

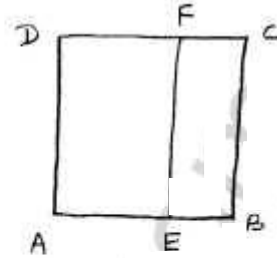
Perimeter and Area

1.

Given

ABCD is a square of side 24cm.

AE = 15cm.



(i)

$$\begin{aligned}\text{Perimeter of AEFD} &= 2(AE + AD) \\ &= 2(15 + 24)\end{aligned}$$

$$= 2(39)$$

$$\text{Perimeter of AEFD} = 78 \text{ cm}$$

$$\text{Perimeter of EBCF} = 2(EB + BC)$$

$$AB = AE + EB$$

$$24 = 15 + EB$$

$$EB = 24 - 15$$

$$EB = 9 \text{ cm}$$

$$\text{Perimeter of EBCF} = 2(9 + 24)$$

$$= 2(33)$$

$$\text{Perimeter of EBCF} = 66 \text{ cm}$$

$$\text{Difference in perimeter} = 78 - 66 = 12 \text{ cm}$$

∴ Perimeter of AEFD exceeds the perimeter of EBCF by 12 cm.

(ii)

$$\text{Area of AEFD (rectangle)} = l \times b$$

$$= AE \times AD$$

$$= 15 \times 24$$

$$\text{Area of AEFD}$$

$$= 360 \text{ cm}^2$$

$$\begin{aligned}
 \text{Area of EBCF (rectangle)} &= l \times b & 2 \\
 &= EB \times BC \\
 &= 9 \times 24 \\
 \text{Area of EBCF} &= 216 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Difference in Area} &= 360 - 216 \\
 &= 144 \text{ cm}^2
 \end{aligned}$$

Area of AEFD exceeds the area of EBCF by 144 cm^2 .

2.

Dimensions of rectangular park ($l \times b$) = $180 \text{ m} \times 120 \text{ m}$

$$\begin{aligned}
 \text{Perimeter of park} &= 2(l+b) \\
 &= 2(180+120) \\
 &= 2(300)
 \end{aligned}$$

$$\text{Perimeter of park} = 600 \text{ m}$$

Distance covered by Nagma for five rounds around park

$$\begin{aligned}
 &= 5 \times 600 \\
 &= 3000 \text{ m}
 \end{aligned}$$

Speed of Nagma = 7.5 km/hour

$$= \frac{7500}{3600} \text{ m/sec}$$

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

$$= \frac{3000}{7500} \times 3600$$

$$\text{Time} = 1440 \text{ Sec} = 24 \text{ min}$$

3.

$$\text{Area of rectangular plot} = 540 \text{ m}^2$$

$$\text{length of rectangular plot (l)} = 27 \text{ m}$$

$$\text{Area of rectangle} = l \times b$$

$$540 = 27 \times b$$

$$\text{breadth} = \frac{540}{27}$$

$$\text{breadth} = 20 \text{ m}$$

$$\text{Perimeter of rectangular plot} = 2(l+b)$$

$$= 2(27+20)$$

$$= 2(47)$$

$$\text{Perimeter of rectangular plot} = 94 \text{ m}$$

4.

$$\text{Perimeter of rectangular plot} = 151 \text{ m}$$

$$\text{breadth (b)} = 32 \text{ m}$$

$$\text{length (l)} = ?$$

$$\text{Perimeter} = 2(l+b)$$

$$151 = 2(l+32)$$

$$l+32 = \frac{151}{2}$$

$$l+32 = 75.5$$

$$l = 75.5 - 32$$

$$l = 43.5 \text{ m}$$

$$\text{Area of rectangular plot} = l \times b$$

$$= 43.5 \times 32$$

$$\text{Area of rectangular plot} = 1522.5 \text{ m}^2$$

5.

$$\text{Area of rectangular plot} = 340 \text{ m}^2$$

$$\text{breadth (b)} = 17 \text{ m}$$

$$\text{Area} = l \times b$$

$$340 = l \times 17$$

$$l = \frac{340}{17}$$

$$\boxed{l = 20 \text{ m}}$$

$$\text{Perimeter of rectangular plot} = 2(l+b)$$

$$= 2(20+17)$$

$$= 2(37)$$

$$\text{Perimeter of rectangular plot} = 74 \text{ m}$$

$$\text{cost for fencing} = ₹ 5.70 \text{ per meter}$$

$$\text{Total cost of fence around the plot} = 74 \times 5.7$$

$$= ₹ 421.80$$

$$\therefore \text{Total cost of fencing} = ₹ 421.80.$$

6.

Let breadth of park = b

5

length of park = $l = 90\text{m}$ Side of square park(s) = 60m

Area of square park = Area of rectangular park

$$s^2 = l \times b$$

$$60^2 = 90 \times b$$

$$3600 = 90 \times b$$

$$b = \frac{3600}{90}$$

$$b = 40\text{m}$$

 \therefore breadth of rectangular park = 40m .

7.

