Exercise 20G

Let the radius of the circle be $r$ cm.

Circumference = $2\pi r$

(Circumference) - (Radius) = 37

$\therefore (2\pi r - r) = 37$

$\Rightarrow r(2\pi - 1) = 37$

$\Rightarrow r = \frac{37}{(2\pi - 1)} = \frac{37}{\left(2\times\frac{22}{7} - 1\right)} = \frac{37}{\left(\frac{44}{7} - 1\right)} = \frac{37}{\left(\frac{44-7}{7}\right)} = \left(\frac{37\times 7}{37}\right) = 7$

$\therefore$ Radius of the given circle is 7 cm.

$\therefore$ Area = $\pi r^2$ = $\left(\frac{22}{7} \times 7 \times 7\right)$ cm$^2$ = 154 cm$^2$

## Q19

**Answer :**

(c) 54 m$^2$

Given:

Perimeter of the floor = $2(l + b)$ = 18 m

Height of the room = 3 m

$\therefore$ Area of the four walls = $\{2(l + b) \times h\}$

= Perimeter × Height

= 18 m × 3 m = 54 m$^2$

## Q20

**Answer :**

(a) 200 m

Area of the floor of a room = 14 m × 9 m = 126 m$^2$

Width of the carpet = 63 cm = 0.63 m (since 100 cm = 1 m)

$\therefore$ Required length of the carpet = $\frac{\text{Area of the floor of a room}}{\text{Width of the carpet}}$

$= \left(\frac{126}{0.63}\right) \text{m} = 200 \text{ m}$

Q21

**Answer :**

(c) 120 $cm^2$

Let the length of the rectangle be $x$ cm and the breadth be $y$ cm.

Area of the rectangle = $xy$ $cm^2$

Perimeter of the rectangle = $2(x + y) = 46$ cm (given)

$\Rightarrow 2(x + y) = 46$

$\Rightarrow (x + y) = \left(\frac{46}{2}\right)$ cm = 23 cm

Diagonal of the rectangle = $\sqrt{x^2 + y^2}$ = 17 cm

$\Rightarrow \sqrt{x^2 + y^2} = 17$

Squaring both the sides, we get:

$\Rightarrow x^2 + y^2 = (17)^2$

$\Rightarrow x^2 + y^2 = 289$

Now, $(x^2 + y^2) = (x + y)^2 - 2xy$

$\Rightarrow 2xy = (x + y)^2 - (x^2 + y^2)$

$= (23)^2 - 289$

$= 529 - 289 = 240$

$\therefore xy = \left(\frac{240}{2}\right)$ $cm^2$ = 120 $cm^2$

Q22

**Answer :**

(b) 3:1

Let a side of the first square be *a* cm and that of the second square be *b* cm.
Then, their areas will be $a^2$ and $b^2$, respectively.
Their perimeters will be 4*a* and 4*b*, respectively.

According to the question:
$\frac{a^2}{b^2} = \frac{9}{1} \Rightarrow \left(\frac{a}{b}\right)^2 = \frac{9}{1} = \left(\frac{3}{1}\right)^2 \Rightarrow \frac{a}{b} = \frac{3}{1}$

$\therefore$ Required ratio of the perimeters = $\frac{4a}{4b} = \frac{4\times3}{4\times1} = \frac{3}{1}$ = 3:1

Q23

**Answer :**

(d) 4:1

Let the diagonals be 2*d* and *d*.
Area of the square = sq. units
Required ratio =

Q24

**Answer :**

(c) 49 m

Let the width of the rectangle be *x* m.

Given:
Area of the rectangle = Area of the square
$\Rightarrow$ Length × Width = Side × Side
$\Rightarrow$ (144 × *x*) = 84 × 84
$\therefore$ Width (*x*) = $\left(\frac{84\times84}{144}\right)$m = 49 m
Hence, width of the rectangle is 49 m.

