CHRIST KING HR. SEC SCHOOL KOHIMA.

Class : VII

Sub : Mathematics

Syllabus : 3rd Term.

→ Ch. 11 Properties of Triangles. (15 m)

→ Ch. 16. Perimeter and Area (20 m)

→ Ch 17. Collecting and Organising Data. (15 m).

Submitted by : Ms. Edini

11. PROPERTIES OF TRIANGLES.

Exercise 11.1

1

a)

Solⁿ

$$\angle A + \angle B + \angle C = 60^\circ + 60^\circ + 60^\circ$$
$$= 180^\circ$$

$\because$ the sum of the three angles is equal to 180°, we can say that it is a triangle.

e)

Solⁿ

$$\angle A + \angle B + \angle C = 90^\circ + 90^\circ + 20^\circ$$
$$= 200^\circ$$

$\because$ the sum of the three angles is more than 180°, we can say that it is not a triangle.

2.

a) $\angle ACD = \angle ABC + \angle BAC$.

b) $\angle EAB = \angle ACB + \angle CBA$.

c). $\angle FBC = \angle BAC + \angle ACB$.

* By Exterior Angle Property, we know that the exterior angle of a Δ is equal to the sum of the interior opposite angles.

3.

a.

Sol.ⁿ $\angle A + \angle B + \angle C = 180°$ (By Angle Sum Property)

d).

Sol.ⁿ $\angle ABC = 180° - 120°$

$= 60°$

$\angle ACB = 180° - 130°$

$= 50°$

$\therefore \angle A = 180° - (60° + 50°)$

$= 180^\circ - 110^\circ$

$= 70^\circ$

e).

Sol:ⁿ

$\because BC \parallel AD.$

$\angle x = 180^\circ - 70^\circ$

$= 10^\circ.$

h)

Sol:ⁿ

$\angle A = 180^\circ - (32^\circ + 32^\circ)$

$= 180^\circ - 64^\circ$

$= 116^\circ$

$$\begin{array}{r} 180 \\ -\ 64 \\ \hline 116 \end{array}$$

$\therefore \angle ACD = \angle A + \angle B$ {EXTERIOR ANGLE PROP.}.

$= 116^\circ + 32^\circ$

$= 148^\circ$

$$\begin{array}{r} 116 \\ +32 \\ \hline 148 \end{array}$$

4.

Sol^n Let the three angles be $2x$, $3x$ and $4x$.

By Angle Sum Property of $\triangle$,

$$2x + 3x + 4x = 180°$$

$$\Rightarrow 9x = 180°$$

$$\Rightarrow x = \frac{\cancel{180°}^{20}}{\cancel{9}_{1}}$$

$$= 20°$$

$\therefore \angle A = 2x$

$= 2 \times 20°$

$= 40°$

$\angle B = 3x$

$= 3 \times 20°$

$= 60°$

$\angle C = 4x$

$= 4 \times 20°$

$= 80°$

5.

Sol.^{n} Let one of the complimentary angle be x

then, the other complimentary angle

$= 2x$

By Angle Sum Property of $\triangle$

$$90° + x + 2x = 180°$$

$$\Rightarrow 90° + 3x = 180°$$

$$\Rightarrow 3x = 180° - 90°$$

$$\Rightarrow 3x = 90°$$

$$\Rightarrow x = \frac{\cancel{90°}^{30}}{\cancel{3}_{1}}$$

$$= 30°$$

$\therefore$ the angles are : $x = 30°$

and $2x = 2 \times 30°$

$= 60°$.

Exercise 11.2.

1 a).

Sol^n $AB + BC > AC$?

$= 7cm + 8cm > 7cm$?

$= 15\ cm > 7\ cm$? Yes.

$BC + AC > AB$?

$= 8cm + 7cm > 7cm$?

$= 15\ cm > 7cm$? Yes.

$AB + AC > BC$?

$= 7cm + 7cm > 8\ cm$?

$= 14\ cm > 8cm$? Yes.

It is a triangle.

* The sum of any two sides of a Δ is greater than the third side.

h).

Sol^n $MN + ON > OM$?

$= 100\ m + 60\ m > 40\ m$

$= 160\ m > 40\ m$? Yes.

$ON + OM > MN$?

$60\ m + 40\ m > 100\ m$

$= 100m > 100\ m$? No.