When wire is in the shape of rectangle

length = $l = 40\text{cm}$ breadth $b = 22\text{cm}$

$$\text{Perimeter (P)} = 2(l+b)$$

$$= 2(40+22)$$

$$= 2(62)$$

$$\text{Perimeter (P)} = 124\text{cm}$$

$$\text{Area (A)} = l \times b$$

$$= 40 \times 22$$

$$\text{Area (A)} = 880\text{cm}^2$$

When wire in the shape of square

6

Perimeter of square = perimeter of rectangle

$$4s = P$$

$$4s = 124$$

$$s = \frac{124}{4}$$

$$s = 31 \text{ cm}$$

∴ Side of square = 31 cm

$$\text{Area of square} = s^2$$

$$= 31^2$$

$$\text{Area of square} = 961$$

Area of square > Area of rectangle

∴ Square occupies more area than rectangle

$$\text{by } (961 - 880) = 81 \text{ cm}^2$$

8.

Dimensions of wall (l × b) = 4.5 m × 3.6 m

Dimension of door (b × h) = 1 m × 2 m

$$\text{Area of wall } (A_1) = l \times b$$

$$= 4.5 \times 3.6$$

$$\text{Area of wall } (A_1) = 16.2 \text{ m}^2$$

$$\text{Area of door } (A_2) = b \times h$$

$$= 1 \times 2$$

$$\text{Area of door } (A_2) = 2 \text{ m}^2$$

$$\begin{aligned} \text{Area of white washing} &= A_1 - A_2 \\ &= 16.2 - 2 \end{aligned}$$

$$\text{Area of white washing} = 14.2 \text{ m}^2$$

$$\text{Cost for white washing} = ₹ 20/\text{m}^2$$

$$\begin{aligned} \therefore \text{Cost of white washing} &= 14.2 \times 20 \\ &= ₹ 284 \end{aligned}$$

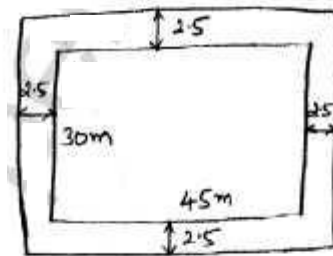
9.

Inner rectangle dimensions

$$(l \times b) = 45 \times 30 \text{ m}^2$$

Outer rectangle dimensions

$$\begin{aligned} (l \times b) &= 45 + 2 \times 2.5 \times 30 + 2 \times 2.5 \\ &= 45 + 5 \times 30 + 5 \\ &= 50 \times 35 \text{ m}^2 \end{aligned}$$



$$\text{Path area} = \text{Outer rectangle area} - \text{Inner rectangle area}$$

$$= 50 \times 35 - (45 \times 30)$$

$$= 1750 - 1350$$

$$\text{Path area} = 400 \text{ m}^2$$

10. Carpet size (lxb) = 5m x 2m
(Outer)

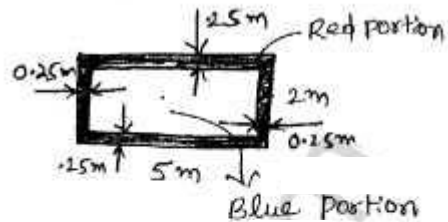
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Inner part of Carpet size

$$= (5 - 2 \times 0.25) \times (2 - 2 \times 0.25)$$

$$= (5 - 0.5) \times (2 - 0.5)$$

$$= 4.5 \times 1.5 \text{ m}^2$$



$$\text{Red portion Area} = \text{Outer part area} - \text{Inner part area}$$

$$= 5 \times 2 - (4.5 \times 1.5)$$

$$= 10 - 6.75$$

$$\text{Red Portion Area} = 3.25 \text{ m}^2$$

$$\text{Blue portion Area} = 4.5 \times 1.5 = 6.75 \text{ m}^2$$

$$\text{Ratio of Areas} = \frac{\text{Red portion area}}{\text{Blue portion area}}$$

$$= \frac{3.25}{6.75}$$

$$\text{Ratio of Areas} = \frac{13}{27}$$

11.

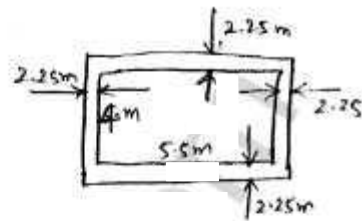
Width of verandah = 2.25m

dimensions of room = 5.5m x 4m

(i) outside rectangle dimension

$$l = 5.5 + 2 \times 2.25 = 10\text{m}$$

$$b = 4 + 2 \times 2.25 = 8.5\text{m}$$



Area of Verandah = ^{Area} outside dimensions - Inside Area

$$= 10 \times 8.5 - (5.5 \times 4)$$

$$= 85 - 22$$

Area of Verandah = 63 m²

(ii) Cost of Cementing the floor of verandah = ₹200/m²

Total cost of Cementing the floor of

Verandah = 63 x 200

= ₹12600.

