Exercise 20G

We know that a square encloses more area even though its perimeter is the same as that of the rectangle.

∴ Area of a square > Area of a rectangle

Q9

Answer:

(b) 13500 m^2

Let the length of the rectangular field be 5x.
Breadth = 3x
Perimeter of the field = 2(l + b) = 480 m   (given)
⇒ 480 = 2(5x + 3x) ⇒ 480 = 16x
⇒ x = $\frac{480}{16}$ = 30
∴ Length = 5x = (5 × 30) = 150 m
Breadth = 3x = (3 × 30) = 90 m
∴ Area of the rectangular park = 150 m × 90 m = 13500 m^2

Q10

Answer:

(a) 6 m

Total cost of carpeting = Rs 6000
Rate of carpeting = Rs 50 per m
∴ Length of the carpet = $\left(\frac{6000}{50}\right)$ m = 120 m
∴ Area of the carpet = $\left(120 \times \frac{75}{100}\right)$ m^2 = 90 m^2 [since 75 cm = $\frac{75}{100}$ m]
Area of the floor = Area of the carpet = 90 m^2
∴ Width of the room = $\left(\frac{\text{Area}}{\text{Length}}\right) = \left(\frac{90}{15}\right)$ m $= 6$ m

Q11

Answer:

(a) 84 cm^2

Let a = 13 cm, b = 14 cm and c = 15 cm

Then, $s = \frac{a+b+c}{2} = \left(\frac{13+14+15}{2}\right)$ cm = 21 cm

$\therefore$ Area of the triangle $= \sqrt{s(s-a)(s-b)(s-c)}$ sq. units

$$= \sqrt{21(21-13)(21-14)(21-15)} \text{ cm}^2$$
$$= \sqrt{21 \times 8 \times 7 \times 6} \text{ cm}^2$$
$$= \sqrt{3 \times 7 \times 2 \times 2 \times 2 \times 7 \times 2 \times 3} \text{ cm}^2$$
$$= (2 \times 2 \times 3 \times 7) \text{ cm}^2$$
$$= 84 \text{ cm}^2$$

Q12

Answer :

(b) 48 m^2

Base = 12 m

Height = 8 m

Area of the triangle $= \left(\frac{1}{2} \times \textbf{Base} \times \textbf{Height}\right)$ sq. units

$$= \left(\frac{1}{2} \times 12 \times 8\right) \text{ m}^2$$
$$= 48 \text{ m}^2$$

Q13

Answer :

(b) 4 cm

Area of the equilateral triangle $= 4\sqrt{3}$ cm^2

We know:

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

∴ Side of the equilateral triangle = $\left[\sqrt{\left(\frac{4 \times \text{Area}}{\sqrt{3}}\right)}\right]$ cm

$= \left[\sqrt{\left(\frac{4 \times 4\sqrt{3}}{\sqrt{3}}\right)}\right]$ cm = $\left(\sqrt{4 \times 4}\right)$ cm = $\left(\sqrt{16}\right)$ cm = 4 cm

Q14

Answer:

(c) $16\sqrt{3}$ cm^2

It is given that one side of an equilateral triangle is 8 cm.

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

$= \frac{\sqrt{3}}{4}$ (8)^2 cm^2

$= \left(\frac{\sqrt{3}}{4} \times 64\right)$ cm^2 = $16\sqrt{3}$ cm^2

Q15

Answer:

(b) $2\sqrt{3}$ cm^2

Let ∆ABC be an equilateral triangle with one side of the length a cm.

Diagonal of an equilateral triangle = $\frac{\sqrt{3}}{2} a$ cm

$\Rightarrow \frac{\sqrt{3}}{2} a = \sqrt{6}$

$\Rightarrow a = \frac{\sqrt{6} \times 2}{\sqrt{3}} = \frac{\sqrt{3} \times \sqrt{2} \times 2}{\sqrt{3}} = 2\sqrt{2}$ cm

Area of the equilateral triangle = $\frac{\sqrt{3}}{4} a^2$

$= \frac{\sqrt{3}}{4} \left(2\sqrt{2}\right)^2$ cm^2 = $\left(\frac{\sqrt{3}}{4} \times 8\right)$ cm^2 = $2\sqrt{3}$ cm^2

Q16

Answer:

(b) 72 cm^2

Base of the parallelogram = 16 cm

Height of the parallelogram = 4.5 cm

∴ Area of the parallelogram = Base × Height

$= (16 \times 4.5)$ cm^2 = 72 cm^2

Q17

Answer:

(b) 216 cm^2

Length of one diagonal = 24 cm

Length of the other diagonal = 18 cm

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

$= \left(\frac{1}{2} \times 24 \times 18\right)$ cm^2 = 216 cm^2

Q18

Answer:

(c) 154 cm^2

Let the radius of the circle be r cm.

Circumference = $2\pi r$

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