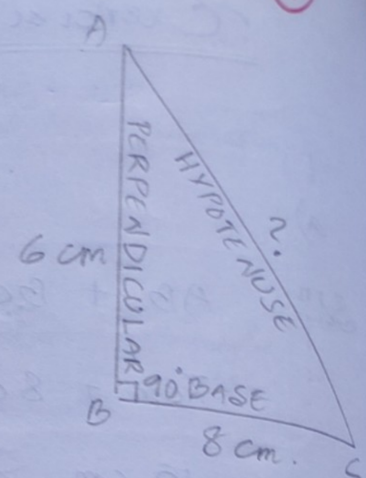
It cannot be a triangle.

2.

a)

Sol:ⁿ Here,

Hypotenuse (AC) = ?
Base (BC) = 8 cm
Perpendicular (AB) = 6 cm.



By Pythagoras' Theorem,

$$(H)^2 = (B)^2 + (P)^2$$

$$\Rightarrow (AC)^2 = (8\,cm)^2 + (6\,cm)^2$$

$$\Rightarrow (AC)^2 = 64\,cm^2 + 36\,cm^2$$

$$\Rightarrow (AC)^2 = 100\,cm^2$$

$$\Rightarrow AC = \sqrt{100\,cm^2}$$

$$= \sqrt{10\,cm \times 10\,cm}$$

$$= \sqrt{(10\,cm)^{\cancel{2}}}$$

$$= 10\,cm$$

$$1 \overline{)\,\overline{1}\overline{00}\,} \; 10$$
1
x

$\therefore$ Hypotenuse (AC) = 10 cm

3 (a)

Sol.^{n} Here, $x = CB$ is the base.

By Pythagoras' Theorem

$$(H)^2 = (B)^2 + (P)^2$$

$$\Rightarrow (25)^2 = (x)^2 + (24)^2$$

$$\Rightarrow 625 = x^2 + 576.$$

$$\Rightarrow 625 - 576 = x^2$$

$$\Rightarrow 49 = x^2$$

$$\Rightarrow \sqrt{49} = x$$

$$\Rightarrow \sqrt{7 \times 7} = x$$

$$\Rightarrow \cancel{\sqrt{}}(7)^{\cancel{2}} = x$$

$$\Rightarrow 7 = x.$$

$$\begin{array}{r} \overset{2}{2}5 \\ \times\ 25 \\ \hline 125 \\ +\ 50 \\ \hline 625 \end{array} \quad 1$$

$$\begin{array}{r} \overset{1}{2}4 \\ \times\ 24 \\ \hline 1\,96 \\ +\ 48 \\ \hline 576 \end{array}$$

$$\begin{array}{r} 625 \\ -\ 576 \\ \hline 49 \end{array}$$

c.

Sol.ⁿ Here, $x = AC$ is the hypotenuse.

By Pythagoras Theorem,

$$(H)^2 = (B)^2 + (P)^2$$

$$\Rightarrow (x)^2 = (9)^2 + (12)^2$$

$$\Rightarrow x^2 = 81 + 144$$

$$\Rightarrow x^2 = 225.$$

$$\Rightarrow x = \sqrt{225}.$$

$$\Rightarrow x = \sqrt{15 \times 15}$$

$$\Rightarrow x = \cancel{\sqrt{}}(15)^{\cancel{2}}$$

$$\Rightarrow x = 15.$$

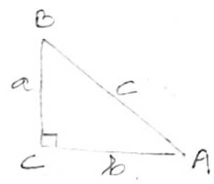
2
$25 \times 5 = 125$

1
$144 + 81 = 225$

$$\begin{array}{r|l} & 15 \\ \hline 1 & \overline{2}\,\overline{25} \\ & 1 \downarrow \\ \hline 25 & 125 \\ & 125 \\ \hline & \times\times \end{array}$$

4.

a).



Sol^n By Pythagoras theorem

$$(H)^2 = (B)^2 + (P)^2$$

$$\Rightarrow (c)^2 = (8)^2 + (6)^2$$

$$\Rightarrow c^2 = 64 + 36$$

$$\Rightarrow c^2 = 100$$

$$\Rightarrow c = \sqrt{100}$$

$$\Rightarrow c = \sqrt{10 \times 10}$$

$$= \sqrt{(10)^2}$$

$$= 10.$$

d).