12. Given

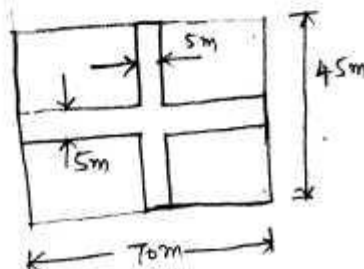
Dimensions of park = 70m x 45m

length of path = l + b - w

$$= 70 + 45 - 5$$

$$= 70 + 40$$

length of path = 110m



Area of path = length of path x width of path

$$\text{Area of path} = 110 \times 5$$

$$\text{Area of path} = 550 \text{ m}^2$$

$$\text{Rate of constructing the road} = \text{₹ } 105/\text{m}^2$$

$$\begin{aligned} \text{Total cost of constructing the road} &= 550 \times 105 \\ &= \text{₹ } 57750 \end{aligned}$$

13. rectangular room dimensions = $10 \text{ m} \times 7.5 \text{ m}$

$$\text{width of Carpet} = 1.25 \text{ m}$$

$$\begin{aligned} \text{Area of Room} &= l \times b \\ &= 10 \times 7.5 \end{aligned}$$

$$\text{Area of Room} = 75 \text{ m}^2$$

$$\text{length of Carpet} = \frac{\text{Area of Room}}{\text{width of Carpet}}$$

$$= \frac{75}{1.25}$$

$$\text{length of Carpet} = 60 \text{ m}$$

$$\text{Cost of Carpet} = \text{₹ } 250/\text{m}^2$$

$$\text{Total cost of covering the floor with Carpet}$$

$$= 250 \times 60$$

$$= \text{₹ } 30000$$

14.

Dimensions of rectangular Room = $6.5\text{m} \times 5\text{m}$

Dimensions of square tile = $25\text{cm} \times 25\text{cm}$
= $0.25\text{m} \times 0.25\text{m}$

Area of Room = $l \times b$
= 6.5×5

Area of Room = 32.5m^2

Area of tile = s^2
= $(0.25)^2$

Area of tile = 0.0625m^2

No. of tiles required to cover the floor

$$= \frac{\text{Area of Room}}{\text{Area of tile}}$$

$$= \frac{32.5}{0.0625}$$

No. of tiles = 520

Cost of one tile = ₹ 9.40

Total cost of tiles = 9.4×520

Total cost of tiles = ₹ 4888

15.

12

Side of Square shape room = 4.8m.

Perimeter of Square tile = 1.2m.

Side of Square tile = $4S = 1.2$

$$S = \frac{1.2}{4}$$

Side of Square tile = 0.3m.

$$\begin{aligned} \text{Area of Square tile} &= S^2 \\ &= (0.3)^2 \end{aligned}$$

Area of Square tile = 0.09 m²

$$\begin{aligned} \text{Area of Square shape room} &= (4.8)^2 \\ &= 23.04 \text{ m}^2 \end{aligned}$$

No. of tiles required to cover the floor

$$\begin{aligned} &= \frac{\text{Area of square shape Room}}{\text{Area of tile}} \\ &= \frac{23.04}{0.09} \end{aligned}$$

$$\text{No. of tiles required} = 256$$

$$\text{Cost of one tile} = ₹ 27$$

$$\begin{aligned} \text{Total Cost of tiles to cover the room} &= 27 \times 256 \\ &= ₹ 6912 \end{aligned}$$

16.

Width of rectangular plot land = 50m.

Total cost of fencing = ₹ 4680

Rate of cost of fencing = ₹ 18/m

$$\text{Total length of fencing} = \frac{\text{Total Cost}}{\text{Rate of cost}}$$

$$= \frac{4680}{18}$$

$$\text{Total length of fencing} = 260 \text{ m}$$

Length of fencing = perimeter of rectangle

$$260 = 2(l+b)$$

$$260 = 2(l+50)$$

$$l+50 = \frac{260}{2}$$

$$l+50 = 130$$

$$l = 130 - 50$$

$$l = 80 \text{ m}$$

length of plot = 80m

(ii)

Area of plot = $l \times b$

$$= 80 \times 50$$

Area of plot = 4000 m^2

Rate of cost for leveling = ₹ 7.6/ m^2

Total cost of leveling = $4000 \times 7.6 = ₹ 30400$

Exercise 16.2

(i) Area of parallelogram = $b \times h$

$$\text{base } (b) = 8 \text{ cm}$$

$$\text{height } (h) = 4.5 \text{ cm}$$

$$\begin{aligned} \text{Area of parallelogram} &= 8 \times 4.5 \\ &= 36 \text{ cm}^2 \end{aligned}$$

(ii)

$$\text{Base } (b) = 2 \text{ cm}$$

$$\text{Height } (h) = 4.4 \text{ cm}$$

$$\begin{aligned} \text{Area of parallelogram} &= b \times h \\ &= 2 \times 4.4 \end{aligned}$$

$$\text{Area of parallelogram} = 8.8 \text{ cm}^2$$

iii)

$$\text{Base } (b) = 2.5 \text{ cm}$$

$$\text{Height } (h) = 3.5 \text{ cm}$$

$$\begin{aligned} \text{Area} &= b \times h \\ &= 2.5 \times 3.5 \end{aligned}$$

$$\begin{aligned} \text{Area of} &= 8.75 \text{ cm}^2 \\ \text{parallelogram.} & \end{aligned}$$

2.

