Chapter : 17. PERIMETER AND AREA OF PLANE FIGURES

Exercise : 17A

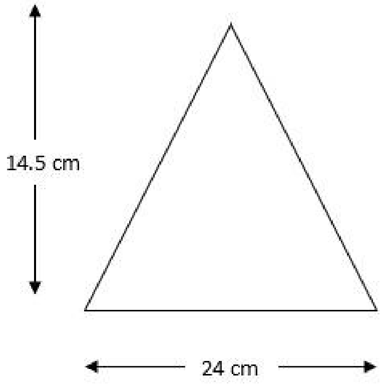
Question: 1

Find the area of

Solution:

Given: Base = 24 cm

Height = 14.5 cm



We know that,

Area of a triangle = 1/2 × Base × Height

= 1/2 × 24 cm × 14.5 cm

= 174 cm^2

Question: 2

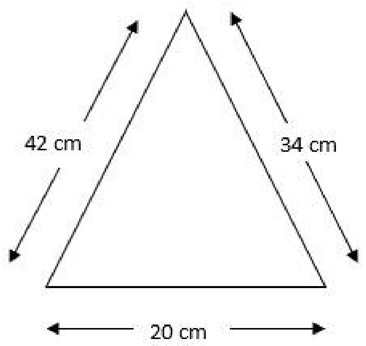
Find the area of

Solution:

Given: Side 1 = a (let) = 42 cm

Side 2 = b (let) = 34 cm

Side 3 = c (let) = 20 cm



We know that,

Area of a scalene triangle = √(s(s-a) (s-b) (s-c))

Where, $s = \frac{a+b+c}{2}$

$$s = \frac{42 + 34 + 20}{2} \text{cm}$$

$\Rightarrow s = \frac{96}{2} \text{cm}$

$\Rightarrow$ s = 48 cm

Now,

Area of a scalene triangle = √(48cm × (48-42)cm × (48-34)cm × (48-20)cm)

= √(48cm × 6cm × 14cm × 28cm)

= √112896 cm^2

= 336 cm^2

Clearly,

Length of longest side = 42 cm

Now,

We know that,

Area of a triangle = 1/2 × Base × Height

$\Rightarrow$ 336 cm^2 = 1/2 × 42 cm × Height

$\Rightarrow$ 336 cm^2 = 21 cm × Height

$\Rightarrow \text{ Height } = \frac{336 \text{ cm}^2}{21 \text{ cm}}$

$\Rightarrow$ Height = 16 cm

Question: 3

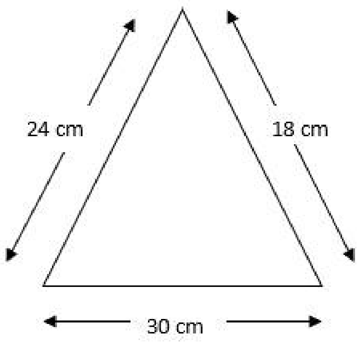
Find the area of

Solution:

Given: Side 1 = a (let) = 18 cm

Side 2 = b (let) = 24 cm

Side 3 = c (let) = 30 cm



We know that,

Area of a scalene triangle = √(s(s-a)(s-b)(s-c))

Where, $s = \frac{a+b+c}{2}$

$s = \frac{18 + 24 + 30}{2} \text{cm}$

$\Rightarrow s = \frac{72}{2} \text{cm}$

$\Rightarrow$ s = 36 cm

Now,

Area of a scalene triangle = √(36cm × (36-18)cm × (36-24)cm × (36-30)cm)

= √(36cm × 18cm × 12cm × 6cm)

$= \sqrt{46656}\ cm^2$

$= 216\ cm^2$

Clearly,

Length of smallest side = 18 cm

Now,

We know that,

Area of a triangle = 1/2 × Base × Height

$\Rightarrow 216\ cm^2 = 1/2 \times 18\ cm \times Height$

$\Rightarrow 216\ cm^2 = 9\ cm \times Height$

$\Rightarrow \text{Height} = \dfrac{216\ cm^2}{9\ cm}$

⇒ Height = 24 cm

Question: 4

The sides of a tr

Solution:

Given: Ratio of Sides = 5 : 12 : 13

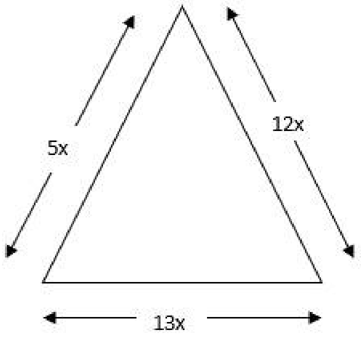
Perimeter = 150 cm

Let the sides be,

a = 5x cm

b = 12x cm

c = 13x cm



We know that,

Perimeter of a triangle = a + b + c

⇒ 150 cm = 5x cm + 12x cm + 13x cm

⇒ 150 cm = 30x cm

$\Rightarrow x = \dfrac{150\ cm}{30\ cm}$

⇒ x = 5

Therefore,

a = 5x cm = 5 × 5 cm = 25 cm

b = 12x cm = 12 × 5 cm = 60 cm

c = 13x cm = 13 × 5 cm = 65 cm

Now,

We know that,

Area of a scalene triangle = $\sqrt{(s(s-a)(s-b)(s-c))}$

Where, $s = \frac{a+b+c}{2}$

$$s = \frac{25 + 60 + 65}{2} \text{cm}$$

$$\Rightarrow s = \frac{150}{2} \text{cm}$$

⇒ s = 75cm

Now,

Area of a scalene triangle = $\sqrt{(75\text{cm} \times (75-25)\text{cm} \times (75-60)\text{cm} \times (75-65)\text{cm})}$

= $\sqrt{(75\text{cm} \times 50\text{cm} \times 15\text{cm} \times 10\text{cm})}$

= $\sqrt{562500}$ cm^2

= 750 cm^2

Question: 5

The perimeter of

Solution:

Given: Ratio of Sides = 25 : 17 : 12

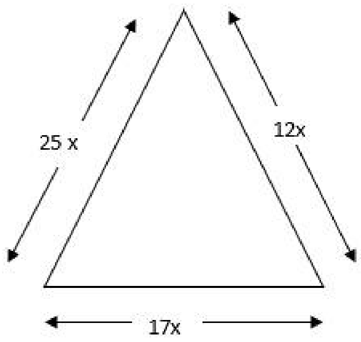
Perimeter = 540 m

Let the sides be,

a = 25x m

b = 17x m

c = 12x m



We know that,

Perimeter of a triangle = a + b + c

⇒ 540 m = 25x m + 17x m + 12x m

⇒ 540 m = 54x m

$$\Rightarrow x = \frac{540 \text{ m}}{54 \text{ m}}$$

⇒ x = 10

Therefore,

a = 25x m = 25 × 10 m = 250 m

b = 17x m = 17 × 10 m = 170 m

c = 12x m = 12 × 10 m = 120 m

Now,

We know that,

Area of a scalene triangle = $\sqrt{(s(s-a)(s-b)(s-c))}$

Where, $s = \frac{a+b+c}{2}$

$$s = \frac{250 + 170 + 120}{2} m$$

$$\Rightarrow s = \frac{540}{2} m$$

$\Rightarrow$ s = 270 m

Now,

Area of a scalene triangle =

$\sqrt{(270m \times (270\text{-}250)m \times (270\text{-}170)m \times (270\text{-}120)m)} = \sqrt{(270m \times 20m \times 10m \times 150cm)}$

= $\sqrt{81000000}$ m^2

= 9000 m^2

Now,

The cost of ploughing 100 m^2 = Rs 40

Therefore, The cost of ploughing 1 m^2 = Rs $\frac{40}{100}$

Therefore, The cost of ploughing 9000 m^2 = Rs $\frac{40}{100} \times 9000$

= Rs 3600

Question: 6

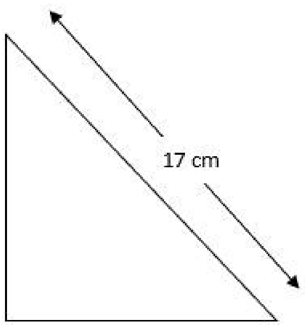
The perimeter of

Solution:

Given: Perimeter = 40 cm

Hypotenuse = 17 cm

The diagram is given as:



Let the sides be a, b and c(hypotenuse).

Therefore, a + b + c = 40 cm

$\Rightarrow$ a + b + 17 = 40 cm

$\Rightarrow$ a + b = 40 - 17 cm

$\Rightarrow$ a + b = 23 cm

$\Rightarrow$ a = (23-b) cm

Now we know that,

$Base^2 + Perpendicular^2 = Hypotenuse^2$

$\Rightarrow a^2 + b^2 = c^2$

$\Rightarrow (23-b)^2 + b^2 = 17^2$

$\Rightarrow 23^2 + b^2 - 46b + b^2 = 289$

$\Rightarrow 529 + b^2 - 46b + b^2 = 289$

$\Rightarrow 2b^2 - 46b + 240 = 0$

$\Rightarrow b^2 - 23b + 120 = 0$

$\Rightarrow b^2 - 8b - 15b + 120 = 0$

$\Rightarrow b(b-8) - 15(b-8) = 0$

$\Rightarrow (b-8)(b-15) = 0$

This gives us two equations,

i. $b-8 = 0$

$\Rightarrow b = 8$

ii. $b-15 = 0$

$\Rightarrow b = 15$

Let b = 8 cm

$\Rightarrow a = (23-b)$ cm

$\Rightarrow a = (23-8)$ cm

$\Rightarrow a = 15$ cm

Now,

Area of triangle = 1/2 × base × height

= 1/2 × 8 × 15

= 60 cm^2

Question: 7

The difference be

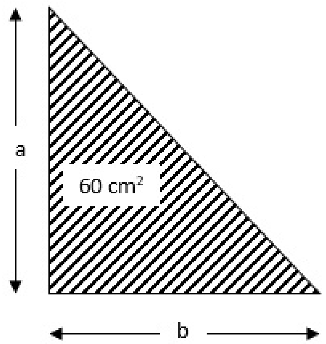
Solution:

Let the sides at right angles be a and b

And, the third side be c.

Given: $a-b = 7$ cm

Area of triangle = 60 cm^2



Now, since $a-b = 7$

$\Rightarrow a = b + 7$

Now we know that,

Area of triangle = 1/2 × base × height

$\Rightarrow 60 = 1/2 \times b \times (b + 7)$

$\Rightarrow 60 \times 2 = b^2 + 7b$

$\Rightarrow b^2 + 7b = 120$

$\Rightarrow b^2 + 7b – 120 = 0$

$\Rightarrow b^2 + 15b - 8b – 120 = 0$

$\Rightarrow b(b + 15) - 8(b + 15) = 0$

$\Rightarrow (b + 15)(b-8) = 0$

This gives us two equations,

i. $b – 8 = 0$

$\Rightarrow b = 8$

ii. $b + 15 = 0$

$\Rightarrow b = -15$

Since, the side of the triangle cannot be negative

Therefore, b = 8 cm

$\Rightarrow a = (b + 7)$ cm

$\Rightarrow a = (8 + 7)$ cm

$\Rightarrow a = 15$ cm

Now we know that,

$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$

$\Rightarrow a^2 + b^2 = c^2$

$\Rightarrow 15^2 + 8^2 = c^2$

$\Rightarrow c^2 = 225 + 64$

$\Rightarrow c^2 = 289$

$\Rightarrow c = 17$

Now,

Perimeter of triangle = a + b + c

⇒ Perimeter of triangle = 15 + 8 + 17

⇒ Perimeter of triangle = 40 cm

Question: 8

The lengths of th

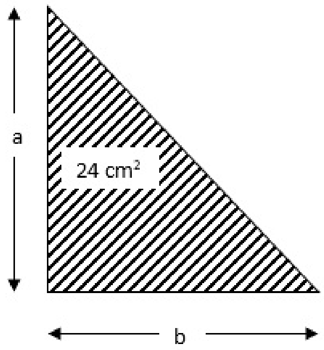
Solution:

Let the sides at right angles be a and b

And, the third side be c.