Sol^n By Pythagoras theorem

$$(H)^2 = (B)^2 + (P)^2$$

$$\Rightarrow (c)^2 = (9)^2 + (12)^2$$

$$\Rightarrow c^2 = 81 + 144$$

$$\Rightarrow c^2 = 225.$$

$$\Rightarrow c = \sqrt{225}.$$

$$= \sqrt{15 \times 15}$$

$$= \sqrt{(15)^2}$$

$$= 15$$

5.

a)

Sol^n We know, In a Right angled $\triangle$

longest side = hypotenuse

$\therefore$ Applying Pythagoras theorem, if $(H)^2 = (B)^2 + (P)^2$ for the values 12, 16, 20 we can say it is a right angled $\triangle$.

$$(20)^2 = \quad + 16^2$$

$$\Rightarrow 400 = 144 + 256.$$

$$\Rightarrow 400 = 400$$

Hence, (12, 16, 20) form the lengths of a right angled $\triangle$.

c).

Sol:ⁿ Applying Pythagoras theorem for the values (15, 28, 14), we have.

$$(28)^2 = (15)^2 + (14)^2$$

$$\Rightarrow 784 = 225 + 196.$$

$$\Rightarrow 784 \neq 421$$

$$\begin{array}{r} 28 \\ \times 28 \\ \hline 224 \\ +56 \\ \hline 784 \end{array}$$

$$\begin{array}{r} 14 \\ \times 14 \\ \hline 56 \\ 14 \\ \hline 196 \end{array}$$

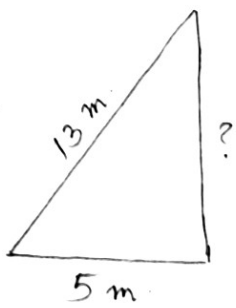
$$\begin{array}{r} 225 \\ +196 \\ \hline 421 \end{array}$$

$\because$ (15, 28, 14) do not satisfy the Pythagoras theorem, the lengths do not form a right angled $\triangle$.

6.

Sol:ⁿ Here,

The height of the window from the ground = perpendicular.



$H = 13\ m$

$B = 5\ m$

By Pythagoras' theorem,

$$(H)^2 = (B)^2 + (P)^2$$

$$\Rightarrow (13m)^2 = (5m)^2 + (P)^2$$

$\Rightarrow 169m^2 = 25m^2 + (p)^2$

$$\begin{array}{r} 13 \\ \times 13 \\ \hline 39 \\ +13 \\ \hline 169 \end{array}$$

$\Rightarrow 169m^2 - 25m^2 = p^2$

$\Rightarrow 144m^2 = p^2$

$$\begin{array}{r} 169 \\ -25 \\ \hline 144 \end{array}$$

$\Rightarrow \sqrt{144m^2} = p.$

$\Rightarrow \sqrt{12m \times 12m} = p.$

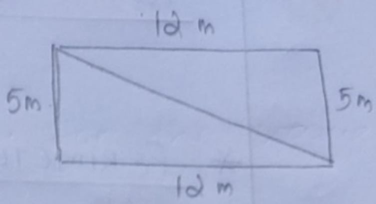
$\Rightarrow \cancel{\sqrt{}}(12m)^{\cancel{2}} = p.$

$\Rightarrow 12m = p.$

$\therefore$ Height of the window from the ground = 12 m.

8.

Sol.: Here,



Diagonal = Hypotenuse.

(P) = 12 m

(B) = 5 m.

By Pythagoras theorem,

$(H)^2 = (B)^2 + (P)^2$

$\Rightarrow (H)^2 = (5m)^2 + (12m)^2$

$$\begin{array}{r} 144 \\ +25 \\ \hline 169 \end{array}$$

$\Rightarrow H^2 = 25\,m^2 + 144\,m^2$

$\Rightarrow H^2 = 169\,m^2$

$\Rightarrow H = \sqrt{169\,m^2}$

$\Rightarrow H = \sqrt{13m \times 13m}$

$= \cancel{\sqrt{}}(13m)^{\cancel{2}}$

$= 13\,m.$

$\therefore$ length of the diagonal = 13 m.

16. Perimeter and Area.

* PERIMETER : The length of the boundary of any plane figure, or the sum of the measure of all its sides, is called as the perimeter.

* AREA : The surface covered in a plane by a closed boundary is called the area.

FORMULAE :

→ PERIMETER OF SQUARE : $4 \times$ Side

→ PERIMETER OF RECTANGLE : $2 \times (l + b)$.

→ AREA OF SQUARE : Side $\times$ Side.

→ AREA OF RECTANGLE : length $\times$ breadth.

→ AREA OF TRIANGLE : $\frac{1}{2} \times$ base $\times$ height.