(i)

$$\text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$\text{Base (b)} = 6.4 \text{ cm}$$

$$\text{Height (h)} = 6 \text{ cm}$$

$$\text{Area of triangle} = \frac{1}{2} \times 6.4 \times 6$$

$$= 6.4 \times 3$$

$$\text{Area of triangle} = 19.2 \text{ cm}^2$$

(ii)

$$\text{Base (b)} = 5 \text{ cm}$$

$$\text{Height (h)} = 6 \text{ cm}$$

$$\text{Area of triangle} = \frac{1}{2} bh$$

$$= \frac{1}{2} \times 5 \times 6$$

$$= 5 \times 3$$

$$\text{Area of triangle} = 15 \text{ cm}^2$$

(iii)

$$\text{Base (b)} = 4.5 \text{ cm}$$

$$\text{Height (h)} = 6 \text{ cm}$$

$$\text{Area of triangle} = \frac{1}{2} bh$$

$$= \frac{1}{2} \times 4.5 \times 6$$

$$= 4.5 \times 3$$

$$\text{Area of triangle} = 13.5 \text{ cm}^2$$

3.

i) 41 cm^2

ii) 12.3 cm

iii) 10.3 cm

iv) 5.8 cm

4.

i) 193.72 cm^2

ii) ~~$2.9 \text{ cm} \times 11.6 \text{ cm}$~~

iii) ~~$8.875 \text{ cm} \times 15.5 \text{ cm}$~~

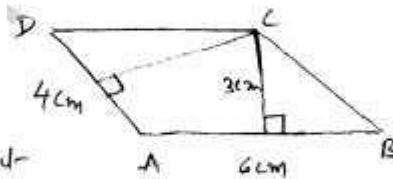
iv) 80 cm

5.

(i) Area of parallelogram

$$= \text{base} \times \text{Height}$$

$$\text{base} = 6 \text{ cm}, \text{ height} = 3 \text{ cm}$$



$$\text{Area of parallelogram} = 6 \times 3 = 18 \text{ cm}^2 \rightarrow \textcircled{1}$$

Consider

$$\text{Base} = 4 \text{ cm}, \text{ height} = h$$

$$\text{Area of parallelogram} = 4 \times h \rightarrow \textcircled{2}$$

$$\textcircled{1} = \textcircled{2}$$

$$4 \times h = 18$$

$$h = \frac{18}{4}$$

$$h = 4.5 \text{ cm}$$

6. Consider

$$\text{Base } (b) = 9\text{cm}, \text{ Height } (h) = 6\text{cm}$$

$$\text{Area of triangle} = \frac{1}{2}bh$$

$$= \frac{1}{2} \times 9 \times 6$$

$$= 9 \times 3$$

$$\text{Area of triangle} = 27\text{cm}^2 \rightarrow \textcircled{1}$$

Consider

$$\text{Base } (b) = 7.5\text{m}, \text{ Height } (h) = ?$$

$$\text{Area of triangle} = \frac{1}{2} \times 7.5 \times h \rightarrow \textcircled{2}$$

$$\textcircled{1} = \textcircled{2}$$

$$\frac{1}{2} \times 7.5 \times h = 27$$

$$\frac{h}{2} = \frac{27}{7.5}$$

$$h = 7.2\text{m}$$

Height corresponding to the base 7.5m = 7.2m.

7.

$$\text{Base} = 8\text{cm}$$

$$\text{Hypotenuse} = 17\text{cm}$$

$$\text{Height} = h$$

$$AC^2 = AB^2 + BC^2 \quad (\text{Pythagoras Theorem})$$

$$17^2 = h^2 + 8^2$$

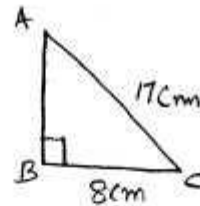
$$h^2 = 289 - 64$$

$$h^2 = 225$$

$$h = \sqrt{225}$$

$$h = 15\text{cm}$$

Height of right angled triangle = 15cm.



$$\begin{aligned} \text{Area of triangle} &= \frac{1}{2}bh \\ &= \frac{1}{2} \times 8 \times 15 \\ &= 4 \times 15 \\ \text{Area of triangle} &= 60 \text{ cm}^2 \end{aligned}$$

8. Given

(i) $\triangle ABC$ is Right angled triangle

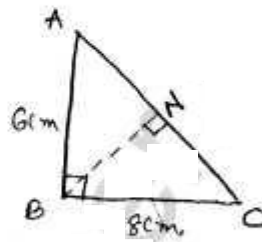
$$AC^2 = AB^2 + BC^2$$

$$AC^2 = 6^2 + 8^2$$

$$AC = \sqrt{36 + 64}$$

$$= \sqrt{100}$$

$$AC = 10 \text{ cm.}$$



(ii) Area of triangle = $\frac{1}{2}bh$

$$= \frac{1}{2} \times 8 \times 6$$

$$= 8 \times 3$$

$$\text{Area of triangle} = 24 \text{ cm}^2 \rightarrow \textcircled{1}$$

$$\text{Area of triangle} = \frac{1}{2} \times AC \times BN$$

$$= \frac{1}{2} \times 10 \times BN \rightarrow \textcircled{2}$$

$$\textcircled{1} = \textcircled{2}$$

$$\frac{1}{2} \times 10 \times BN = 24$$

$$BN = \frac{48}{10}$$

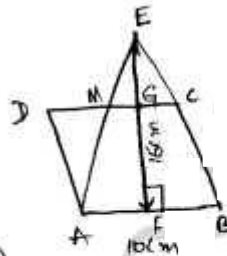
$$BN = 4.8 \text{ cm}$$

7. Given $AB = 10\text{cm}$

$EF = 16\text{cm}$

M is mid point of DC

$$DM = MC = \frac{10}{2} = 5\text{cm}$$



Area of $\triangle AEB =$ Area of $\parallel^{\text{gm}} ABCD$

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

$$\frac{1}{2} \times AB \times EF = AB \times GF$$

$$\frac{1}{2} \times 10 \times 16 = 10 \times GF$$

$$GF = 8\text{cm}$$

$$\therefore EF = GF + EG$$

$$16 = 8 + EG$$

$$EG = 8\text{cm}$$

Given Area of $\triangle AEB =$ Area of $\parallel^{\text{gm}} ABCD$

\therefore Area of $\triangle AME$ is Common in both $\triangle AEB$ & $\parallel^{\text{gm}} ABCD$

