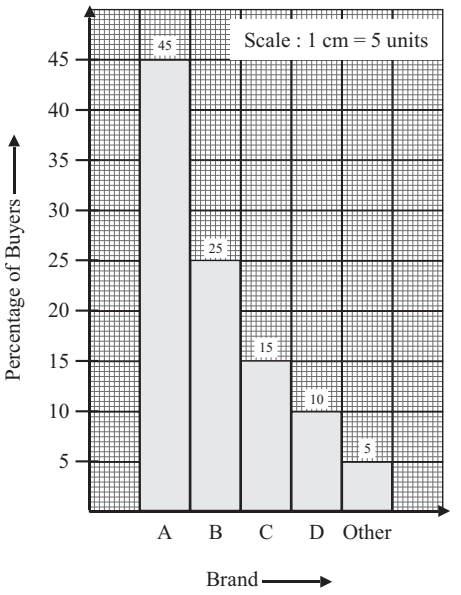
**8.**


Scale : 1 cm = 10 units
Interest (In thousand crores rupees)
120
110
100
90
80
70
60
50
40
30
20
10
70
84
98
106
120
1988-99
1999-2000
2000-01
20001-02
2002-03
Years

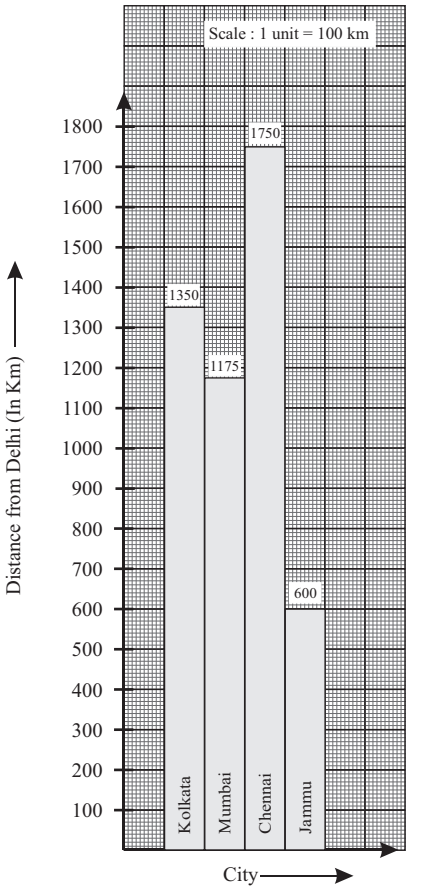
**9.**


Scale : 1 cm = 5 units
Rainfall (cm)
45
40
35
30
25
20
15
10
5
23
3
38
28
21
4
June
July
Aug.
Sep.
Oct.
Nov.
Month

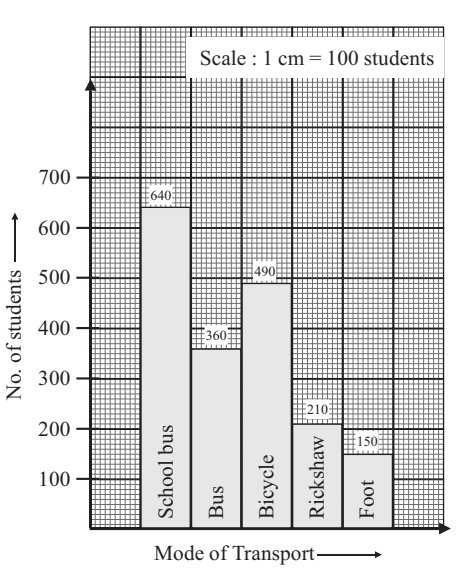
**10.**


Scale : 1 cm = 5 units
Percentage of Buyers
45
40
35
30
25
20
15
10
5
45
25
15
10
5
A
B
C
D
Other
Brand

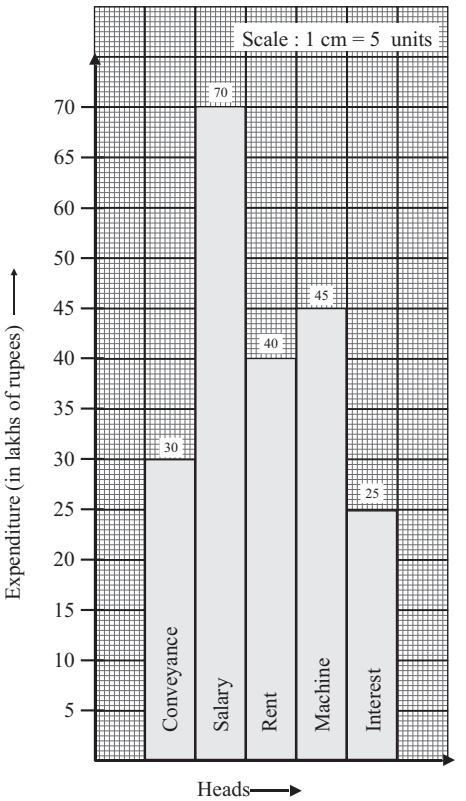
**11.**


Scale : 1 unit = 100 km
Distance from Delhi (In Km)
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
1350
1175
1750
600
Kolkata
Mumbai
Chennai
Jammu
City

**12.**


Scale : 1 cm = 100 students
No. of students
700
600
500
400
300
200
100
640
360
490
210
150
School bus
Bus
Bicycle
Rickshaw
Foot
Mode of Transport

**13.**


Scale : 1 cm = 5 units
Expenditure (in lakhs of rupees)
70
65
60
50
45
40
35
30
25
20
15
10
5
30
70
40
45
25
Conveyance
Salary
Rent
Machine
Interest
Heads

❑