→ AREA OF PARALLELOGRAM : $b \times h$.

Exercise 16.1

1.

a).

Sol^n Here, length (AB) = 13 cm.
breadth (BC) = 8 cm

$\therefore$ Perimeter $= 2\times(l+b)$

$= 2\times(13\text{ cm} + 8\text{ cm})$

$= 2\times 21\text{ cm}$

$= 42\text{ cm}$.

e).

Sol^n Here, length (AD) = 12.1 cm
breadth (DC) = 16.7 cm

$$\begin{array}{r} 12.1 \\ 16.7 \\ \hline 28.8 \end{array}$$

$\therefore$ Perimeter $= 2\times(l+b)$

$= 2\times(12.1\text{ cm} + 16.7\text{ cm})$

$$\begin{array}{r} 1\,1 \\ 288 \\ \times 2 \\ \hline 57.6 \end{array}$$

$= 2\times 28.8\text{ cm}$

$= 57.6\text{ cm}$.

2.

a)

Soln

Here,

Side (AB) = 8 cm

$\therefore$ Perimeter = 4 x Side

= 4 x 8 cm

= 32 cm.

3.

Soln

Here,

Side of the square = 13 m.

$\therefore$ Perimeter of the square = 4 x side

= 4 x 13 m

= 52 m.

A.P.Q.

Perimeter of rectangle = Perimeter of the square

$\Rightarrow$ $2 \times (l + b) = 52\ m.$

$\Rightarrow$ $2 \times (16m + b) = 52\ m$

$\Rightarrow$ $32\ m + 2b = 52\ m.$

$\Rightarrow 2b = 52\text{ m} - 32\text{ m}$

$$\begin{array}{r} 52 \\ 32 \\ \hline 20 \end{array}$$

$\Rightarrow 2b = 20\text{ m}$

$\Rightarrow b = \dfrac{\cancel{20}^{10}\text{ m}}{\cancel{2}_{1}}$

$= 10\text{ m}.$

$\therefore$ breadth of the rectangle $= 10\text{ m}.$

5.

Sol^n Here,

$l = 18\text{ m}$

$b = 12\text{ m}.$

$\therefore$ Perimeter of the rectangular lawn $= 2 \times (l + b)$

$= 2 \times (18\text{m} + 12\text{ m})$

$= 2 \times 30\text{ m}$

$= 60\text{ m}.$

$\therefore$ No. of shrubs needed in all $= 3 \times 60$

$= 180.$

7.

Soln Here,

let $b = x$.

then, $l = 3x$.

A.P.Q.

Perimeter of the hallway = 48 m.

$\Rightarrow 2 \times (l + b) = 48$ m

$\Rightarrow 2 \times (3x + x) = 48$ m

$\Rightarrow 2 \times 4x = 48$ m

$\Rightarrow 8x = 48$ m

$\Rightarrow x = \frac{\cancel{48}^{6}}{\cancel{8}_{1}}$ m

$= 6$ m.

$\therefore l = 3x$

$= 3 \times 6$ m

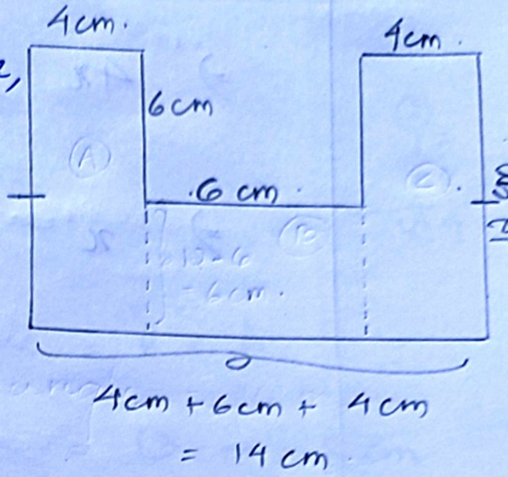
$= 18$ m

and $b = x$

$= 6$ m.

8.
a).

Solⁿ {∵ it is an irregular figure, we add up all the measure of the sides}.



Perimeter of the figure = 4 cm + 6 cm + 6 cm + 6 cm + 4 cm + 12 cm + 14 cm + 12 cm

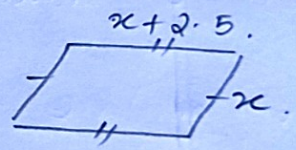
= 64 cm.