\therefore Area of $\triangle ADM =$ Area of $\triangle MEC$

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

$$= \frac{1}{2} \times 5 \times 8$$

$$= 5 \times 4$$

\therefore Area of $\triangle ADM = 20\text{cm}^2$

10. ABCD is a rectangle of size = 18cm x 10cm

$$\angle E = 90^\circ$$

In $\triangle ECB$

$$BC^2 = EC^2 + EB^2 \quad (\because \text{Pythagoras Theorem})$$

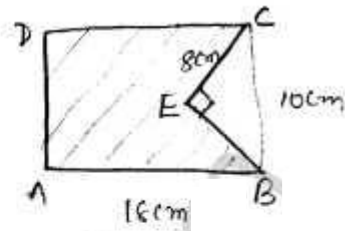
$$10^2 = 8^2 + EB^2$$

$$EB^2 = 100 - 64$$

$$EB^2 = 36$$

$$EB = \sqrt{36}$$

$$EB = 6 \text{ cm}$$



Area of Shaded Region = Area of $\square ABCD$ - Area of $\triangle ECB$

$$= l \times b - \left(\frac{1}{2}bh\right)$$

$$= 18 \times 10 - \left(\frac{1}{2} \times 6 \times 8\right)$$

$$= 180 - 24$$

Area of Shaded Region = 156 cm²

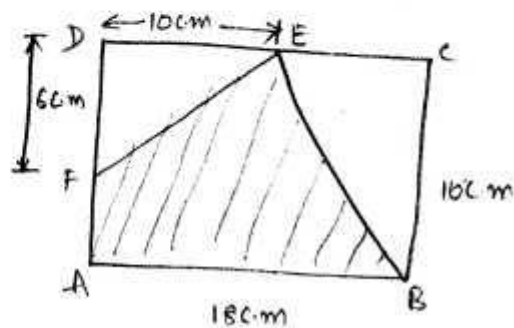
11.

(i)

Area of Shaded Region

$$= \text{Area of } \square ABCD -$$

(Area of $\triangle ECB$ + Area of $\triangle DEF$)



$$\neq 18 \times 10 - \left(\frac{1}{2} \times 8 \right)$$

$$= 18 \times 10 - \left(\frac{1}{2} \times 10 \times 8 + \frac{1}{2} \times 6 \times 10 \right)$$

$$(\because DC = DE + EC)$$

$$18 = 10 + EC$$

$$EC = 8 \text{ cm}$$

$$= 180 - (10 + 30)$$

$$= 180 - 70$$

$$\text{Area of shaded region} = 110 \text{ cm}^2$$

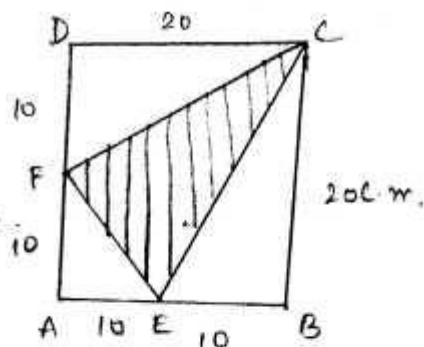
Shaded region

(ii)

Area of shaded region =

$$\text{Area of } \square ABCD - [\text{Area of } \triangle AEF +$$

$$\text{Area of } \triangle ECB + \text{Area of } \triangle DCF]$$



$$= 20 \times 20 -$$

$$= AB \times BC - \left[\frac{1}{2} \times AE \times AF + \frac{1}{2} \times EB \times BC + \frac{1}{2} \times DF \times DC \right]$$

$$= 20 \times 20 - \left[\frac{1}{2} \times 10 \times 10 + \frac{1}{2} \times 10 \times 20 + \frac{1}{2} \times 10 \times 20 \right]$$

$$= 400 - [10 \times 5 + 10 \times 10 + 10 \times 10]$$

$$= 400 - [50 + 100 + 100]$$

$$= 400 - [250]$$

$$\text{Area of shaded region} = 150 \text{ cm}^2$$

Exercise 16.3

1.

(i) $r = 7 \text{ cm}$

$$\text{Circumference of Circle} = 2\pi r$$

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

$$\text{Circumference of Circle} = 44 \text{ cm}$$

(ii) $r = 21 \text{ cm}$

$$\text{Circumference of Circle} = 2\pi r$$

$$= 2 \times \frac{22}{7} \times 21$$

$$= 2 \times 22 \times 3$$

$$\text{Circumference of Circle} = 132 \text{ cm}$$

(iii) $r = 28 \text{ cm}$

$$\text{Circumference of Circle} = 2\pi r$$

$$= 2 \times \frac{22}{7} \times 28$$

$$= 2 \times 22 \times 4$$

$$\text{Circumference of Circle} = 176 \text{ cm}$$

(iv) $r = 3.5 \text{ cm}$

$$\text{Circumference of Circle} = 2\pi r$$

$$= 2 \times \frac{22}{7} \times 3.5$$

$$\text{Circumference of Circle} = 22 \text{ cm}$$

2.