Q25

**Answer :**

(d) $4 : \sqrt{3}$

Let one side of the square and that of an equilateral triangle be the same, i.e. *a* units.
Then, Area of the square = $(\text{Side})^2 = (a)^2$
Area of the equilateral triangle = $\frac{\sqrt{3}}{4}(\text{Side})^2 = \frac{\sqrt{3}}{4}(a)^2$
$\therefore$ Required ratio = $\frac{a^2}{\frac{\sqrt{3}}{4}a^2} = \frac{4}{\sqrt{3}} = 4 : \sqrt{3}$

Q26

**Answer :**

(a) $\sqrt{\pi} : 1$

Let the side of the square be *x* cm and the radius of the circle be *r* cm.
Area of the square = Area of the circle
$\Rightarrow (x)^2 = \pi r^2$
$\therefore$ Side of the square $(x) = \sqrt{\pi}r$
Required ratio = $\frac{\text{Side of the square}}{\text{Radius of the circle}}$
$= \frac{x}{r} = \frac{\sqrt{\pi}r}{r} = \frac{\sqrt{\pi}}{1} = \sqrt{\pi} : 1$

Q27

**Answer :**

(b) $\frac{49\sqrt{3}}{4}$ $\text{cm}^2$

Let the radius of the circle be $r$ cm.

Then, its area = $\pi r^2$ cm$^2$

$\therefore$ $\pi r^2$ = 154

$\Rightarrow \frac{22}{7} \times r \times r = 154$

$\Rightarrow r^2 = \left(\frac{154 \times 7}{22}\right) = 49$

$\Rightarrow r = \sqrt{49}$ cm = 7 cm

Side of the equilateral triangle = Radius of the circle

= 7 cm

$\therefore$ Area of the equilateral triangle = $\frac{\sqrt{3}}{4}(\text{side})^2$ sq. units

$= \frac{\sqrt{3}}{4}(7)^2$ cm$^2$

$= \frac{49\sqrt{3}}{4}$ cm$^2$

Q28

**Answer :**

(c) 12 cm

Area of the rhombus = $\frac{1}{2}$ × (Product of the diagonals)

Given:

Length of one diagonal = 6 cm

Area of the rhombus = 36 cm$^2$

∴ Length of the other diagonal = $\left(\frac{36\times2}{6}\right)$ cm = 12 cm

Q30

**Answer :**

(c) 17.60 m

Let the radius of the circle be *r* m.
Area = $\pi r^2$ $m^2$
∴ $\pi r^2$ = 24.64
⇒ $\left(\frac{22}{7}\times r\times r\right)$ = 24.64
⇒ $r^2$ = $\left(\frac{24.64\times7}{22}\right)$ = 7.84
⇒ *r* = $\sqrt{7.84}$ = 2.8 m
⇒ Circumference of the circle = $(2\pi r)$ m
= $\left(2\times\frac{22}{7}\times2.8\right)$ m = 17.60 m

Q31

**Answer :**

(c) 3 cm

Suppose the radius of the original circle is *r* cm.
Area of the original circle = $\pi r^2$

Suppose the radius of the original circle is *r* cm.
Area of the original circle = $\pi r^2$

Radius of the circle = (*r* +1) cm
According to the question:
$\pi(r+1)^2 = \pi r^2 + 22$
⇒ $\pi(r^2+1+2r) = \pi r^2 + 22$
⇒ $\pi r^2 + \pi + 2\pi r = \pi r^2 + 22$
⇒ $\pi + 2\pi r = 22$ [cancel $\pi r^2$ from both the sides of the equation]
⇒ $\pi(1+2r) = 22$
⇒ $(1+2r) = \frac{22}{\pi} = \left(\frac{22\times7}{22}\right) = 7$
⇒ 2*r* = 7 -1 = 6
∴ *r* = $\left(\frac{6}{2}\right)$ cm = 3 cm
∴ Original radius of the circle = 3 cm

Q32

**Answer :**

(c) 1000

Radius of the wheel = 1.75 m
Circumference of the wheel = $2\pi r$
= $\left(2\times\frac{22}{7}\times1.75\right)$cm = (2 × 22 × 0.25) m = 11 m

Distance covered by the wheel in 1 revolution is 11 m.
Now, 11 m is covered by the car in 1 revolution.
(11 × 1000) m will be covered by the car in $\left(1\times\frac{1}{11}\times11\times1000\right)$ revolutions, i.e. 1000 revolutions.
∴ Required number of revolutions = 1000

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