Given: a-b = 2 cm

Area of triangle = 24 cm^2



Now, since a-b = 2

⇒ a = b + 2

Now we know that,

Area of triangle = 1/2 × base × height

⇒ 24 = 1/2 × b × (b + 2)

⇒ 24 × 2 = b^2 + 2b

⇒ b^2 + 2b = 48

⇒ b^2 + 2b-48 = 0

⇒ b^2 + 8b-6b-48 = 0

⇒ b(b + 8)-6(b + 8) = 0

⇒ (b + 8)(b-6) = 0

This gives us two equations,

i. b + 8 = 0

⇒ b = -8

ii. b-6 = 0

⇒ b = 6

Since, the side of the triangle cannot be negative

Therefore, b = 6 cm

⇒ a = (b + 2) cm

⇒ a = (6 + 2) cm

⇒ a = 8 cm

Now we know that,

$Base^2$ + $Perpendicular^2$ = $Hypotenuse^2$

⇒ $a^2 + b^2 = c^2$

⇒ $8^2 + 6^2 = c^2$

⇒ c^2 = 64 + 36

⇒ c^2 = 100

⇒ c = 10

Now,

Perimeter of triangle = a + b + c

⇒ Perimeter of triangle = 8 + 6 + 10

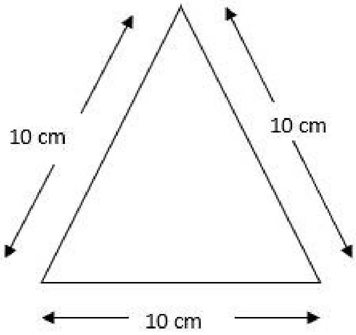
⇒ Perimeter of triangle = 24 cm

Question: 9

Each side of an e

Solution:

Given: Side of an equilateral triangle = 10 cm



(i) Area of equilateral triangle = $\frac{\sqrt{3}}{4} \times \text{side}^2$

$= \frac{\sqrt{3}}{4} \times 10^2$

$= \frac{\sqrt{3}}{4} \times 100$

$= \frac{100\sqrt{3}}{4}$

$= 25\sqrt{3}$

$= 25 \times 1.732$

$= 43.3 \text{ cm}^2$

(ii) Height of equilateral triangle = $\frac{\sqrt{3}}{2} \times a$

$= \frac{\sqrt{3}}{2} \times 10$

$= \frac{10\sqrt{3}}{2}$

$= 5\sqrt{3}$

$= 5 \times 1.732$

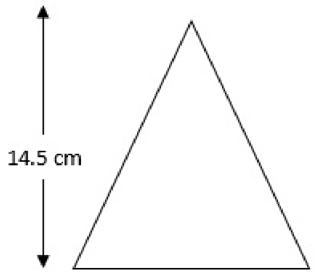
$= 8.66 \text{ cm}^2$

Question: 10

The height of an

Solution:

Given: Height of an equilateral triangle = 6 cm



Let sides of equilateral triangle be a cm

We know that,

Height of equilateral triangle = $\frac{\sqrt{3}}{2} \times a$

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

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

$\Rightarrow 12 = a\sqrt{3}$

$\Rightarrow\ a = \frac{12}{\sqrt{3}}$

$\Rightarrow\ a = \frac{12}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$

$\Rightarrow\ a = \frac{12\sqrt{3}}{3}$

$\Rightarrow a = 4 \times 1.73$

$= 6.92\ cm^2$

Now,

Area of equilateral triangle = $\frac{\sqrt{3}}{4} \times side^2$

$= \frac{\sqrt{3}}{4} \times 6.92^2$

$= \frac{\sqrt{3}}{4} \times 47.88$

$= 11.98\sqrt{3}\ cm^2$

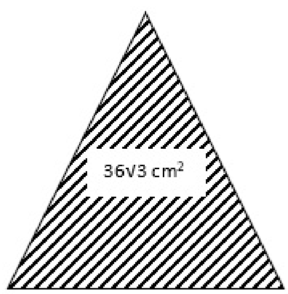
$= 20.76\ cm^2$

Question: 11

If the area of an

Solution:

Given: Area of an equilateral triangle = $36\sqrt{3}\ cm^2$



We know that,

Area of equilateral triangle = $\frac{\sqrt{3}}{4} \times \text{side}^2$

$$\Rightarrow 36\sqrt{3} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$\Rightarrow \text{side}^2 = 36\sqrt{3} \times \frac{4}{\sqrt{3}}$$

$\Rightarrow \text{side}^2 = 36 \times 4$

$\Rightarrow$ side = 12 cm

Now,

Perimeter of equilateral triangle = 3 × side

= 3 × 12 cm

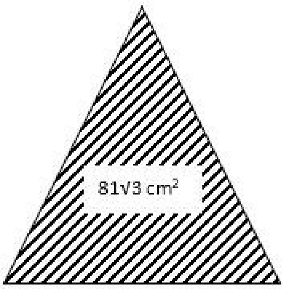
= 36 cm

Question: 12

If the area of an

Solution:

Given: Area of an equilateral triangle = $81\sqrt{3}$ cm^2



We know that,

Area of equilateral triangle = $\frac{\sqrt{3}}{4} \times \text{side}^2$

$$\Rightarrow 81\sqrt{3} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$\Rightarrow \text{side}^2 = 81\sqrt{3} \times \frac{4}{\sqrt{3}}$$

$\Rightarrow \text{side}^2 = 81 \times 4$

$\Rightarrow$ side = 18 cm

Now,

Height of equilateral triangle = $\frac{\sqrt{3}}{2} \times \text{side}$

$$= \frac{\sqrt{3}}{2} \times 18$$

= $9\sqrt{3}$ cm

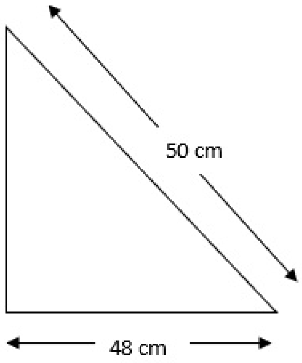
Question: 13

The base of a rig

Solution:

Given: Base = 48 cm

Hypotenuse = 50 cm



We know that,

$Base^2 + Perpendicular^2 = Hypotenuse^2$

$\Rightarrow 48^2 + Perpendicular^2 = 50^2$

$\Rightarrow Perpendicular^2 = 50^2 - 48^2$

$\Rightarrow Perpendicular^2 = 2500 – 2304$

$\Rightarrow Perpendicular^2 = 196\ cm^2$

$\Rightarrow$ Perpendicular = 14 cm

Area of a triangle = 1/2 × Base × Height

= 1/2 × 48 cm × 14 cm

= 336 cm^2

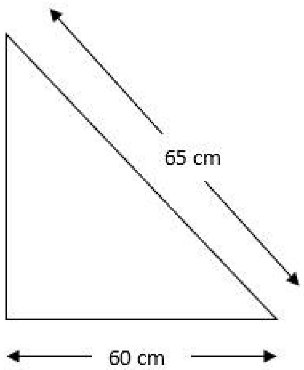
Question: 14

The hypotenuse of

Solution:

Given: Base = 60 cm

Hypotenuse = 65 cm



We know that,

$Base^2 + Perpendicular^2 = Hypotenuse^2$

$\Rightarrow 60^2 + Perpendicular^2 = 65^2$

$\Rightarrow Perpendicular^2 = 65^2 - 60^2$

$\Rightarrow Perpendicular^2 = 4225 – 3600$

$\Rightarrow Perpendicular^2 = 625\ cm^2$

$\Rightarrow$ Perpendicular = 25 cm

Area of a triangle = 1/2 × Base × Height

= 1/2 × 60 cm × 25 cm

= 750 cm^2

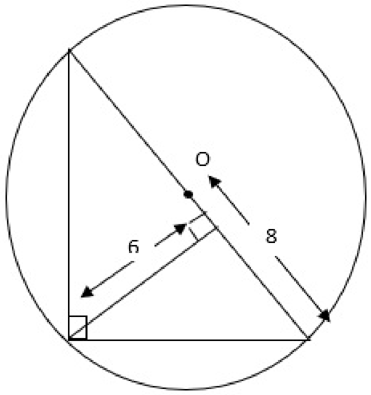
Question: 15

Find the area of

Solution:

Given: Radius of circle = 8 cm

Altitude = 6 cm



Since, in a right-angled triangle the hypotenuse

is the diameter of circumcircle.

Therefore,

Hypotenuse = 2 × Radius

= 2 × 8 cm

= 16 cm

Now, we consider the hypotenuse as base and the altitude to the hypotenuse as height

So,

Area of a triangle = 1/2 × Base × Height

= 1/2 × 16 cm × 6 cm

= 1/2 × 96 cm^2

= 48 cm^2

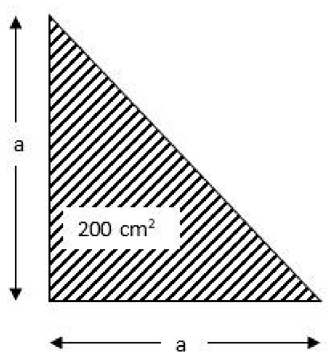
Question: 16

Find the length o

Solution:

Given: Area = 200 cm

Let the equal sides be a.



We know that,

Area of a triangle = 1/2 × Base × Height

$\Rightarrow 200 = 1/2 \times a \times a$

$\Rightarrow 200 = 1/2 \times a^2$

$\Rightarrow a^2 = 200 \times 2$

$\Rightarrow a^2 = 400$

$\Rightarrow a = 20$ cm

Now,

$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$

$\Rightarrow 20^2 + 20^2 = \text{Hypotenuse}^2$

$\Rightarrow \text{Hypotenuse}^2 = 400 + 400$

$\Rightarrow \text{Hypotenuse}^2 = 800 \text{ cm}^2$

$\Rightarrow$ Hypotenuse$= 20\sqrt{2}$ cm

$\Rightarrow$ Hypotenuse$= 28.2$ cm

Now,

Perimeter of triangle = 20 + 20 + 28.2 cm

= 68.2 cm

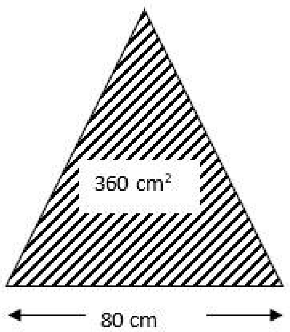
Question: 17

The base of an is

Solution:

Given: Area of isosceles triangle = 360 cm^2

Base of triangle = 80 cm



Let a be the equal sides of the triangle

We know that,

Area of isosceles triangle = $1/4 \times b\sqrt{(4a^2 - b^2)}$

$\Rightarrow 360 = 1/4 \times 80\sqrt{(4a^2 - 80^2)}$

$\Rightarrow 360 = 1/4 \times 80\sqrt{(4a^2 - 6400)}$

$\Rightarrow 360 = 20\sqrt{[4(a^2 - 1600)]}$

$\Rightarrow 360 = 20 \times 2\sqrt{(a^2 - 1600)}$

$$\Rightarrow \frac{360}{20 \times 2} = \sqrt{a^2 - 1600}$$

$\Rightarrow 9 = \sqrt{(a^2 - 1600)}$

On squaring both sides we get,

$\Rightarrow 81 = a^2 - 1600$

$\Rightarrow a^2 = 1600 + 81 = 1681$

$\Rightarrow a = 41$ cm

Now,

Perimeter of triangle = 41 cm + 41 cm + 80 cm

= 162 cm

Question: 18

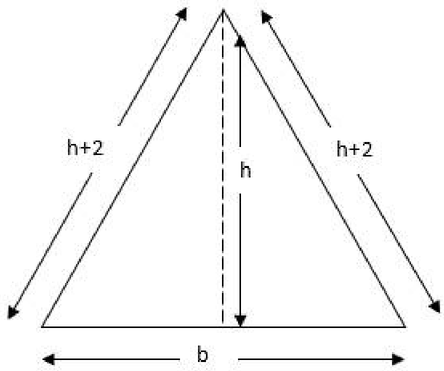
Each of the equal

Solution:

Let height of triangle = h cm

Given: Base of the triangle (b) = 12 cm

Equal sides (a) = h + 2 cm



Now,

Area of a triangle = 1/2 × Base × Height

And,

Area of isosceles triangle = $1/4 \times b\sqrt{(4a^2 - b^2)}$

$\Rightarrow 1/2 \times \text{Base} \times \text{Height} = 1/4 \times b\sqrt{(4a^2 - b^2)}$

$\Rightarrow 1/2 \times 12 \times h = 1/4 \times 12\sqrt{[4(h + 2)^2 - 12^2]}$

$\Rightarrow 6h = 3\sqrt{(4h^2 + 16h + 16-144)}$

$\Rightarrow 2h = \sqrt{(4h^2 + 16h-128)}$

On squaring both sides we get,

$\Rightarrow 4h^2 = 4h^2 + 16h - 128$

$\Rightarrow 16h - 128 = 0$

$\Rightarrow 16h = 128$

$$\Rightarrow h = \frac{128}{16}$$

$\Rightarrow h = 8$ cm

Now,

Area of a triangle = 1/2 × Base × Height

= 1/2 × 12 cm × 8 cm

= $1/2 \times 96 \text{ cm}^2$

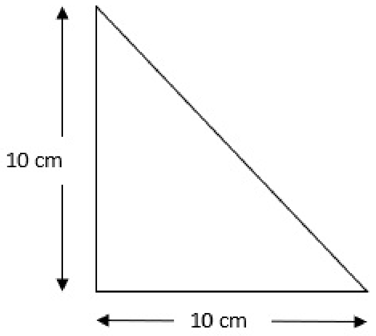
= 48 cm^2

Question: 19

Find the area and

Solution:

Given: Equal sides (i.e., base and perpendicular) = 10 cm



We know that,

Area of a triangle = 1/2 × Base × Height

Area of a triangle = 1/2 × 10 cm × 10 cm

Area of a triangle = 50 cm^2

Now,

$Base^2 + Perpendicular^2 = Hypotenuse^2$

⇒ $10^2 + 10^2 = Hypotenuse^2$

⇒ $Hypotenuse^2 = 100 + 100$

⇒ $Hypotenuse^2 = 200\ cm^2$

⇒ Hypotenuse= 10√2 cm

⇒ Hypotenuse= 14.1 cm

Now,

Perimeter of triangle = 10 + 10 + 14.1 cm

= 24.1 cm

Question: 20

In the given figu

Solution:

Given: AB = BC = AC = a (let) = 10 cm

BD = 8 cm

Now,

Area of an equilateral triangle (ΔABC) = $\frac{\sqrt{3}}{4} \times a^2$

= $\frac{\sqrt{3}}{4} \times 10^2$

= 25√3 cm^2

= 43.3 cm^2

Now, in ΔDBC

$Base^2 + Perpendicular^2 = Hypotenuse^2$

⇒ $DC^2 + DB^2 = BC^2$

$\Rightarrow DC^2 = BC^2 - BD^2$

$\Rightarrow DC^2 = 10^2 - 8^2$

$\Rightarrow DC^2 = 100 - 64$

$\Rightarrow DC^2 = 36\ cm^2$

$\Rightarrow DC = 6$ cm

Now,

Area of a triangle (ΔDBC) = 1/2 × Base × Height

= 1/2 × DC × BC

= 1/2 × 6 cm × 8 cm

= 1/2 × 48 cm^2

= 24 cm^2

Now,

Area of shaded region = ΔABC - ΔDBC

= 43.3 cm^2 – 24 cm^2

= 19.3 cm^2

Exercise : 17B

Question: 1

The perimeter of

Solution:

Given: Perimeter = 80 m

Breadth = 16 m

We know that,

Perimeter of a rectangle = 2(length + breadth)

⇒ 80 m = 2(length + 16 m)

$\Rightarrow \frac{80}{2}\text{m} = \text{length} + 16\text{ m}$

⇒ 40m = length + 16 m

⇒ Length = 40 m – 16 m

⇒ Length = 24 m

Now,

Area of rectangle = Length × Breadth

= 24 m × 16 m

= 384 m^2

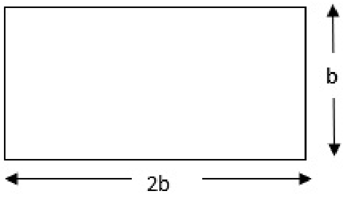
Question: 2

The length of a r

Solution:

Given: Length of park (l) = 2 × breadth(b) = 2b

Perimeter of park = 840 m



We know that,

Perimeter of a rectangle = 2(length + breadth)

⇒ 840 m = 2(2b + b)

$\Rightarrow \frac{840}{2} m = 2b + b$

⇒ 420 m = 3b

$\Rightarrow b = \frac{420}{3} m$

⇒ b = 140m

Now,

l = 2b = 2 × 140 m = 280 m

Hence,

Area of rectangle = Length × Breadth

= 140 m × 280 m

= 39200 m^2

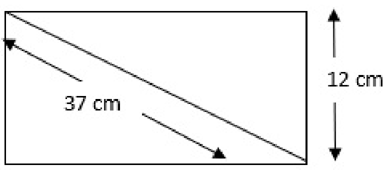
Question: 3

One side of a rec

Solution:

Given: Breadth (b) = 12 cm

Diagonal = 37 cm



Let length be l cm

We know that,

$Base^2 + Perpendicular^2 = Hypotenuse^2$

$\Rightarrow l^2 + 12^2 = 37^2$

$\Rightarrow l^2 = 37^2 - 12^2$

$\Rightarrow l^2 = 1369\ cm^2 – 144\ cm^2$

$\Rightarrow l^2 = 1225\ cm^2$

⇒ l = 35 cm

Now,

Area of rectangle = Length × Breadth

= 35 cm × 12 cm

= 420 cm^2

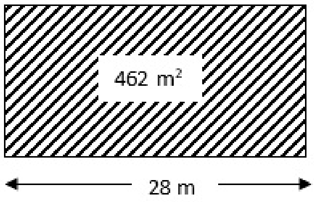
Question: 4

The area of a rec

Solution:

Given: Area = 462 m^2

Length = 28 m



We know that,

Area of rectangle = Length × Breadth

⇒ 462 m^2 = 28 m × Breadth

$$\Rightarrow \text{ Breadth } = \frac{462 \text{ m}^2}{28 \text{ m}}$$

⇒ Breadth = 16.5 m

Now,

Perimeter of a rectangle = 2(length + breadth)

= 2(28 m + 16.5 m)

= 2 × 44.5 m

= 89 m

Question: 5

A lawn is in the

Solution:

Given: Cost of fencing lawn = Rs 65 per metre.

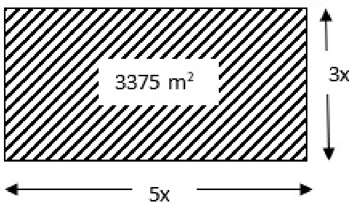
Area of lawn = 3375 m^2

Length: Breadth = 5: 3

Let,

Length = 5x

Breadth = 3x



We know that,

Area of lawn = Length × Breadth

⇒ 3375 m^2 = 5x × 3x

$\Rightarrow 3375\ m^2 = 15x^2$

$\Rightarrow x^2 = \frac{3375}{15} m^2$

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

$\Rightarrow x = 15\ m$

Therefore,

Length = 5x = 5 × 15 = 75 m

Breadth = 3x = 3 × 15 = 45 m

Now,

Perimeter of lawn = 2(length + breadth)

= 2(75 m + 45 m)

= 2 × 120 m

= 240 m

Hence,

Cost of Fencing = 240 m × Rs 65 per meter

= Rs 15600

Question: 6

A room is 16 m lo

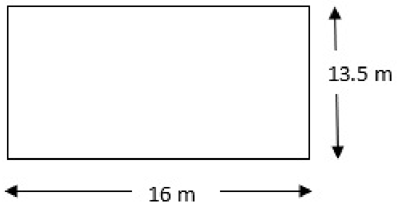
Solution:

Given: Cost of covering = Rs 60 per metre.

Breadth of carpet = 75 cm = 0.75 m

Length of room = 16 m

Breadth of room = 13.5 m



We know that,

Area of room = Length × Breadth

= 16 m × 13.5 m

$= 216\ m^2$

Now,

$$\text{Length of carpet} = \frac{\text{Area of room}}{\text{Breadth of carpet}}$$

$$= \frac{216\ m^2}{0.75\ m}$$

= 288 m

Now,

Cost of covering the floor = 288 m × Rs 60 per meter

= Rs 17280

Question: 7

The floor of a re

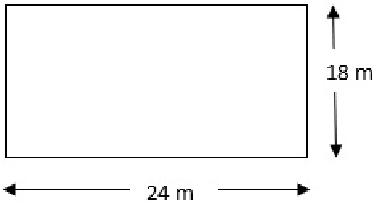
Solution:

Given: Length of carpet = 2.5 m

Breadth of carpet = 80 cm = 0.8 m

Length of hall = 24 m

Breadth of hall = 18 m



We know that,

Area of hall = Length × Breadth

= 24 m × 18 m

= 432 m^2

And,

Area of carpet = Length × Breadth

= 2.5 m × 0.8 m

= 2 m^2

Now,

$$\text{Number of carpets} = \frac{\text{Area of hall}}{\text{Area of carpet}}$$

$$= \frac{432\ m^2}{2\ m^2}$$

= 216 carpets

Question: 8

A 36-m-long, 15-m

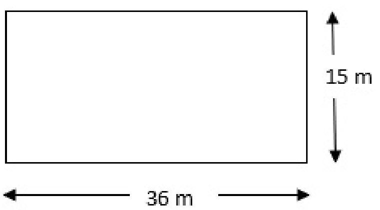
Solution:

Given: Length of verandah = 36 m

Breadth of verandah = 15 m

Length of stones = 6 dm = 0.6 m

Breadth of stones = 5 dm = 0.5 m



We know that,

Area of verandah = Length × Breadth

$= 36 \text{ m} \times 15 \text{ m}$

$= 540 \text{ m}^2$

And,

Area of stones = Length × Breadth

$= 0.6 \text{ m} \times 0.5 \text{ m}$

$= 0.3 \text{ m}^2$

Now,

$\text{Number of stones} = \dfrac{\text{Area of verandah}}{\text{Area of stones}}$

$= \dfrac{540 \text{ m}^2}{0.3 \text{ m}^2}$

= 1800 stones

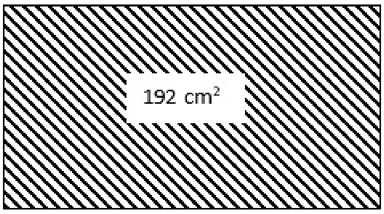
Question: 9

The area of a rec

Solution:

Given: Area of rectangle = 192 cm^2

Perimeter of rectangle = 56 cm



Let,

Length be l cm

And, breadth be b cm

Now,

Area of rectangle = Length × Breadth

$\Rightarrow 192 \text{ cm}^2 = l \text{ cm} \times b \text{ cm}$

$\Rightarrow l \text{ cm} = \dfrac{192 \text{ cm}^2}{b \text{ cm}}$

Perimeter of rectangle = 2(length + breadth)

$\Rightarrow 56 \text{ cm} = 2(l \text{ cm} + b \text{ cm})$

Now, substituting the value of l in this we get,

$56 = 2\left(\dfrac{192}{b} + b\right)$

$\Rightarrow 56 = 2\left(\dfrac{192 + b^2}{b}\right)$

$\Rightarrow \dfrac{56}{2} = \dfrac{192 + b^2}{b}$

$\Rightarrow 28 = \dfrac{192 + b^2}{b}$

$\Rightarrow 28b = 192 + b^2$

$\Rightarrow b^2 - 28b + 192 = 0$

$\Rightarrow b^2 - 16\,b - 12\,b + 192 = 0$

$\Rightarrow b(b - 16) - 12(b - 16) = 0$

$\Rightarrow (b - 12)(b - 16) = 0$

This gives us two equations,

i. $b - 12 = 0$

$\Rightarrow b = 12$

ii. $b - 16 = 0$

$\Rightarrow b = 16$

Let b = 12 cm

$$\Rightarrow l\,\text{cm} = \frac{192\ \text{cm}^2}{12\ \text{cm}} = 16\ \text{cm}$$

Hence,

Length = 16 cm

Breadth = 12 cm

Question: 10

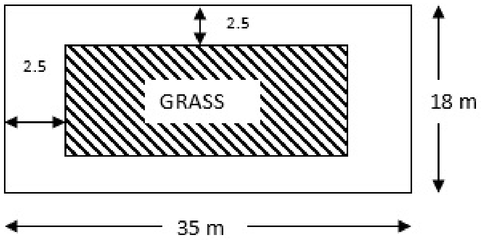
A rectangular par

Solution:

Given:

Length of park = 35 m

Breadth of park = 18 m



Now,

Length to be covered = 35 – (2.5 + 2.5)

= 30 m

Breadth to be covered = 18 – (2.5 + 2.5)

= 13 m

Area of park = Length × Breadth

= 30 m × 13 m

= 390 m^2

Question: 11

A rectangular plo

Solution:

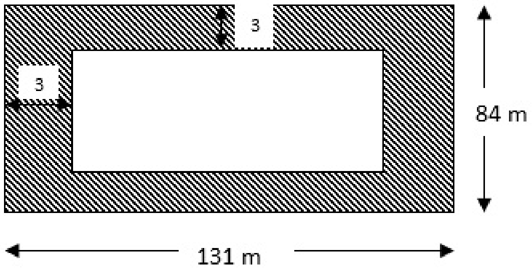
Given: Length of plot = 125 m and Breadth of plot = 78 m. It has a gravel path 3 m wide all around on the outside.**To find:** The area of the path and the cost of gravelling it at RS. 75 per

m^2.

Solution: Since gravel path is 3 m wide all around,

$\therefore$ Length of plot with path = 125 + (3 + 3)= 131 m

Breadth of plot with path = 78 + (3 + 3)= 84 m



Now,

Area of the rectangular plot without path= L × B⇒ Area of the rectangular plot without path = 125 × 78 = 9750 m^2Area of rectangular plot with path = L × B⇒ Area of the rectangular plot with path = 131 × 84 = 11004 m^2Area of the path = Area of the rectangular plot with path - Area of the rectangular plot without path = 11004 - 9750 = 1254 m^2Cost of gravelling 1 m^2 path = Rs 75Cost of gravelling 1254 m^2 path = Rs 75 × 1254 = Rs 94050

Question: 12

A footpath of uni

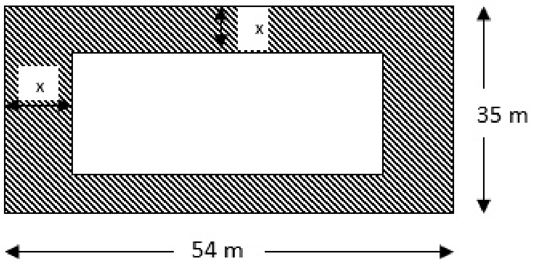
Solution:

Given:

Length of field = 54 m

Breadth of field = 35 m

Let width of the path be x m



Area of field = Length × Breadth

= 54 m × 35 m

= 1890 m^2

Therefore,

Length of field without path = 54 - (x + x)

= 54 - 2x

Breadth of field without path = 35 - (x + x)

= 35 - 2x

Therefore,

Area of field without path = Length without path × Breadth without path

= (54 - 2x) × (35 - 2x)