i. $r = 14 \text{ mm.}$

$$\begin{aligned}\text{Area of Circle} &= \pi r^2 \\ &= \frac{22}{7} \times 14 \times 14\end{aligned}$$

$$\text{Area of Circle} = 616 \text{ mm}^2$$

ii) $d = 49 \text{ m.} \Rightarrow r = \frac{d}{2}$

$$r = \frac{49}{2} = 24.5 \text{ m}$$

$$\begin{aligned}\text{Area of Circle} &= \pi r^2 \\ &= \frac{22}{7} \times 24.5 \times 24.5\end{aligned}$$

$$\text{Area of Circle} = 1886.5 \text{ m}^2$$

iii)

$$\text{diameter } (d) = 9.8 \text{ m}$$

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

$$r = \frac{9.8}{2}$$

$$r = 4.9 \text{ m}$$

$$\begin{aligned}\text{Area of circle} &= \pi r^2 \\ &= \frac{22}{7} \times 4.9 \times 4.9\end{aligned}$$

$$\text{Area of Circle} = 75.46 \text{ m}^2$$

iv)

$$r = 5 \text{ cm}$$

$$\begin{aligned}\text{Area of Circle} &= \pi r^2 \\ &= \frac{22}{7} \times 5 \times 5\end{aligned}$$

$$\text{Area of Circle} = 78.57 \text{ cm}^2$$

3.

Given

$$\text{Radius of Circle } (r) = 20 \text{ cm}$$

$$\begin{aligned} \text{Circumference of Circle} &= 2\pi r \\ &= 2 \times 3.14 \times 20 \end{aligned}$$

$$\text{Circumference of Circle} = 125.6 \text{ cm}$$

$$\begin{aligned} \text{Area of Circle} &= \pi r^2 \\ &= 3.14 \times 20 \times 20 \end{aligned}$$

$$\text{Area of Circle} = 1256 \text{ cm}^2$$

25

4.

$$\text{Radius of minute hand} = 1.4 \text{ m}$$

$$\begin{aligned} \text{Distance covered by minute hand tip in 1 Hour} \\ &= \text{Circumference of Circle of Radius } 1.4 \text{ m} \\ &= 2\pi r \\ &= 2 \times \frac{22}{7} \times 1.4 \\ &= 8.8 \text{ m} \end{aligned}$$

5.

$$\text{Diameter of garden} = 21 \text{ m}$$

$$\text{Radius } (r) = \frac{21}{2} = 10.5 \text{ m}$$

$$\begin{aligned} \text{Circumference of garden} &= 2\pi r \\ &= 2 \times \frac{22}{7} \times 10.5 \\ &= 66 \text{ m} \end{aligned}$$

$$\text{Length of Rope} = 66 \times 2 = 132 \text{ m } (\because \text{For 2 rounds})$$

$$\text{Rate of Cost of rope} = ₹ 4/m$$

$$\begin{aligned}\text{Total Cost of rope} &= 4 \times 132 \\ &= ₹ 528\end{aligned}$$

$$\therefore \text{Cost of rope} = ₹ 528$$

6. given

Circumference of circle exceeds diameter by 30 cm

$$2\pi r = d + 30$$

$$2\pi r = 2r + 30$$

$$2\pi r - 2r = 30$$

$$2r(\pi - 1) = 30$$

$$2r\left(\frac{22}{7} - 1\right) = 30$$

$$2r\left(\frac{15}{7}\right) = 30$$

$$r = \frac{30 \times 7}{2 \times 15}$$

$$\underline{\underline{r = 7 \text{ cm}}}$$

\therefore Radius of circle = 7 cm

7. Given Circumference of Circle = 44 cm

$$2\pi r = 44$$

$$\pi r = \frac{44}{2}$$

$$\pi r = 22$$

$$r = \frac{22}{\pi}$$

$$r = \frac{22}{\frac{22}{7}}$$

$$r = 7 \text{ cm}$$

$$\text{diameter} = 2r = 2 \times 7 = 14 \text{ cm}$$

8. Given Circumference of Circle = 31.4 cm

$$2\pi r = 31.4$$

$$r = \frac{31.4}{2 \times \pi}$$

$$= \frac{31.4}{2 \times 3.14}$$

$$r = 5 \text{ cm}$$

$$\text{radius} = 5 \text{ cm}$$

$$\text{Area} = \pi r^2$$

$$= 3.14 \times 5^2$$

$$\text{Area} = 78.5 \text{ cm}^2$$

9.