9.
Solⁿ

Here,

$l = x + 2.5$

$b = x$.



A.P.Q.

Perimeter of the ∥gm = 51 m

$\Rightarrow 2 \times (l + b) = 51$ m

$\Rightarrow 2 \times (x + 2.5 + x) = 51$ m.

$\Rightarrow 2 \times (2x + 2.5) = 51$ m

$$\Rightarrow 4x + 5 = 51 \text{ m}$$

$$\Rightarrow 4x = 51 \text{ m} - 5$$

$$\Rightarrow 4x = 46 \text{ m}$$

$$\Rightarrow x = \frac{\cancel{46}^{\,23}}{\cancel{4}_{\,2}} \text{ m}$$

$$= 11.5 \text{ m}.$$

$$\therefore l = x + 2.5$$

$$= 11.5 \text{ m} + 2.5 \text{ m}$$

$$= 14 \text{ m}.$$

$$b = x$$

$$= 11.5 \text{ m}.$$

$$\begin{array}{r} 11.5 \\ 2\,\overline{)\,23} \\ -2 \\ \hline \times 3 \\ -2 \\ \hline 10 \\ 10 \\ \hline \times\times \end{array}$$

$$\begin{array}{r} \overset{1}{1}1.5 \\ +2.5 \\ \hline 14.0 \end{array}$$

Exercise 16.2.

1.

a)

Sol:

length (AB) = 13 cm

breadth (BC) = 8 cm

$$\begin{array}{r} \overset{2}{1}3 \\ \times\ 8 \\ \hline 104 \end{array}$$

∴ Area of the rectangle = $l \times b$

= $13\ cm \times 8\ cm$

= $104\ cm^2$

or 104 sq. cm.

e).

Sol:

length (DC) = 16.7 cm

breadth (AD) = 12.1 cm.

∴ Area of the rectangle = $l \times b$

= $16.7\ cm \times 12.1\ cm$

= $202.07\ cm^2$.

$$\begin{array}{r} 167 \\ \times\ 121 \\ \hline 167 \\ 334 \\ +\ 167 \\ \hline 202.07 \end{array}$$

2.
c)

Solⁿ Side = 5.5 cm.

$\therefore$ Area of the square = side × side

= 5.5 cm × 5.5 cm

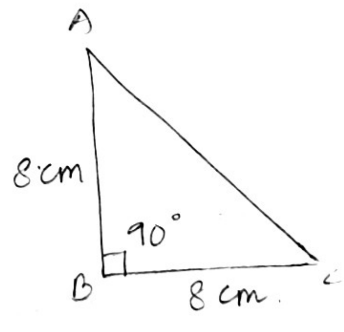
= 13.75 cm^2

or 13.75 sq. cm.

2
55
×55
125
+ 125
13.75

3.

a).



Solⁿ Base = 8 cm.

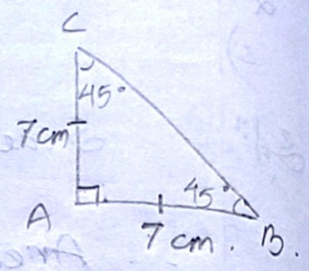
Height = 8 cm.

$\therefore$ Area of $\triangle ABC = \frac{1}{2} \times B \times H$

$= \frac{1}{\cancel{2}_1} \times \overset{4}{\cancel{8}} cm \times 8\ cm$

$= 32\ cm^2.$

c)



Solⁿ $\because$ it is an isosceles $\triangle$

$CA = AB = 7\ cm$

here, $B = 7\ cm$

$H = 7\ cm$

$\therefore$ Area of $\triangle ABC = \frac{1}{2} \times B \times H$

$$= \frac{1}{2} \times 7\ cm \times 7\ cm$$

$$= \frac{49\ cm^2}{2}$$

$$= 24.5\ cm^2$$

$$\begin{array}{r} 24.5 \\ 2\overline{)49} \\ -4 \\ \hline \times 9 \\ -8 \\ \hline 10 \\ 10 \\ \hline \times\times \end{array}$$

4.