= 1890 – 70x – 108x + $4x^2$

$= 1890 – 178x + 4x^2$

Now,

Area of path = Area of field - Area of field without path

$\Rightarrow 420 = 1890 – (1890 – 178x + 4x^2)$

$\Rightarrow 420 = 1890 – 1890 + 178x - 4x^2$

$\Rightarrow 420 = 178x - 4x^2$

$\Rightarrow 4x^2 - 178x + 420 = 0$

$\Rightarrow 2x^2 - 89x + 210 = 0$

$\Rightarrow 2x^2 - 84x – 5x + 210 = 0$

$\Rightarrow 2x(x - 42) – 5(x – 42) = 0$

$\Rightarrow (x - 42)(2x – 5) = 0$

This gives us two equations,

i. $x - 42 = 0$

$\Rightarrow x = 42$

ii. $2x – 5 = 0$

$\Rightarrow x = \frac{5}{2}$

Since, width of park cannot be more than breadth of field

Therefore, width of park = 42 m

Question: 13

The length and th

Solution:

Given:

Length : Breadth 9 : 5

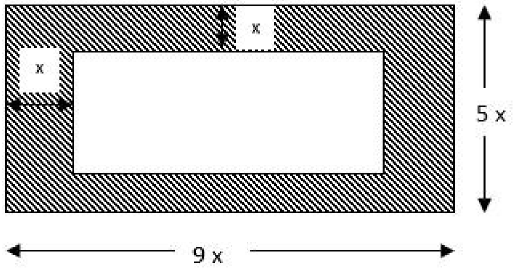
Width of the path = 3.5 m

Area of path = 1911 m^2

Let,

Length of field = 9x

Breadth of field = 5x



Area of field = Length × Breadth

$= 9x \times 5x$

$= 45\ x^2$

Therefore,

Length of field without path = 9x - (3.5 + 3.5)

= 9x - 7

Breadth of field without path = 5x - (3.5 + 3.5)

= 5x - 7

Therefore,

Area of field without path = Length without path × Breadth without path

= (9x - 7) × (5x - 7)

= $45x^2 – 35x – 63x + 49$

= $45x^2 – 98x + 49$

Now,

Area of path = Area of field - Area of field without path

⇒ $1911 = 45 x^2 – (45x^2 – 98x + 49)$

⇒ $1911 = 45 x^2 – 45x^2 + 98x - 49$

⇒ 1911 = 98x - 49

⇒ 98x = 1911 + 49

⇒ 98x = 1960

⇒ x = 20

Hence,

Length of field = 9x = 9 × 20 = 180 m

Breadth of field = 5x = 5 × 20 = 100 m

Question: 14

A room 4.9 m long

Solution:

Given:

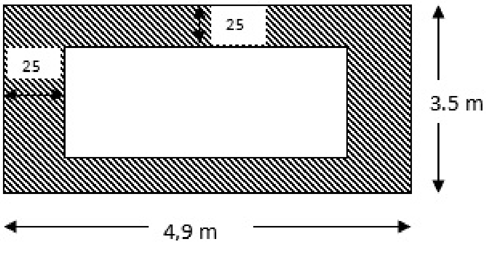
Length = 4.9 m

Breadth = 3.5 m

Margin = 25 cm = 0.25 m

Breadth of carpet = 80 cm = 0.8 m

Cost = Rs 80 per meter



Now,

Length to be carpeted = 4.9 m - (0.25 + 0.25) m

= 4.4 m

Breadth to be carpeted = 3.5 m - (0.25 + 0.25) m

= 3 m

Therefore,

Area to be carpeted = Length to be carpeted × Breadth to be carpeted

= 4.4 m × 3 m

= 13.2 m^2

Area of carpet = Area to be carpeted = 13.2 m^2

Now,

$$\text{Length of carpet} = \frac{\text{Area of carpet}}{\text{Breadth of carpet}}$$

$$\text{Length of carpet} = \frac{13.2 \text{ m}^2}{0.8 \text{ m}}$$

= 16.5 m

Now,

Cost of 1 m carpet = Rs 80

Therefore,

Cost of 16.5 m carpet = Rs 80 × 16.5 m

= Rs 1,320

Question: 15

A carpet is laid

Solution:

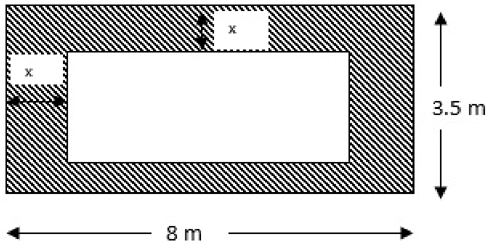
Given:

Length = 8 m

Breadth = 5 m

Border = 12 m^2

Let the width be x m



Area of floor = Length × Breadth

= 8 m × 5 m

= 40 m^2

Now,

Length without border = 8 m - (x + x) m

= (8 – 2x) m

Breadth without border = 5 m - (x + x) m

= (5 – 2x) m

Therefore,

Area without border = Length without border × Breadth without border

$= (8 – 2x) \times (5 – 2x)$

$= 40 – 16x – 10x + 4x^2$

Area of border = Area of floor - Area without border

$\Rightarrow 12 = 40 – (40 – 16x – 10x + 4x^2)$

$\Rightarrow 12 = 40 – 40 + 16x + 10x - 4x^2$

$\Rightarrow 12 = 26x - 4x^2$

$\Rightarrow 4x^2 – 26x + 12 = 0$

$\Rightarrow 4x^2 – 24x – 2x + 12 = 0$

$\Rightarrow 4x(x– 6) – 2(x -6) = 0$

$\Rightarrow (x– 6) (4x -2) = 0$

This gives us two equations,

i. $x - 6 = 0$

$\Rightarrow x = 6$

ii. $4x -2 = 0$

$\Rightarrow x = 1/2$

Since,

Border cannot be greater than carpet

Hence, width of border is 1/2 m = 50 cm

Question: 16

A 80 m by 64 m re

Solution:

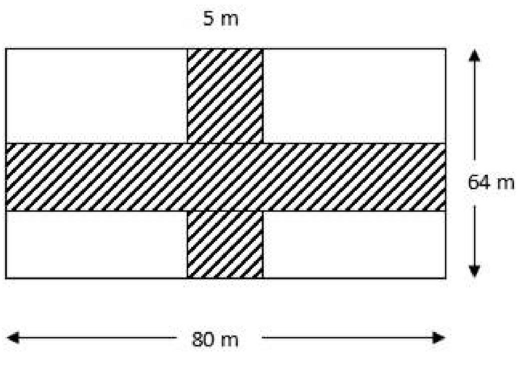
Given: A 80 m by 64 m rectangular lawn has two roads, each 5 m wide, running through its middle, one parallel to its length and the other parallel to its breadth.**To find:** The cost of gravelling the roads at RS. 40 per m^2.

Solution:

Length = 80 m

Breadth = 64 m

Width of road = 5 m



Area of horizontal road = 5 m × 80 m = 400 m^2

Area of vertical road = 5 m × 64 m = 320 m^2

Area of common part to both roads = 5 m × 5 m = 25 m^2

Now,

Area of roads to be gravelled = Area of horizontal road + Area of vertical road - Area of common part to both roads

= 400 m^2 + 320 m^2 - 25 m^2

= 695 m^2

Cost of gravelling = 695 m^2 × Rs 40 per m^2

= Rs 27800

Question: 17

The dimensions of

Solution:

Given:

Length of walls = 14 m

Breadth of walls = 10 m

Height of walls = 6.5 m

Length of windows = 1.5 m

Breadth of windows = 1 m

Length of doors = 2.5 m

Breadth of doors = 1.2 m

Cost = Rs 35 per m^2

Now,

Area of four walls = 2(Length of walls × Height of walls) + 2(Breadth of walls × Height of walls)

= 2(14 × 6.5) + 2(10 × 6.5)

= 182 m^2 + 130 m^2

= 312 m^2

Area of two doors = 2(Length of doors × Breadth of doors)

= 2(2.5 × 1.2)

= 6 m^2

Area of four windows = 4(Length of windows × Breadth of windows)

= 4(1.5 × 1)

= 6 m^2

Therefore,

Area to be painted = Area of 4 walls–(Area of 2 doors + Area of 4 windows)

= 312 m^2 – (6 m^2 + 6 m^2)

= 300 m^2

Cost of painting = 300 m^2 × Rs 35 per m^2

= Rs 10500

Question: 18

The cost of paint

Solution:

Given:

Length = 12 m

Cost per meter = Rs 30

Total cost = Rs 7560

Cost per meter for floor = Rs 25

Total cost for floor = Rs 2700

Let height be h

Now,

$$\text{Area of the floor} = \frac{\text{Total cost}}{\text{Cost per meter}}$$

$$= \frac{2700}{25}$$

= 108 m^2

$$\text{Breadth} = \frac{\text{Area of the floor}}{\text{Length}}$$

$$= \frac{108}{12}$$

= 9 m

$$\text{Area of walls} = \frac{\text{Total cost}}{\text{Cost per meter}}$$

$$= \frac{7560}{30}$$

= 252 m^2

Area of 4 walls = 2(Length of walls × Height of walls) + 2(Breadth of walls × Height of walls)

⇒ 252 = 2(12 × h) + 2(9 × h)

⇒ 252 = 24h + 18h

⇒ 252 = 42h

⇒ h = 6 m

Therefore,

Dimensions = 12 m × 9 m × 6 m

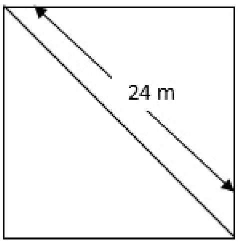
Question: 19

Find the area and

Solution:

Given:

Diagonal = 24 m



Let the side of square be s

Area of square = 1/2 × Diagonal^2

$= 1/2 \times 24^2$

$= 288\ m^2$

Area of square = $side^2$

$\Rightarrow 288\ m^2 = s^2$

$\Rightarrow s = 12\sqrt{2}\ m$

$\Rightarrow s = 16.92\ m$

Therefore,

Perimeter of square = 4×16.92

$= 67.68\ m$

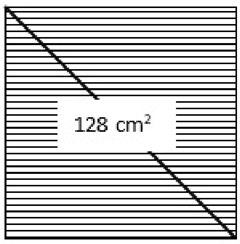
Question: 20

Find the length o

Solution:

Given:

Area = $128\ cm^2$



Let the side of square be s

Area of square = $1/2 \times Diagonal^2$

$\Rightarrow 128 = 1/2 \times Diagonal^2$

$\Rightarrow Diagonal^2 = 2 \times 128$

$\Rightarrow Diagonal^2 = 256$

$\Rightarrow$ Diagonal= 16 cm

Area of square = $side^2$

$\Rightarrow 128\ m^2 = s^2$

$\Rightarrow s = 8\sqrt{2}\ cm$

$\Rightarrow s = 11.28\ cm$

Therefore,

Perimeter of square = 4×11.28

$= 45.12\ cm$

Question: 21

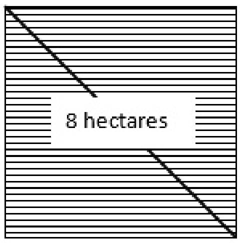
The area of a squ

Solution:

Given:

Area = 8 hectares = $0.08\ km^2$

Speed = 4 km per hr



Let the side of square be s

Area of square = 1/2 × Diagonal^2

⇒ 0.08 = 1/2 × Diagonal^2

⇒ Diagonal^2 = 2 × 0.08

⇒ Diagonal^2 = 0.16

⇒ Diagonal= 0.04 km

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

$= \frac{0.04 \text{ km}}{4 \text{ km per hr}}$

= 0.01 hr

= (0.01 × 60) mins

= 6 mins

Therefore,

Time taken = 6 mins

Question: 22

The cost of harve

Solution:

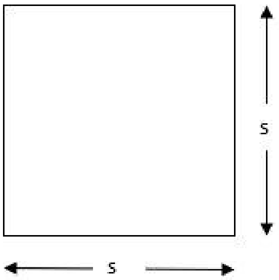
Given:

Rate = Rs 900 per hectare

Total Cost = Rs 8100

Rate of fencing = Rs 18 per metre

Let the side of square field be s



Now,

$\text{Area} = \frac{\text{Total Cost}}{\text{Rate}}$

$= \frac{8100}{900}$

= 9 hectares = 90000 m^2

Area = $side^2$

$\Rightarrow 90000\ m^2 = side^2$

$\Rightarrow side = 300\ m^2$

Now,

Perimeter = 4 × side

$= 4 \times 300\ m^2$

$= 1200m^2$

Therefore,

Cost of fencing = $1200\ m^2$ × Rs 18 per metre

= Rs 21600

Question: 23

The cost of fenci

Solution:

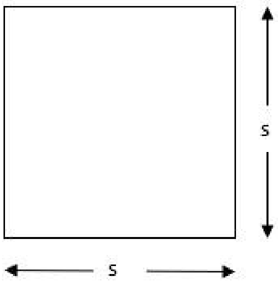
Given:

Rate = RS. 14 per metre

Total Cost = RS. 28000

Rate of mowing = RS. 54 per 100 m^2

Let the side of square field be s



Now,

$$\text{Perimeter} = \frac{\text{Total Cost}}{\text{Rate}}$$

$$= \frac{28000}{14}$$

= 2000 m

Perimeter = 4 × side

$\Rightarrow 2000\ m = 4 \times s$

$$\Rightarrow s = \frac{2000}{4}$$

$\Rightarrow s = 500\ m$

Now,

Area = $side^2$

$= (500\ m)^2$

$= 250000\ m^2$

Therefore,

Cost of mowing 100 m^2 = Rs 54

Cost of mowing 1 $m^2 = \text{Rs } \frac{54}{100}$

Cost of mowing 250000 $m^2 = \text{Rs } \frac{54}{100} \times 250000$

= Rs 135000

Question: 24

In the given figu

Solution:

Given:

BD = 24 cm

AL = 9 cm

CM = 12 cm

In ΔADB,

Area of ΔADB = 1/2 × BD × AL

= 1/2 × 24 cm × 9 cm

= 108 cm^2

In ΔCDB,

Area of ΔCDB = 1/2 × BD × CM

= 1/2 × 24 cm × 12 cm

= 144 cm^2

Now,

Area of quadrilateral ABCD = Area of ΔADB + Area of ΔADB

= 108 cm^2 + 144 cm^2

= 252 cm^2

Question: 25

Find the area of

Solution:

Given:

BC = 26 cm

DC = 26 cm

AD = 24 cm

BD = 26 cm

In ΔBCD,

Area of $\Delta BCD(\text{equilateral}) = \frac{\sqrt{3}}{4} \times \text{side}^2$

$= \frac{\sqrt{3}}{4} \times 26^2$

= 292.37 cm^2

In ΔADB,

$Base^2 + Perpendicular^2 = Hypotenuse^2$

$\Rightarrow AB^2 + AD^2 = DB^2$

$\Rightarrow AB^2 = DB^2 - AD^2$

$\Rightarrow AB^2 = 26^2 - 24^2$

$\Rightarrow AB^2 = 676 - 576$

$\Rightarrow AB^2 = 100$

$\Rightarrow AB= 10$ cm

Area of $\Delta ADB = 1/2 \times AB \times AD$

$= 1/2 \times 10$ cm $\times 24$ cm

$= 120$ cm^2

Now,

Area of quadrilateral ABCD = Area of ΔADB + Area of ΔBCD

$= 120$cm^2 + 292.37 cm^2

$= 412.37$ cm^2

And,

Perimeter of quadrilateral ABCD = AB + BC + CD + DA

= 10 cm + 26 cm + 26 cm + 24 cm

= 86 cm

Question: 26

Find the perimete

Solution:

Given:

AC = 15 cm

AB = 17 cm

AD = 9 cm

CD = 12 cm

In ΔACB (right-angled),

$Base^2 + Perpendicular^2 = Hypotenuse^2$

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

$\Rightarrow BC^2 = AB^2 - AC^2$

$\Rightarrow BC^2 = 17^2 - 15^2$

$\Rightarrow BC^2 = 289 - 225$

$\Rightarrow BC^2 = 64$

$\Rightarrow BC= 8$ cm

Area of $\Delta ACB = 1/2 \times BC \times AC$

$= 1/2 \times 8$ cm $\times 15$ cm

$= 60$ cm^2

In ΔADC,

Area of ΔADC = 1/2 × AD × CD

= 1/2 × 9 cm × 12 cm

= 54 cm^2

Now,

Area of quadrilateral ABCD = Area of ΔACB + Area of ΔADC

= 60 cm^2 + 54 cm^2

= 114 cm^2

And,

Perimeter of quadrilateral ABCD = AB + BC + CD + DA

= 17 cm + 8 cm + 12 cm + 9 cm

= 46 cm

Question: 27

Find the area of

Solution:

Given:

DB = 20 cm

AB = 42 cm

AD = 34 cm

CD = 29 cm

CB = 21 cm

In ΔABD(scalene),

Area of a scalene triangle = √(s(s-AB)(s-BD)(s-AD))

Where, $s = \frac{AB + BD + AD}{2}$

$s = \frac{42 + 20 + 34}{2} cm$

$\Rightarrow s = \frac{96}{2} cm$

⇒ s = 48 cm

Now,

Area of a scalene triangle = √(48cm × (48-42)cm × (48-20)cm × (48-34)cm)

= √(48 cm × 6 cm × 28 cm × 14 cm)

= √112896 cm^2

= 336 cm^2

Similarly,

In ΔBCD (scalene),

Area of a scalene triangle = √(s(s-BC)(s-CD)(s-BD))

Where, $s = \frac{BC + BD + CD}{2}$

$s = \frac{29 + 20 + 21}{2} cm$

$\Rightarrow s = \frac{70}{2} \text{cm}$

$\Rightarrow$ s = 35 cm

Now,

Area of a scalene triangle = $\sqrt{(35 \text{ cm} \times (35-29)\text{cm} \times (35-20)\text{cm} \times (35-21)\text{cm})}$

= $\sqrt{(35 \text{ cm} \times 6 \text{ cm} \times 15 \text{ cm} \times 14 \text{ cm})}$

= $\sqrt{44100}$ cm^2

= 210 cm^2

Now,

Area of quadrilateral ABCD = Area of ΔABD + Area of ΔBCD

= 336 cm^2 + 210 cm^2

= 546 cm^2

Question: 28

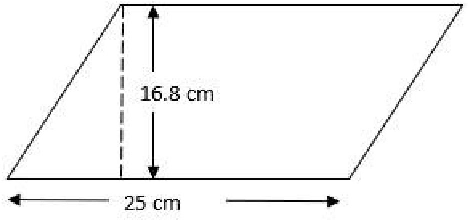
Find the area of

Solution:

Given:

Base = 25 cm

Height = 16.8 cm



Now,

Area of parallelogram = Base × Height

= 25 cm × 16.8 cm

= 420 cm^2

Question: 29

The adjacent side

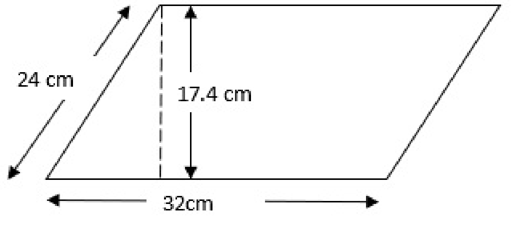
Solution:

Given:

Longer side = 32 cm

Shorter side = 24 cm

Distance between Longer sides = 17.4 cm



Now,

Area of parallelogram = Longer side × Distance between Longer sides

= 32 cm × 17.4 cm

= 556.8 cm^2

Also,

Area of parallelogram = Shorter side × Distance between Shorter sides

⇒ 556.8 cm^2 = 24 cm × x cm

$$\Rightarrow x = \frac{556.8}{24}$$

⇒ x = 23.2 cm

Hence,

Distance between Shorter sides = 23.2 cm

Question: 30

The area of a par

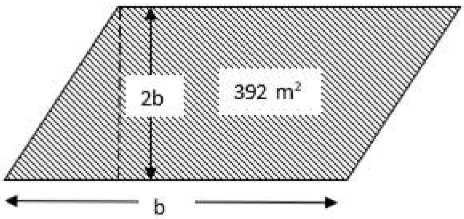
Solution:

Given:

Area = 392 m^2

Base = b (let)

Height = 2b



Now,

Area of parallelogram = Base × Height

⇒ 392 = b × 2b

⇒ 392 = $2b^2$

⇒ b^2 = 196

⇒ b = 14 cm

Hence,

Base = 14 cm

Altitude = 2 × 14 = 28 cm

Question: 31

The adjacent side

Solution:

Given:

AB = 34 cm

BC = 20 cm

AC = 42 cm

In ΔABC (scalene),

Area of ΔABC = √(s(s-AB)(s-BC)(s-AC))

Where, $s = \frac{AB + BC + AC}{2}$

$s = \frac{42 + 20 + 34}{2} cm$

$\Rightarrow s = \frac{96}{2} cm$

⇒ s = 48 cm

Now,

Area of a scalene triangle = √(48cm × (48-42)cm × (48-20)cm × (48-34)cm)

= √(48 cm × 6 cm × 28 cm × 14 cm)

= √112896 cm^2

= 336 cm^2

Now,

Area of parallelogram ABCD = 2 × Area of ΔABC

= 2 × 336 cm^2

= 672 cm^2

Question: 32

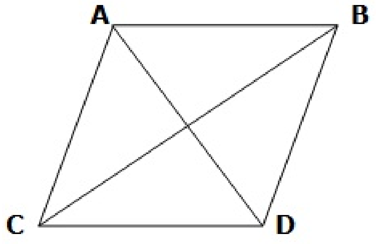
Find the area of

Solution:

Given:

Length of diagonal 1 (d_1) = 30 cm

Length of diagonal 2 (d_2) = 16 cm



Area of rhombus = 1/2 × d_1 × d_2

= 1/2 × 30 cm × 16 cm

= 240 cm^2

Now,

Side of rhombus = 1/2 × √(d_1^2 + d_2^2)

= 1/2 × √(30^2 + 16^2)

= 1/2 × √(900 + 256)

= 1/2 × √1156

= 1/2 × 34

= 17 cm

Therefore,

Perimeter of rhombus = 4 × Side of rhombus

= 4 × 17 cm

= 68 cm

Question: 33

The perimeter of

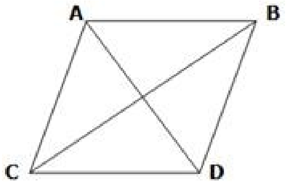
Solution:

Given:

Perimeter of rhombus = 60 cm

Length of diagonal 1 (d_1) = 18 cm

Let, Length of diagonal 2 be d_2



(i) Perimeter of rhombus = 4 × side

⇒ 60 = 4 × side

$\Rightarrow \text{ side } = \frac{60}{4} = 15 \text{ cm}$

Now,

Side of rhombus = $1/2 \times \sqrt{(d_1^2 + d_2^2)}$

⇒ $15 = 1/2 \times \sqrt{(18^2 + d_2^2)}$

⇒ $15 = 1/2 \times \sqrt{(324 + d_2^2)}$

⇒ $15 \times 2 = \sqrt{(324 + d_2^2)}$

⇒ $30 = \sqrt{(324 + d_2^2)}$

Squaring both sides,

⇒ $900 = 324 + d_2^2$

⇒ $900-324 = d_2^2$

⇒ $d_2^2 = 576$

⇒ $d_2 = 24$

Therefore,

Length of other diagonal = 24 cm

(ii) Area of rhombus = $1/2 \times d_1 \times d_2$

= 1/2 × 18 cm × 24 cm

= 216 cm^2

Question: 34

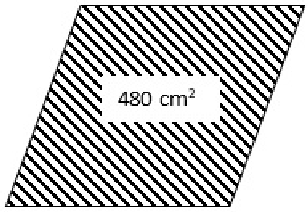
The area of a rho

Solution:

Given:

Area of rhombus = 480 cm^2

Length of diagonal 1 (d_1) = 48 cm



Let, Length of diagonal 2 be d_2

(i) Area of rhombus = $1/2 \times d_1 \times d_2$

⇒ $480 = 1/2 \times 48 \times d_2$

$$\Rightarrow d_2 = \frac{480 \times 2}{48}$$

⇒ d_2 = 20 cm

Therefore,

Length of other diagonal = 20 cm

(ii) Side of rhombus = $1/2 \times \sqrt{(48^2 + 20^2)}$

= $1/2 \times \sqrt{(2304 + 400)}$

= $1/2 \times \sqrt{2704}$

= $1/2 \times 52$

= 26 cm

Therefore,

Side of rhombus = 26 cm

(iii) Perimeter of rhombus = 4 × side

= 4 × 26 cm

= 104 cm

Therefore,

Perimeter of rhombus = 104 cm

Question: 35

The parallel side

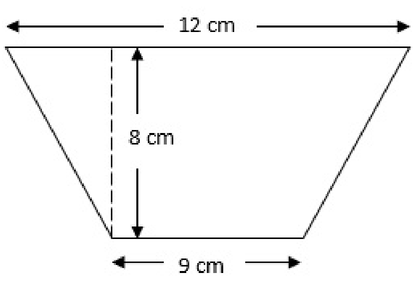
Solution:

Given:

Side 1 = 12 cm

Side 2 = 9 cm

Distance between sides = 8 cm



Now,

Area of trapezium = 1/2 × Sum of parallel sides × Distance between them

= 1/2 × (12 + 9) × 8

= 1/2 × 21 × 8

= 84 cm^2

Question: 36

The shape of the

Solution:

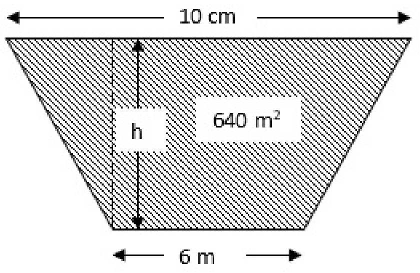
Given:

Top width = 10 m

Bottom width = 6 m

Area of cross section = 640 m^2

Let the depth be h



Now,

Area of trapezium = 1/2 × Sum of parallel sides × Distance between them

⇒ 640 = 1/2 × (10 + 6) × h

⇒ 640 × 2 = 16 h

$\Rightarrow h = \dfrac{640 \times 2}{16}$

⇒ h = 80 m

Question: 37

Find the area of

Solution:

Given:

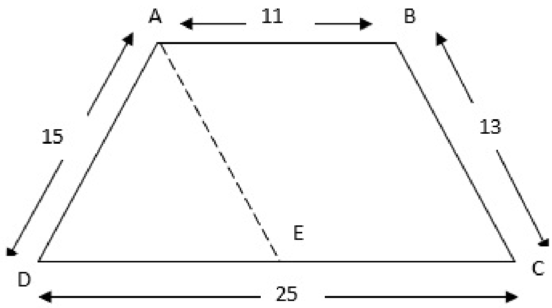
AB (say) = 11 cm

DC (say) = 25 cm

AD (say) = 15 cm

BC (say) = 13 cm

Draw AE ∥ BC



Now the trapezium is divided into a triangle ADE and a parallelogram AECB.