Given

28

$$\text{area of circle} = 144\pi \text{ cm}^2$$

$$\pi r^2 = 144\pi$$

$$r^2 = 144$$

$$r = \sqrt{144}$$

$$r = 12 \text{ cm}$$

$$\text{radius} = 12 \text{ cm}$$

$$\begin{aligned} \text{Circumference of circle} &= \frac{2\pi r}{2 \times \pi \times 12} \\ &= 24\pi \text{ cm} \end{aligned}$$

$$\therefore \text{Circumference of circle} = 24\pi \text{ cm}$$

10.

$$\text{diameter of wheel} = 56 \text{ cm}$$

$$\text{radius of wheel} = \frac{56}{2} = 28 \text{ cm}$$

$$\begin{aligned} \text{Circumference of wheel} &= 2\pi r \\ &= 2 \times \pi \times 28 \\ &= 2 \times \frac{22}{7} \times 28 \end{aligned}$$

$$\text{Circumference of wheel} = 176 \text{ cm}$$

$$\text{No. of rotations} = \frac{\text{Distance covered by car}}{\text{Distance for one rotation}}$$

$$= \frac{88 \times 10^3 \times 10^2}{176}$$

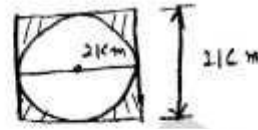
$$\text{No. of rotations} = 45454.54 \approx \underline{\underline{45455}}$$

11. Given

Square with side = 21 cm

Circle with maximum area & diameter

$$d = 21 \text{ cm}$$



Shaded area = Square Area - Circle area

$$= (21)^2 - \pi \left(\frac{21}{2}\right)^2$$

$$= 441 - \frac{22}{7} \times \frac{441}{4}$$

$$= 441 \left(1 - \frac{22}{28}\right)$$

$$= 441 \left(\frac{6}{28}\right)$$

$$\text{Shaded area} = 94.5 \text{ cm}^2$$

12.

Side of equilateral triangle = 4.4 cm

Perimeter of triangle = 3×4.4

$$= 13.2 \text{ cm}$$

∴ Perimeter of circle = perimeter of equilateral triangle

$$2\pi r = 13.2$$

$$r = \frac{13.2 \times 7}{2 \times 22}$$

$$r = 2.1 \text{ cm}$$

Radius of circle = 2.1 cm

$$\begin{aligned}\text{Area of circle} &= \pi r^2 \\ &= \frac{22}{7} \times (2.1)^2\end{aligned}$$

$$\text{Area of circle} = 13.86 \text{ cm}^2$$

13.

wire is bent in the form of square of side

$$= 27.5 \text{ cm}$$

Perimeter of square = length of wire

$$\text{length of wire} = 4 \times 27.5$$

$$\text{length of wire} = 110 \text{ cm}$$

Now same wire bent into shape of circle

length of wire = perimeter of circle

$$110 = 2\pi r$$

$$r = \frac{110}{2 \times 22} \times 7$$

$$r = \frac{35}{2}$$

$$r = 17.5 \text{ cm}$$

Radius of circle = 17.5 cm

$$\text{Area of circle} = \pi r^2$$

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

$$\text{Area of circle} = 962.5 \text{ cm}^2$$

14.

wire is initially in the form of rectangle
of length, breadth = 18.7 cm / 14.3 cm

$$\begin{aligned}\therefore \text{length of wire} &= \text{Perimeter of rectangle} \\ &= 2(18.7 + 14.3) \\ &= 2(33)\end{aligned}$$

$$\text{length of wire} = 66 \text{ cm}$$

Now same wire is bent into circle

$$\text{length of wire} = \text{Perimeter of Circle}$$

$$66 = 2\pi r$$

$$r = \frac{66}{2 \times 22} \times 7$$

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

$$r = 10.5 \text{ cm}$$

$$\text{Radius of circle} = 10.5 \text{ cm}$$

$$\text{Area of Circle} = \pi r^2$$

$$= \frac{22}{7} \times (10.5)^2$$

$$\text{Area of Circle} = 346.5 \text{ cm}^2$$

15.

Diameter of circular park = 84 m.

32

Radius of circular park = 42 m

Radius of outer circle = 42 + 3.5
= 45.5 m

∴ Area of Road = Outer Circle Area
radius - Inner circle area

$$= \pi (45.5)^2 - \pi (42)^2$$

Area of Road = 962.5 m²

Cost of Constructing the Road = ~~962.5~~ m × 240/m²

Cost of Constructing the Road = 962.5 × 240

$$= ₹ 231000$$

16.

Outer Circle Circumference = 44 m

$$2\pi R = 44$$

$$R = \frac{44}{2 \times 22} \times 7$$

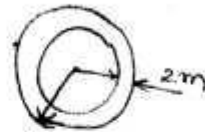
$$\boxed{R = 7 \text{ m}}$$

Outer circle radius = 7 m

Inner circle radius = 7 - 2 = 5 m

Circumference of Inner circle = $2\pi r = 2 \times \frac{22}{7} \times 5 = 31.42 \text{ m}$ Area of Inner Circle = $\pi r^2 = \pi (5)^2$

$$= 78.57 \text{ m}^2$$



17.

33

Area between the circles = 770 cm^2 Radius of Outer Circle = 21 cm Area between the Circles = ~~As~~ Outer Circle area - Inner Circle area

$$770 = \pi(21)^2 - \pi r^2$$

$$770 = \frac{22}{7}(441 - r^2)$$

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

$$245 = 441 - r^2$$

$$r^2 = 441 - 245$$

$$r^2 = 196$$

$$r = \sqrt{196}$$

$$r = 14 \text{ cm}$$

Inner Circle Radius = 14 cm .

18.

Radius of Big Circle = 14 cm

Shaded Region Area

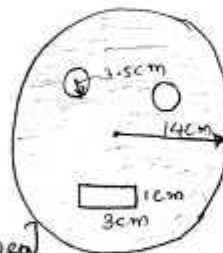
$$= \pi R^2 - [\text{Rectangle area} + 2 \times \text{Circle area}]$$

$$= \pi(14)^2 - [3 \times 1 + \pi(5)^2]$$

$$= 616 - [3 + 38.5]$$

$$= 616 - 41.5$$

$$= 574.5 \text{ cm}^2 \quad \therefore \text{Shaded Region Area} = 574.5 \text{ cm}^2$$



19.