Solⁿ Here,

Base $= 6.5\ cm$

Height $= 3.5\ cm$

$\therefore$ Area of the parallelogram $ABCD = B \times H$

$$= 6.5\ cm \times 3.5\ cm$$

$$= 22.75\ cm^2$$

$$\begin{array}{r} 65 \\ \times 35 \\ \hline 325 \\ 195\ \\ \hline 22.75 \end{array}$$

5.
Soln: length of the lawn = 15 m.

Area of the lawn = $255\ m^2$

$\Rightarrow \quad l \times b = 255\ m^2$

$\Rightarrow \quad 15\ m \times b = 255\ m^2$

$\Rightarrow \quad b = \dfrac{\overset{17}{\cancel{\overset{51}{\cancel{255}}}}\ m^{\cancel{2}}}{\underset{1}{\cancel{\underset{3}{\cancel{15}}}}\ \cancel{m}}$

$= 17\ m.$

$\therefore$ Perimeter of the lawn $= 2 \times (l + b)$

$= 2 \times (15\ m + 17\ m)$

$= 2 \times 32\ m$

$= 64\ m.$

7

Sol^n

height = 7.5 cm.

Area of the parallelogram = 71.25 cm^2

b × h = 71.25 cm^2.

$\Rightarrow$ b × 7.5 cm = 71.25 cm^2.

$\Rightarrow$ b $= \dfrac{71.25 \, cm^{\cancel{2}}}{7.5 \, \cancel{cm}}$

$= \dfrac{71.25 \times 100 \, cm}{7.5 \times 100}$

$= \dfrac{71\cancel{2}5}{7\cancel{5}0}$ $\cancel{1425}$ $\cancel{285}$ 9.5

$\cancel{150}$

$\cancel{30}$ 1

= 9.5 cm

$$\begin{array}{r} 9.5 \\ 30 \overline{)285} \\ -270 \\ \hline 150 \\ -150 \\ \hline \text{XX} \end{array}$$

9.
Sol^n Perimeter of square = 64 cm.

$\Rightarrow$ $4 \times$ side = 64 cm.

$\Rightarrow$ side $= \frac{\cancel{64}^{16}}{\cancel{4}_1}$ cm

$$\begin{array}{r} \overset{3}{1}6 \\ \times 16 \\ \hline 96 \\ 16 \\ \hline 256 \end{array}$$

$= 16$ cm.

$\therefore$ Area of the square = side $\times$ side

$= 16 \text{ cm} \times 16 \text{ cm}$

$= 256 \text{ cm}^2$.

10.
Sol^n 1 hectare $= 10{,}000 \text{ m}^2$.

$\therefore$ 2 hectare $= 2 \times 10{,}000 \text{ m}^2$

$= 20{,}000 \text{ m}^2$.

$\because$ it is divided among 4 son's,

each son's share $= \frac{20{,}000 \text{ m}^2}{4}$

$= 5000 \text{ m}^2$

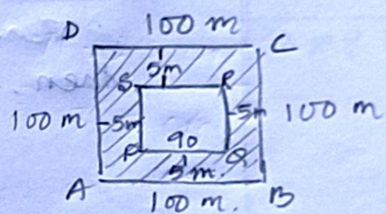
$= \frac{5\cancel{0}\cancel{0}0}{1\cancel{0}\cancel{0}}$ ares. ∵ $1\ m^2 = 100$ ares.

$= 50$ ares

<u>Exercise 16.3</u>

1.

Sol: Let ABCD be the square park with side = 100 m.



and let PQRS be the inner square formed after a 5 m wide path is made.

∴ side of the inner square $= 100\ m - 10\ m$

$= 90\ m.$

∴ Area of the path = Area of the square park ABCD − Area of the inner square PQRS.

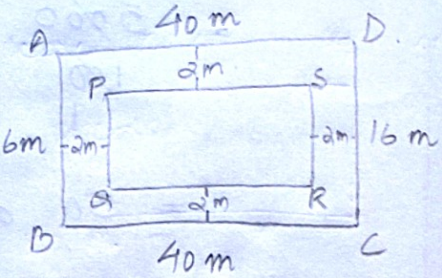
$= 100\ m \times 100\ m - 90\ m \times 90\ m.$

$= 10,000\ m^2 - 8100\ m^2$

$= 1900\ m^2.$

$$\begin{array}{r} 10000 \\ -8100 \\ \hline 1900 \end{array}$$

3.



Sol^n: Let ABCD be the rectangular plot whose length = 40 m and breadth = 16 m.

and let PQRS be the inner rectangle formed after paving a 2 m path inside the plot.

then, length of PQRS = 40 m − 4 m
= 36 m.

breadth of PQRS = 16 m − 4 m
= 12 m.