Since, AECB is a parallelogram

Therefore, AE = BC = 13 cm

And, AB = EC

DE = DC – EC(= AB) = 25 – 11 = 14 cm

Now,

We know that,

Area of a scalene triangle (ΔAED) = √(s(s-AE)(s-ED)(s-AD))

Where, $s = \frac{AE + ED + AD}{2}$

$$s = \frac{13 + 14 + 15}{2} cm$$

$\Rightarrow s = \frac{42}{2} cm$

⇒ s = 21 cm

Now,

Area of a scalene triangle = √(21cm × (21-13)cm × (21-14)cm × (21-15)cm)

= √(21cm × 8cm × 7cm × 6cm)

= √7056 cm^2

= 84 cm^2

Also,

Area of a triangle = 1/2 × base × height

⇒ 84 = 1/2 × 14 × height

$$\Rightarrow \text{height} = \frac{84 \times 2}{14}$$

⇒ height = 12 cm

Now,

Area of a parallelogram = base × height

= 11 cm × 12 cm

= 132 cm^2

Now,

Area of Trapezium ABCD = Area of ΔADE + Area of a parallelogram ABCE

= 84 cm^2 + 132 cm^2

= 216 cm^2

Exercise : MULTIPLE CHOICE QUESTIONS (MCQ)

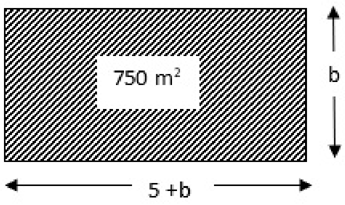
Question: 1

The length of a r

Solution:

Given: Length of hall (l) = 5 + breadth(b) = 5 + b

Area of hall = 750 m^2



We know that,

Area of rectangle = Length × Breadth

$\Rightarrow 750 = (5 + b) \times b$

$\Rightarrow 750 = b^2 + 5b$

$\Rightarrow b^2 + 5b - 750 = 0$

$\Rightarrow b^2 + 30b - 25b - 750 = 0$

$\Rightarrow b(b + 30) - 25(b + 30) = 0$

$\Rightarrow (b + 30)(b - 25) = 0$

This gives us two equations,

i. $b + 30 = 0$

$\Rightarrow b = -30$

ii. $b - 25 = 0$

$\Rightarrow b = 25$

Since, the length of the rectangle cannot be negative

Therefore, b = 25 m

$\Rightarrow l = (b + 5)$ m

$\Rightarrow l = (25 + 5)$ m

$\Rightarrow l = 30$ m

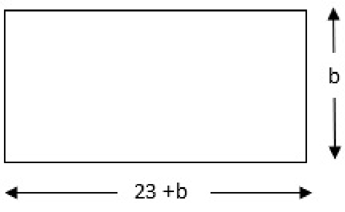
Question: 2

The length of a r

Solution:

Given: Length of field (l) = 23 + breadth(b) = 23 + b

Perimeter of field = 206 m



We know that,

Perimeter = 2(l + b)

⇒ 206 = 2(23 + b + b)

⇒ 206 = 2(23 + 2b)

⇒ 206 = 46 + 4b

⇒ 4b = 206 – 46

⇒ 4b = 160

⇒ b = 40 m

Therefore,

Length of field = 23 + b

= 23 + 40

= 63 m

Now,

Area of rectangle = Length × Breadth

= 63 × 40

= 2520 m^2

Question: 3

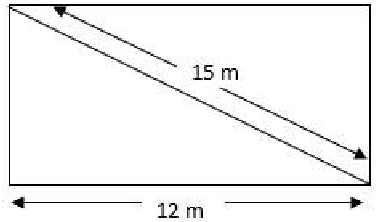
The length of a r

Solution:

Given:

Length = 12 m

Length of diagonal = 15 m



We know that,

$Base^2 + Perpendicular^2 = Hypotenuse^2$

⇒ $12^2 + Perpendicular^2 = 15^2$

⇒ $Perpendicular^2 = 15^2 – 12^2$

⇒ $Perpendicular^2 = 225 – 144$

⇒ $Perpendicular^2 = 81$

⇒ $Perpendicular^2 = 9$

That is,

Breadth = 9 m

Now,

Area = Length × Breadth

= 12 m × 9 m

= 108 m^2

Question: 4

The cost of carpe

Solution:

Given:

Length of room = 15 m

Width of carpet = 75 cm = 0.75 m

Rate = Rs 70

Total cost = Rs 8400

Now,

$$\text{Length of carpet} = \frac{\text{Total cost}}{\text{Rate}}$$

$$= \frac{\text{Rs } 8400}{\text{Rs } 70 \text{ per m}}$$

= 120 m

Therefore,

Area of carpet = Length of carpet × Width of carpet

= 120 m × 0.75 m = 90 m^2

We know that,

Area of room = Area of carpet = 90 m^2

Now,

Area of room = Length of room × Width of room

⇒ 90 m^2 = 15 m × Width of room

$$\Rightarrow \text{Width of room} = \frac{90 \text{ m}^2}{15 \text{ m}}$$

⇒ Width of room = 6 m

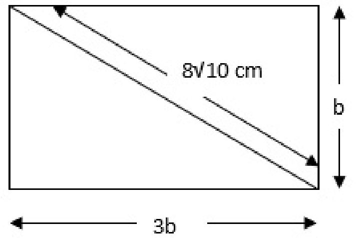
Question: 5

The length of a r

Solution:

Given: Length of rectangle (l) = 3 × breadth(b) = 3b

Diagonal of rectangle = 8√10 m



We know that,

$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$

⇒ $b^2 + (3b)^2 = (8\sqrt{10})^2$

⇒ $b^2 + 9b^2 = 640$

$\Rightarrow 10b^2 = 640$

$\Rightarrow b^2 = \frac{640}{10}$

$\Rightarrow b^2 = 64$

$\Rightarrow b = 8$ cm

Therefore,

$l = 3b = 24$ cm

Hence,

Perimeter of a rectangle = 2(length + breadth)

= 2(24 + 8)

= 64 cm

Question: 6

On increasing the

Solution:

Let the length be l

And, breadth be b

Now,

Area = $l \times b = lb$

Increase in length = 20% of length + length

$= \frac{20}{100}l + l$

$= \frac{1}{5}l + l$

$= \frac{6}{5}l$

Decrease in breadth = breadth - 20% of breadth

$= b - \frac{20}{100}b$

$= b - \frac{1}{5}b$

$= \frac{4}{5}b$

Area $= \frac{6}{5}l \times \frac{4}{5}b = \frac{24}{25}lb$

Since,

$\frac{24}{25}lb < lb$

Therefore,

The area is decreased

Now decrease in area $= lb - \frac{24}{25}lb$

$= \frac{1}{25}lb$

$$\text{Decrease\%} = \frac{1}{25} \times 100$$

= 4%

Hence change in area = 4% decrease

Question: 7

A rectangular gro

Solution:

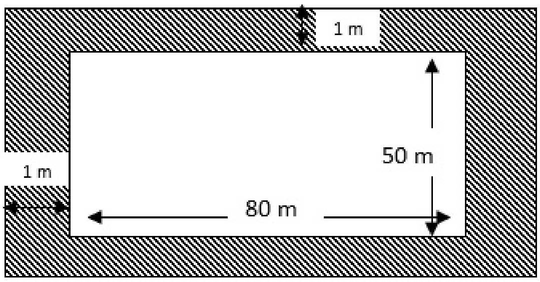
Given:

Length = 80 m

Breadth = 50 m

Width of the path = 1m

Area of path = 1911 m^2



Length of field with path = 80 + (1 + 1)

= 82 m

Breadth of field with path = 50 + (1 + 1)

= 52 m

Area of field with path = Length of field with path × Breadth of field with path

= 82 m × 52 m

= 4264 m^2

Area of field without path = Length without path × Breadth without path

= 80 m × 50 m

= 4000 m^2

Now,

Area of path = Area of field - Area of field without path

= 4264 m^2 – 4000 m^2

= 264 m^2

Question: 8

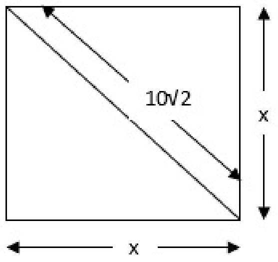
The length of the

Solution:

Given:

Length of diagonal = 10√2 cm

Let the side of square = x cm



We know that,

$Hypotenuse^2 = Base^2 + Perpendicular^2$

$\Rightarrow (10\sqrt{2})^2 = x^2 + x^2$

$\Rightarrow 200 = 2x^2$

$\Rightarrow x^2 = \frac{200}{2}$

$\Rightarrow x^2 = 100$

$\Rightarrow x = 10$ cm

Now,

Area of a square = $side^2$

$= (10 \text{ cm})^2$

$= 100 \text{ cm}^2$

Question: 9

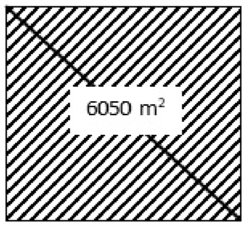
The area of a squ

Solution:

Given:

Area of square field = 6050 m^2

Let the side of square = x m



We know that,

Area of a square = $side^2$

$\Rightarrow 6050 = x^2$

$\Rightarrow x = 55\sqrt{2}$

Now,

$Hypotenuse^2 = Base^2 + Perpendicular^2$

$= (55\sqrt{2})^2 + (55\sqrt{2})^2$

$= 6050 + 6050$

$= 12100 \text{ m}^2$

Therefore,

Diagonal = $\sqrt{12100}$

= 110 m

Question: 10

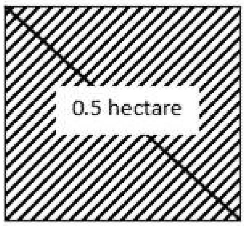
The area of a squ

Solution:

Given:

Area of square field = 0.5 hectare = 5000 m^2

Let the side of square = x m



We know that,

Area of a square = $side^2$

⇒ 5000 = x^2

⇒ x = 50√2

Now,

$Hypotenuse^2 = Base^2 + Perpendicular^2$

= $(50\sqrt{2})^2 + (50\sqrt{2})^2$

= 5000 + 5000

= 10000 m^2

Therefore,

Diagonal = √10000

= 100 m

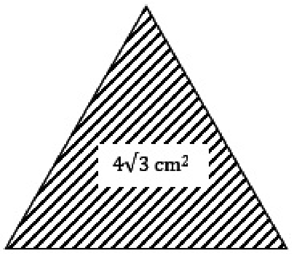
Question: 11

The area of an eq

Solution:

Given:

Area of equilateral triangle = 4√3 cm^2



We know that,

Area of equilateral triangle = $\frac{\sqrt{3}}{4} \times side^2$

$$\Rightarrow 4\sqrt{3} = \frac{\sqrt{3}}{4} \times side^2$$

$\Rightarrow \text{side}^2 = 4\sqrt{3} \times \frac{4}{\sqrt{3}}$

$\Rightarrow$ side^2 = 4 × 4

$\Rightarrow$ side^2 = 16

$\Rightarrow$ side = 4 cm

Now,

Perimeter of triangle = 3 × side

= 3 × 4 cm

= 12 cm

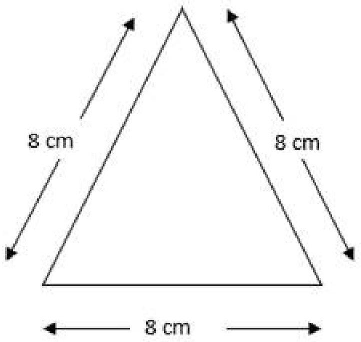
Question: 12

Each side of an e

Solution:

Given:

Side of equilateral triangle = 8 cm



We know that,

Area of equilateral triangle = $\frac{\sqrt{3}}{4} \times \text{side}^2$

$= \frac{\sqrt{3}}{4} \times 8^2$

$= \frac{\sqrt{3}}{4} \times 64$

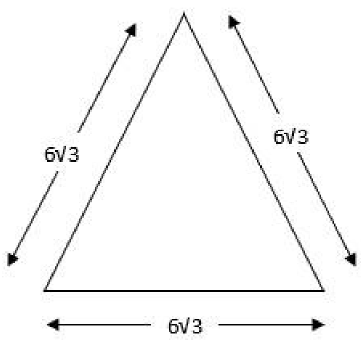
= 16√3 cm^2

Question: 13

Each side of an e

Solution:

Given: Side of an equilateral triangle = 6√3 cm



Height of equilateral triangle = $\frac{\sqrt{3}}{2} \times \text{side}$

$= \frac{\sqrt{3}}{2} \times 6\sqrt{3}$

= 9 cm^2

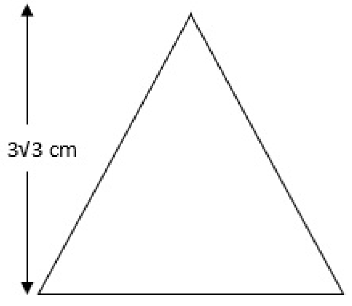
Question: 14

The height of an

Solution:

Given:

Height of equilateral triangle = $3\sqrt{3}$ cm



We know that,

Height of equilateral triangle = $\frac{\sqrt{3}}{2} \times \text{side}$

$\Rightarrow 3\sqrt{3} = \frac{\sqrt{3}}{2} \times \text{side}$

$\Rightarrow \text{side} = 3\sqrt{3} \times \frac{2}{\sqrt{3}}$

⇒ Side = 6 cm

Now,

Area of equilateral triangle = $\frac{\sqrt{3}}{4} \times \text{side}^2$

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

$= \frac{\sqrt{3}}{4} \times 36$

= $9\sqrt{3}$ cm^2

Question: 15

The base and heig

Solution:

Given:

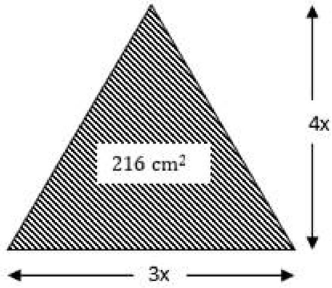
Base: Height = 3: 4

Area = 216 cm^2

Let,

Base = 3x

Height = 4x



We know that,

Area of a triangle = 1/2 × base × height

⇒ 216 = 1/2 × 3x × 4x

⇒ 216 × 2 = $12x^2$

⇒ 12 x^2 = 432

$$\Rightarrow x^2 = \frac{432}{12}$$

⇒ x^2 = 36

⇒ x = 6 cm

Therefore,

Height = 4x

= 24 cm

Question: 16

The length of the

Solution:

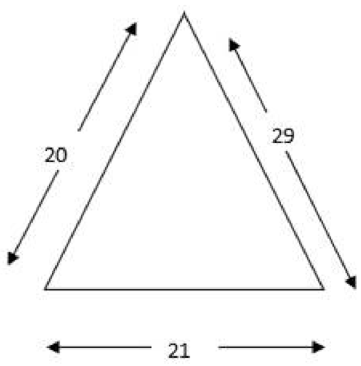
Given:

Rate = Rs 9 per m^2

Side a = 20 m

Side b = 21 m

Side c = 29 m



Area of a scalene triangle = √(s(s-a)(s-b)(s-c))

Where, $s = \frac{a+b+c}{2}$

$$s = \frac{20 + 21 + 29}{2} m$$

$$\Rightarrow s = \frac{70}{2} m$$

⇒ s = 35 m

Now,

Area of triangular field = √(35 m × (35-20)m × (35-21)m × (35-29)m)

= √(35 m × 15 m × 14 m × 6 m)

= √44100 m^2

= 210 m^2

Total Cost = 210 m^2 × Rs 9 per m^2

= Rs 1890

Question: 17

The side of a squ

Solution:

Let the side be x

Now,

Area of equilateral triangle = $\frac{\sqrt{3}}{4} \times \text{side}^2$

$= \frac{\sqrt{3}}{4} \times x^2$

And,

Area of square = side^2

= x^2

$\text{Ratio} = \frac{\text{Area of square}}{\text{Area of triangle}}$

$= \frac{x^2}{\frac{\sqrt{3}}{4} \times x^2}$

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

Therefore, the ratio is 4:√3

Question: 18

The sides of an e

Solution:

Let the side = radius = x

Now,

Area of circle = πr^2

$\Rightarrow 154 = \frac{22}{7} \times x^2$

$\Rightarrow x^2 = \frac{154 \times 7}{22}$

⇒ x^2 = 49

⇒ x = 7 cm

Area of equilateral triangle = $\frac{\sqrt{3}}{4} \times \text{side}^2$

$= \frac{\sqrt{3}}{4} \times 7^2$

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

Question: 19

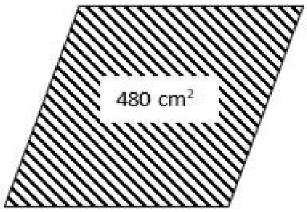
The area of a rho

Solution:

Given:

Area of rhombus = 480 cm^2

Length of diagonal 1 (d_1) = 20 cm



Let, Length of diagonal 2 be d_2

Area of rhombus = 1/2 × d_1 × d_2

⇒ 480 = 1/2 × 20 × d_2

$\Rightarrow\ d_2 = \frac{480 \times 2}{20}$

⇒ d_2 = 48 cm

Now,

Side of rhombus = 1/2 × √(48^2 + 20^2)

= 1/2 × √(2304 + 400)

= 1/2 × √2704

= 1/2 × 52

= 26 cm

Question: 20

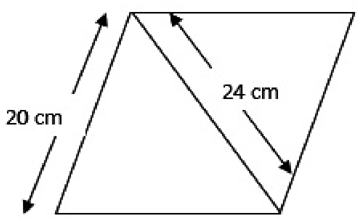
One side of a rho

Solution:

Given:

Side = 24 cm

Length of diagonal 1 (d_1) = 20 cm



Let, Length of diagonal 2 be d_2

We know that,

Side of rhombus = $1/2 \times \sqrt{(d_1^2 + d_2^2)}$

$\Rightarrow 20 = 1/2 \times \sqrt{(24^2 + d_2^2)}$

$\Rightarrow 20 \times 2 = \sqrt{(576 + d_2^2)}$

$\Rightarrow 40 = \sqrt{(576 + d_2^2)}$

Squaring both sides,

$\Rightarrow 1600 = 576 + d_2^2$

$\Rightarrow d_2^2 = 1024$

$\Rightarrow d_2 = 32$ cm

Now,

Area of rhombus = $1/2 \times d_1 \times d_2$

$= 1/2 \times 24 \times 32$

$= 384$ cm^2

Exercise : FORMATIVE ASSESSMENT (UNIT TEST)

Question: 1

In the given figu

Solution:

Given:

AC = 17 cm

BC = 15 cm

BD = 12 cm

CD = 9 cm.

$\angle ABC = 90°$

$\angle BDC = 90°$

In ΔABC,

Using Pythagoras theorem,

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

$\Rightarrow AB^2 = AC^2 - BC^2$

$\Rightarrow AB = \sqrt{(AC^2 - BC^2)}$

$\Rightarrow AB = \sqrt{(17^2 - 15^2)}$

$\Rightarrow AB = \sqrt{(289-225)}$

$\Rightarrow AB = \sqrt{64}$

$\Rightarrow AB = 8$ cm

Therefore,

Area of $\Delta ABC = 1/2 \times AB \times BC$

$= 1/2 \times 8 \times 15$

$= 60$ cm^2

And,

In ΔBDC,

Area of ΔBDC = 1/2 × BD × DC

= 1/2 × × 12 × 9

= 54 cm^2

Therefore,

Area of quadrilateral ABCD = Area of ΔABC + Area of ΔBDC

= 60 cm^2 + 54 cm^2

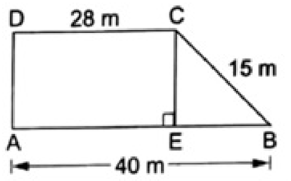
= 114 cm^2

Question: 2

In the given figu

Solution:

Given: ABCD is a trapezium in which AB = 40 m, BC = 15 m, CD = 28 m, AD = 9 m and CE ⊥ AB. **To find:** Area of trap. ABCD**Solution:**



AB = 40 m, BC = 15 m, AD = 9 m and CD = 28 m.

In trapezium ABCD,

Area of trapezium = 1/2 × sum of parallel sides × distance between them

= 1/2 × (28 + 40) × 9

= 1/2 × 68 × 9

= 306 m^2

Question: 3

The sides of a tr

Solution:

Given: Ratio of Sides = 12: 14: 25

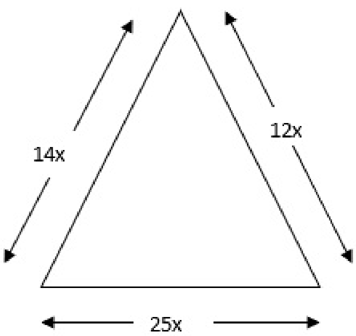
Perimeter = 25.5 cm

Let the sides be,

a = 12x cm

b = 14x cm

c = 25x cm



We know that,

Perimeter of a triangle = a + b + c

$\Rightarrow 25.5 \text{ cm} = 12x \text{ cm} + 14x \text{ cm} + 25x \text{ cm}$

$\Rightarrow 25.5 \text{ cm} = 51x \text{ cm}$

$\Rightarrow x = \frac{25.5 \text{ cm}}{51 \text{ cm}}$

$\Rightarrow x = 0.5$

Therefore,

$a = 12x \text{ cm} = 12 \times 0.5 \text{ cm} = 6 \text{ cm}$

$b = 14x \text{ cm} = 14 \times 0.5 \text{ cm} = 7 \text{ cm}$

$c = 25x \text{ cm} = 25 \times 0.5 \text{ cm} = 12.5 \text{ cm}$

Clearly largest side is $c = 12.5$ cm

Question: 4

The parallel side

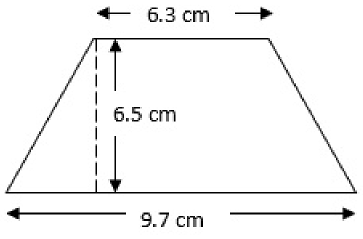
Solution:

Given:

Side 1 = 9.7 cm

Side 2 = 6.3 cm

Distance between sides = 6.5 cm



Area of trapezium = 1/2 × sum of parallel sides × distance between them

= 1/2 × (9.7 + 6.3) × 6.5

= 1/2 × 16 × 6.5

= 52 cm^2

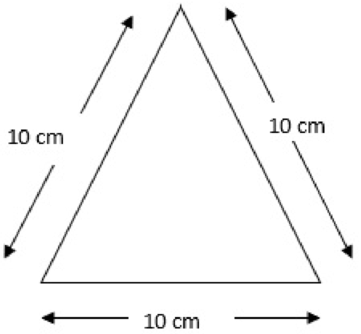
Question: 5

Find the area of

Solution:

Given:

Side of an equilateral triangle = 10 cm



Area of equilateral triangle = $\frac{\sqrt{3}}{4} \times \text{side}^2$

$= \frac{\sqrt{3}}{4} \times 10^2$

$= \frac{\sqrt{3}}{4} \times 100$

$= \frac{100\sqrt{3}}{4}$

$= 25\sqrt{3}$

$= 25 \times 1.732$

$= 43.3\ cm^2$

Question: 6

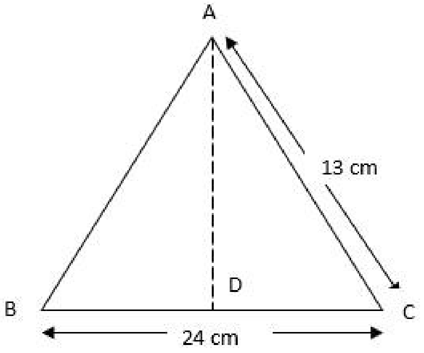
Find the area of

Solution:

Given:

Side AB = Side AC = 13 cm

Base = 24 cm



In ΔADC (right-angled),

DC = 12 cm

By Pythagoras theorem,

$AD^2 + DC^2 = AC^2$

$\Rightarrow AD^2 = AC^2 - DC^2$

$\Rightarrow AD^2 = 13^2 - 12^2$

$\Rightarrow AD^2 = 169 – 144 = 25$

$\Rightarrow AD = 5$ cm

Now,

Area of triangle = 1/2 × base × height

= 1/2 × BC × AD

= 1/2 × 24 × 5

$= 60\ cm^2$

Question: 7

The longer side o

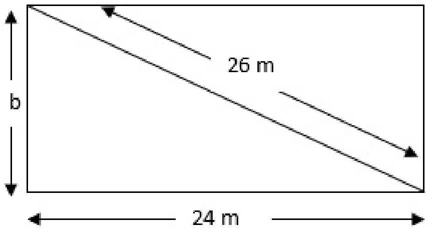
Solution:

Given:

Length (l) = 24 m

Diagonal = 26 m

Let breadth be b



We know that,

$Base^2 + Perpendicular^2 = Hypotenuse^2$

$\Rightarrow 24^2 + b^2 = 26^2$

$\Rightarrow b^2 = 26^2 - 24^2$

$\Rightarrow b^2 = 676 - 576 = 100$

$\Rightarrow b = 10$ m

Area of rectangle = Length × Breadth

= 24 m × 10 m

= 240 m^2

Question: 8

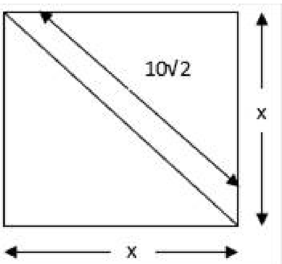
The length of the

Solution:

Given:

Length of diagonal = 24 cm

Let the side of square = x cm



We know that,

$Hypotenuse^2 = Base^2 + Perpendicular^2$

$\Rightarrow 24^2 = x^2 + x^2$

$\Rightarrow 576 = 2x^2$

$$\Rightarrow x^2 = \frac{576}{2}$$

$\Rightarrow x^2 = 288$

$\Rightarrow x = 12\sqrt{2}$ cm

Now,

Area of a square = $side^2$

$= (12\sqrt{2} \text{ cm})^2$

$= 288\ cm^2$

Question: 9

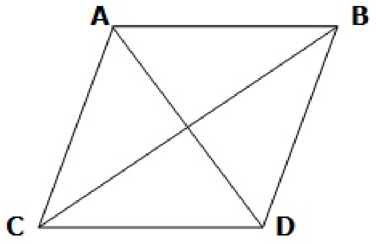
Find the area of

Solution:

Given:

Length of diagonal 1 (d_1) = 48 cm

Length of diagonal 2 (d_2) = 20 cm



Area of rhombus = $1/2 \times d_1 \times d_2$

$= 1/2 \times 48\ cm \times 20\ cm$

$= 480\ cm^2$

Question: 10

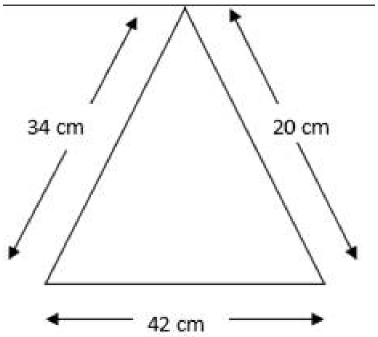
Find the area of

Solution:

Given: Side 1 = a (let) = 42 cm

Side 2 = b (let) = 34 cm

Side 3 = c (let) = 20 cm



We know that,

Area of a scalene triangle = $\sqrt{s(s-a)(s-b)(s-c)}$

Where, $s = \frac{a+b+c}{2}$

$$s = \frac{42 + 34 + 20}{2} cm$$

$$\Rightarrow s = \frac{96}{2} cm$$

$\Rightarrow s = 48$ cm

Now,

Area of a scalene triangle = $\sqrt{48cm \times (48-42)cm \times (48-34)cm \times (48-20)cm}$

$= \sqrt{48cm \times 6cm \times 14cm \times 28cm}$

$= \sqrt{112896}\ cm^2$

$= 336\ cm^2$

Question: 11

A lawn is in the

Solution:

Given: Cost of fencing lawn = Rs 20 per metre.