(i)

Length of boundary =

$$\text{Semi-circle length} + 10 + 7 + 10$$

$$= \frac{2\pi r}{2} + 10 + 7 + 10$$

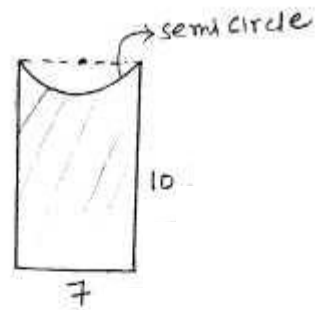
$$= \pi r + 10 + 7 + 10$$

$$= \frac{22}{7} \times \frac{7}{2} + 10 + 7 + 10$$

$$= 11 + 10 + 7 + 10$$

$$= 38 \text{ cm}$$

\therefore Length of boundary = 38 cm



(ii)

Area of Shaded Region = Rectangle Area - Semi Circle Area

$$= 10 \times 7 - \frac{\pi r^2}{2}$$

$$= 10 \times 7 - \frac{22}{7} \times \frac{7^2}{4 \times 2}$$

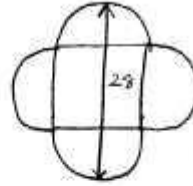
$$= 70 - 19.25$$

Area of Shaded Region = 50.75 cm²

(ii)

From the figure

Side of Square = $2 \times$ radius of circle



$$\therefore r + 2r + r = 28$$

$$4r = 28$$

$$r = \frac{28}{4}$$

$$r = 7 \text{ C.m}$$

$$\text{Radius of Semi circle} = 7 \text{ C.m}$$

$$\text{Side of Square} = 2 \times 7 = 14 \text{ C.m}$$

Length of boundary = $4 \times$ perimeter of semi circle

$$= 4 \times \frac{2\pi r}{2}$$

$$= 4 \times \frac{2 \times 22 \times 7}{1 \times 2}$$

Length of boundary

$$= 88 \text{ C.m}$$

Area of shaded region = $4 \times$ semi circle area + Square Area

$$= 4 \times \frac{\pi \times 7^2}{2} + 14^2$$

$$= \frac{4 \times 22 \times 7^2}{1 \times 2} + 14^2$$

$$= 308 + 196$$

$$\text{Area of shaded region} = 504 \text{ C.m}^2$$

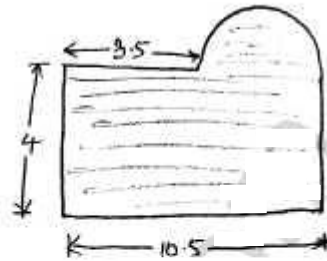
20.

From figure

$$\text{Diameter of Semi circle} = 10.5 - 3.5$$

$$\text{Diameter of Semi Circle} = 7 \text{ c.m.}$$

$$\text{Radius of Semi Circle} = 3.5 \text{ c.m.}$$



$$\text{Length of boundary} = 4 + 3.5 + \text{Semicircle Perimeter} + 4 + 10.5$$

$$= 7.5 + \frac{2\pi \times 3.5}{2} + 14.5$$

$$= 7.5 + \frac{22}{7} \times 3.5 + 14.5$$

$$= 7.5 + 11 + 14.5$$

$$\text{Length of boundary} = 33 \text{ c.m.}$$

$$\text{Area of Shaded Region} = \text{Rectangle Area} + \text{Semi circle arc}$$

$$= 4 \times 10.5 + \frac{\pi (3.5)^2}{2}$$

$$= 42 + \frac{22}{7} \times \frac{(3.5)^2}{2}$$

$$= 42 + 19.25$$

$$\text{Area of Shaded Region} = 61.25 \text{ c.m}^2$$

(ii)

37

Consider $\triangle OAB$

$$OA^2 = OB^2 + AB^2$$

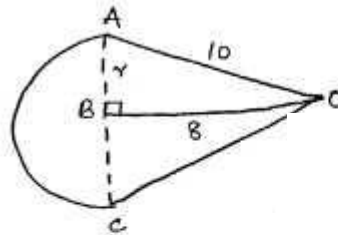
$$10^2 = r^2 + 8^2$$

$$r^2 = 100 - 64$$

$$r^2 = 36$$

$$r = \sqrt{36}$$

$$r = 6 \text{ c.m.}$$

Length of boundary = $10 + \text{Semi circle length} + 10$

$$= 10 + \frac{2\pi \times r}{2} + 10$$

$$= 10 + 2 \times \frac{22}{7} \times \frac{6}{2} + 10$$

$$= 10 + 18.857 + 10$$

Length of boundary = 38.857 c.m. Area of Shaded Region = Area of $\triangle AOC$ + Area of Semi circle

$$= \frac{1}{2} \times 2 \times r \times 8 + \frac{\pi r^2}{2}$$

$$= \frac{1}{2} \times 2 \times 6 \times 8 + \frac{22}{7} \times \frac{6^2}{2}$$

$$= 48 + 56.57$$

Area of Shaded Region = 104.57 cm^2