Area of the path = Area of ABCD − Area of PQRS.

$$\begin{array}{r} ② \\ 16 \\ \times 4 \\ \hline 640 \end{array}$$

= 40 m × 16 m − 36 m × 12 m

$$\begin{array}{r} ① \\ 36 \\ \times 12 \\ \hline 072 \\ +36 \\ \hline 432 \end{array}$$

= 640 m^2 − 432 m^2

= 208 m^2.

$$\begin{array}{r} 640 \\ -432 \\ \hline 208 \end{array}$$

∴ Cost of paving the road with bricks @ ₹ 15 per sq. meter = ₹ 15 × 208.

$= ₹\ 3120.$

$$\begin{array}{r} 208 \\ \times 15 \\ \hline 1040 \\ +208 \\ \hline 3120 \end{array}$$

Now,

Area of PQRS = $432\ m^2$

$\therefore$ Cost of covering the remaining plot (ie, PQRS) with grass @ ₹ 9 per sq. m

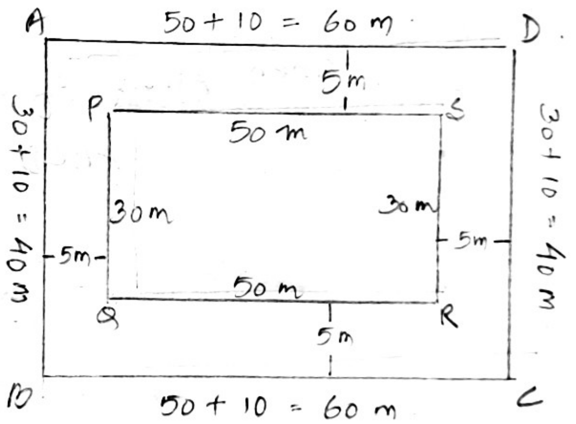
$= ₹\ 9 \times 432$

$= ₹\ 3888$

$$\begin{array}{r} 432 \\ \times 9 \\ \hline 3888 \end{array}$$

4.

Solⁿ



Let PQRS be the auditorium.

length of PQRS = 50 m.

breadth of PQRS = 30 m.

Area of PQRS $= l \times b$

$= 50\ m \times 30\ m$

$= 1500\ m^2$

Let ABCD be the auditorium surrounded by a verandah 5 m wide.

length of ABCD = 50 m + 10 m

= 60 m.

breadth of ABCD = 30 m + 10 m

= 40 m.

Area of ABCD = $l \times b$

= $60 m \times 40 m$

= $2400 m^2$.

Then, Area of the verandah = Area of ABCD - Area of PQRS.

= $2400 m^2 - 1500 m^2$

$$\begin{array}{r} 2400 \\ -1500 \\ \hline 900 \end{array}$$

= $900 m^2$.

Area of 1 tile = $50 cm \times 50 cm$

= $2500 cm^2$

= $\frac{2500}{100 \times 100} m^2$ $\{ \because 1 m = 100 cm$

= $0.25 m^2$.

$\therefore$ No. of tiles required on the verandah $= \dfrac{\text{Area of the verandah}}{\text{Area of the tile}}$

$$= \frac{900\ \cancel{m^2}}{0.25\ \cancel{m^2}}$$

$$= \frac{900 \times 100}{0.25 \times 100}$$

$$= \frac{\overset{3600}{\overset{18\cancel{000}}{9\cancel{0}000}}}{\underset{\cancel{5}\,1}{\cancel{25}}}$$

$= 3600$ tiles.

Exercise 16.4.

$$\begin{array}{r} 314 \\ \times 38 \\ \hline 2512 \\ 942 \\ \hline 11.932 \end{array}$$

1.

c)

Sol.ⁿ diameter = 3.8 cm.

∴ Circumference of the circle $= \pi d$

$= \frac{22}{7} \times 3.8$ cm

$= 3.14 \times 3.8$ cm

$= 11.932$ cm.

or 11.9 cm.

$$\begin{array}{r} 314 \\ \times 27 \\ \hline 2198 \\ +628 \\ \hline 8478 \\ \times 2 \\ \hline 16956 \end{array}$$

2.

b).

Sol.ⁿ radius = 2.7 cm.

∴ Circumference of the circle $= 2\pi r$

$= 2 \times \frac{22}{7} \times 2.7$ cm

$= 2 \times 3.14 \times 2.7$ cm

$= 16.956$ cm

or

16.96 cm

3.
i)

Sol^n Circumference of the circle = 264 mm.