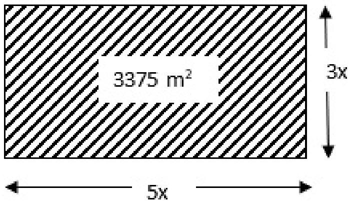
Area of lawn = $3375\ m^2$

Length : Breadth = 5:3

Let,

Length = 5x

Breadth = 3x



We know that,

Area of lawn = Length × Breadth

$\Rightarrow 3375\ m^2 = 5x \times 3x$

$\Rightarrow 3375\ m^2 = 15x^2$

$\Rightarrow x^2 = \frac{3375}{15} m^2$

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

$\Rightarrow x = 15\ m$

Therefore,

Length = 5x = 5 × 15 = 75 m

Breadth = 3x = 3 × 15 = 45 m

Now,

Perimeter of lawn = 2(length + breadth)

= 2(75 m + 45 m)

= 2 × 120 m

= 240 m

Hence,

Cost of Fencing = 240 m × Rs 20 per meter

= Rs 4800

Question: 12

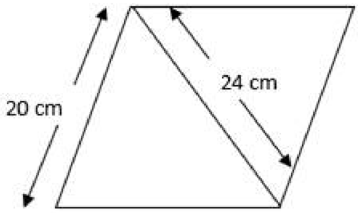
Find the area of

Solution:

Given:

Length of diagonal 1 (d_1) = 24 cm

Side = 20 cm



Let, Length of diagonal 2 be d_2

We know that,

Side of rhombus = $1/2 \times \sqrt{(d_1^2 + d_2^2)}$

$\Rightarrow 20 = 1/2 \times \sqrt{(24^2 + d_2^2)}$

$\Rightarrow 20 \times 2 = \sqrt{(576 + d_2^2)}$

$\Rightarrow 40 = \sqrt{(576 + d_2^2)}$

Squaring both sides,

$\Rightarrow 1600 = 576 + d_2^2$

$\Rightarrow d_2^2 = 1600\text{-}576$

$\Rightarrow d_2^2 = 1024$

$\Rightarrow d_2 = 32$ cm

Now,

Area of rhombus = $1/2 \times d_1 \times d_2$

$= 1/2 \times 24 \times 32$

$= 384$ cm^2

Question: 13

Find the area of

Solution:

Given:

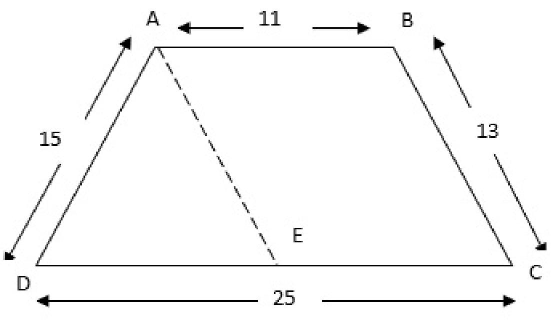
AB (say) = 11 cm

DC (say) = 25 cm

AD (say) = 15 cm

BC (say) = 13 cm

Draw AE ∥ BC



Now the trapezium is divided into a triangle ADE and a parallelogram AECB.

Since, AECB is a parallelogram

Therefore, AE = BC = 13 cm

And, AB = EC

DE = DC – EC(= AB) = 25 – 11 = 14 cm

Now,

We know that,

Area of a scalene triangle (ΔAED) = $\sqrt{(s(s-AE)(s-ED)(s-AD))}$

Where, $s = \frac{AE + ED + AD}{2}$

$$s = \frac{13 + 14 + 15}{2}\,cm$$

$$\Rightarrow s = \frac{42}{2}\,cm$$

$\Rightarrow$ s = 21 cm

Now,

Area of a scalene triangle = $\sqrt{(21cm \times (21-13)cm \times (21-14)cm \times (21-15)cm)}$

= $\sqrt{(21cm \times 8cm \times 7cm \times 6cm)}$

= $\sqrt{7056}$ cm^2

= 84 cm^2

Also,

Area of a triangle = 1/2 × base × height

$\Rightarrow$ 84 = 1/2 × 14 × height

$$\Rightarrow height = \frac{84 \times 2}{14}$$

$\Rightarrow$ height = 12 cm

Now,

Area of a parallelogram = base × height

= 11 cm × 12 cm

= 132 cm^2

Now,

Area of Trapezium ABCD = Area of ΔADE + Area of a parallelogram ABCE

= 84 cm^2 + 132 cm^2

= 216 cm^2

Question: 14

The adjacent side

Solution:

Given:

AB = 34 cm

BC = 20 cm

AC = 42 cm

The diagonal of a parallelogram divides it into two equal triangles.

Therefore,

Area of ABCD = 2 × Area of ΔABC

Now,

We know that,

Area of a scalene triangle = √(s(s-AC)(s-AB)(s-BC))

Where, $s = \frac{AC + AB + BC}{2}$

$$s = \frac{42 + 34 + 20}{2} \text{cm}$$

$$\Rightarrow s = \frac{96}{2} \text{cm}$$

⇒ s = 48cm

Now,

Area of a scalene triangle = √(48cm × (48-42)cm × (48-34)cm × (48-20)cm)

= √(48cm × 6cm × 14cm × 28cm)

= √112896 cm^2

= 336 cm^2

Therefore,

Area of ABCD = 2 × 336 cm^2

= 672 cm^2

Question: 15

The cost of fenci

Solution:

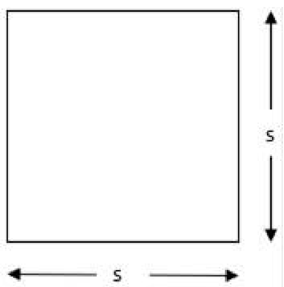
Given:

Rate = RS. 14 per metre

Total Cost = RS. 2800

Rate of mowing = RS. 54 per 100 m^2

Let the side of square field be s



Now,

$$\text{Perimeter} = \frac{\text{Total Cost}}{\text{Rate}}$$

$$= \frac{2800}{14}$$

= 200 m

Perimeter = 4 × side

⇒ 200 m = 4 × s

$\Rightarrow s = \frac{200}{4}$

⇒ s = 50 m

Now,

Area = $side^2$

= $(50 \text{ m})^2$

= 2500 m^2

Therefore,

Cost of mowing 100 m^2 = Rs 54

Cost of mowing 1 m^2 = Rs $\frac{54}{100}$

Cost of mowing 2500 m^2 = Rs $\frac{54}{100} \times 2500$

= Rs 1350

Question: 16

Find the area of

Solution:

Given:

DB = 20 cm

AB = 42 cm

AD = 34 cm

CD = 29 cm

CB = 21 cm

In ΔABD(scalene),

Area of a scalene triangle = √(s(s-AB)(s-BD)(s-AD))

Where, $s = \frac{AB + BD + AD}{2}$

$s = \frac{42 + 20 + 34}{2}$ cm

$\Rightarrow s = \frac{96}{2}$ cm

⇒ s = 48 cm

Now,

Area of a scalene triangle = √(48cm × (48-42)cm × (48-20)cm × (48-34)cm)

= √(48 cm × 6 cm × 28 cm × 14 cm)

= √112896 cm^2

= 336 cm^2

Similarly,

In ΔBCD (scalene),

Area of a scalene triangle = √(s(s-BC)(s-CD)(s-BD))

Where, $s = \frac{BC + BD + CD}{2}$

$s = \frac{29 + 20 + 21}{2} cm$

$\Rightarrow s = \frac{70}{2} cm$

⇒ s = 35 cm

Now,

Area of a scalene triangle = √(35 cm × (35-29)cm × (35-20)cm × (35-21)cm)

= √(35 cm × 6 cm × 15 cm × 14 cm)

= √44100 cm^2

= 210 cm^2

Now,

Area of quadrilateral ABCD = Area of ΔABD + Area of ΔBCD

= 336 cm^2 + 210 cm^2

= 546 cm^2

Question: 17

A parallelogram a

Solution:

Given:

Diagonal 1 (d_1) of rhombus = 120 m

Diagonal 2 (d_2) of rhombus = 44 m

Side of parallelogram = 66 m

Area of rhombus = 1/2 × d_1 × d_2

= 1/2 × 120 m × 44 m

= 2640 m^2

Now,

Area of parallelogram = Base × Height

⇒ 2640 m^2 = 66 m × Height

$\Rightarrow \text{Height} = \frac{2460}{66}$

⇒ Height = 40 m

Question: 18

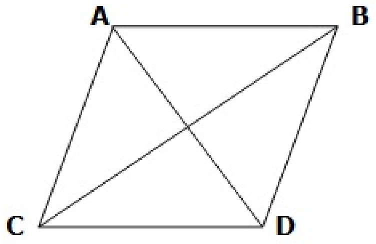
The diagonals of

Solution:

Given:

Length of diagonal 1 (d_1) = 48cm

Length of diagonal 2 (d_2) = 20 cm



Side of rhombus = $1/2 \times \sqrt{(d_1^2 + d_2^2)}$

= $1/2 \times \sqrt{(48^2 + 20^2)}$

= $1/2 \times \sqrt{(2304 + 400)}$

= $1/2 \times \sqrt{2704}$

= $1/2 \times 52$

= 26 cm

Therefore,

Perimeter of rhombus = 4 × Side of rhombus

= 4 × 26 cm

= 104 cm

Question: 19

The adjacent side

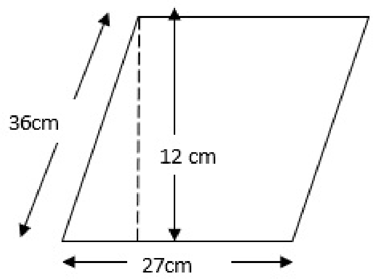
Solution:

Given:

Longer side = 36 cm

Shorter side = 27 cm

Distance between Shorter sides = 12 cm



Let, Distance between Longer sides = x cm

Now,

Area of parallelogram = Shorter Side × Distance between Longer sides

= 27 cm × 12 cm

= 324 cm^2

Also,

Area of parallelogram = Longer side × Distance between Longer sides

⇒ 324 cm^2 = 36 cm × x cm

$$\Rightarrow x = \frac{324}{36}$$

⇒ x = 9 cm

Hence,

Distance between Shorter sides = 9 cm

Question: 20

In a four sided f

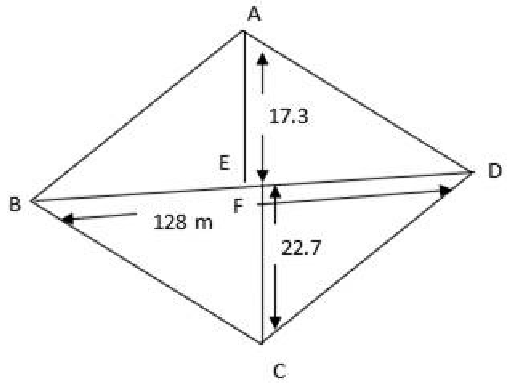
Solution:

Given:

BD = 128 m

CF = 22.7 m

AE = 17.3 m



Now,

In ΔABD,

Area of a triangle = 1/2 × base × height

= 1/2 × BD × AE

= 1/2 × 128 × 17.3

= 1107.2 m^2

Similarly,

In ΔCBD,

Area of a triangle = 1/2 × base × height

= 1/2 × BD × FC

= 1/2 × 128 × 22.7

= 1452.8 m^2

Now,

Area of field = ΔABD + ΔCBD

= 1107.2 m^2 + 1452.8 m^2

= 2560 m^2