$\Rightarrow \quad 2\pi r = 264$ mm

$\Rightarrow \quad 2 \times \frac{22}{7} \times r = 264$ mm.

$\Rightarrow \quad r = \frac{\cancel{264}^{\cancel{132}^{\cancel{12}\,6}} \times 7}{\cancel{2}_1 \times \cancel{22}_{\cancel{11}_1}}$ mm.

$= 42$ mm.

4.

Sol^n Radius of the circular base = 7 m.

$\therefore$ Circumference of the circular base $= 2\pi r$

$= 2 \times \frac{22}{\cancel{7}_1} \times \cancel{7}^1$ m

$= 44$ m.

6.

Sol^n Circumference of the garden $= \dfrac{\overset{528}{26\cancel{4}0\cancel{0}}}{\underset{1}{\cancel{50}}}$

$= 528 \text{ m}.$

$\Rightarrow \quad 2\pi r$

$\Rightarrow \quad 2 \times \dfrac{22}{7} \times r = 528 \text{ m}$

$\Rightarrow \quad r = \dfrac{5\cancel{2}8 \times 7}{\cancel{2} \times \cancel{22}} \text{ m}$

$= 84 \text{ m}.$

$\therefore$ radius $= 84 \text{ m}$

9.

a)

Sol^n here, $r = 3.5 \text{ m}$

$\therefore$ Area of the circle $= \pi r^2$

$= \dfrac{22}{\cancel{7}_1} \times \overset{0.5}{\cancel{3.5}} \text{ m} \times 3.5 \text{ m}.$

$= 38.50 \text{ m}^2$

$$\begin{array}{r} 35 \\ \times 5 \\ \hline 175 \\ \times 22 \\ \hline 350 \\ 350 \\ \hline 38.50 \end{array}$$

$\because$ the shaded portion is $\frac{1}{4}$ of the whole circle.

$$\text{Area of the shaded part} = \frac{\text{Area of circle}}{4}$$

$$= \frac{38.50}{4} m^2$$

$$= 9.625 \, m^2.$$

$$\begin{array}{r} 9.625 \\ 4 \overline{)\,38.50} \\ -36 \\ \hline 25 \\ -24 \\ \hline 10 \\ -8 \\ \hline 20 \\ -20 \\ \hline \text{xx} \end{array}$$

17. Collecting and Organising Data

Exercise 17.1

1.

Solⁿ a). Mode.

b). 27

* MODE : The most common value in a data (or) the item which appears maximum no. of times.

2.

Solⁿ Ascending order : 29, 29, 31, 32, 35, 35, 35, 36, 37, 38, 38, 41, 43

a).

Solⁿ Range = Highest value − Lowest value

= 43 − 29

= 14

$$\begin{array}{r} 43 \\ -\ 29 \\ \hline 14 \end{array}$$

b)

Solⁿ Median = 35 (The middle value).

38

c).

Sol^n Mean $= \dfrac{29 + 29 + 31 + 32 + 35 + 35 + 35 + 36 + 37 + 38 + 38 + 41 + 43}{13}$

$= \dfrac{459}{13}$

$= 35.307$

$= 35.3$.

6
29
29
31
32
35
35
35
36
37
38
41
43
+ 38
459

$13 \overline{)459}$ = 35.307
- 39
69
- 65
40
- 39
100
91

d).

Sol^n Mode = 35.

4.

Sol^n Mode = 13°C.

5.

Sol^n Mean $= \dfrac{137 + 127 + 125 + 130 + 133 + 129 + 128}{7}$

$= \dfrac{90}{7}$

$= 129g$.

2 3
137
127
125
130
133
129
+ 128
903

$7 \overline{)903}$ = 129
7
20
14

6.

a)

Solⁿ: Ascending order : 5, 6, 7, 8, 8, 11, 13, 14

$$\text{Mean} = \frac{5+6+7+7+8+8+11+13+14}{8}$$

$$= \frac{\cancel{72}\,9}{\cancel{8}\,1}$$

$$= 9.$$

$$\begin{array}{r} 5 \\ 6 \\ 7 \\ 8 \\ 8 \\ 11 \\ 13 \\ +14 \\ \hline 72 \end{array}$$

$$\text{Median} = \frac{8+8}{2}$$

$$= \frac{\cancel{16}\,8}{\cancel{2}\,1}$$

$$= 8.$$

Mode = 8.

Exercise 17.2.

1.

Sol.ⁿ

Scale:

1 unit = 2 boxes along the y-axis.