

EXERCISE 20A

The length and the breadth of a rectangular plot are 135 m and 65 m. Find, its perimeter and the cost of

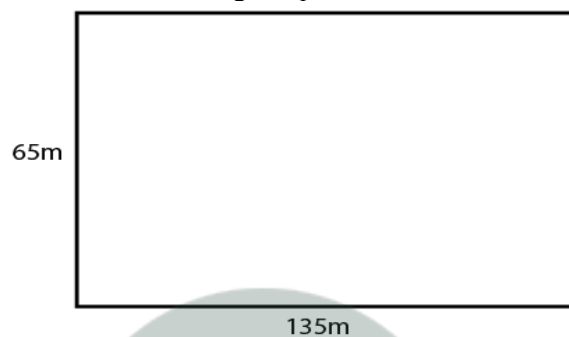
fencing it at the rate of ₹ 60 per m.

Solution:

It is given that

Length of a rectangular plot = 135 m

Breadth of a rectangular plot = 65 m



We know that

Perimeter of a rectangular plot = $2(\text{length} + \text{breadth})$

Substituting the values

$$= 2(135 + 65)$$

$$= 2(200)$$

$$= 400 \text{ m}$$

Here the cost of fencing = ₹ 60 per m

So the cost of fencing 400 m = $60 \times 400 = ₹ 24,000$

1. The length and breadth of a rectangular field are in the ratio 7 : 4. If its perimeter is 440 m, find its length and breadth.

Also, find the cost of fencing it @ ₹150 per m.

Solution:

It is given that

Perimeter of rectangular field = 440 m

Consider $7x$ as the length and $4x$ as the breadth of rectangular field

So we get

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

Substituting the values

$$2(7x + 4x) = 440$$

By further calculation

$$2(11x) = 440$$

$$22x = 440$$

So we get

$$x = 440/22 = 11 \text{ m}$$

Here

$$\text{Length} = 7x = 7 \times 11 = 77\text{m}$$

$$\text{Breadth} = 4x = 4 \times 11 = 44\text{m}$$

We know that

$$\text{Cost of fencing} = ₹150 \text{ per m}$$

$$\text{So the cost of fencing } 440 \text{ m} = 150 \times 440 = ₹ 66,000$$

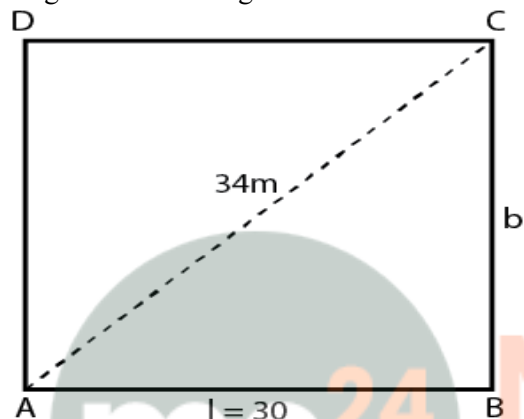
2. The length of a rectangular field is 30 m and its diagonal is 34 m. Find the breadth of the field and its perimeter.

Solution:

It is given that

Length of a rectangular field = 30 m

Diagonal of a rectangular field = 34 m



Consider the breadth of rectangular field = b m

Using the Pythagoras theorem

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

Substituting the values

$$34^2 = 30^2 + b^2$$

By further calculation

$$1156 = 900 + b^2$$

So we get

$$b^2 = 1156 - 900 = 256$$

$$b = \sqrt{256} = 16 \text{ m}$$

We know that

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

Substituting the values

$$= 2(30 + 16)$$

$$= 2 \times 46$$

$$= 92 \text{ m}$$

3. The diagonal of a square is $12\sqrt{2}$ cm. Find its perimeter.

Solution:

It is given that

Diagonal of a square = $12\sqrt{2}$ cm

We know that diagonal = side $\times \sqrt{2}$

Here the side = 12 cm

So the perimeter = $4 \times 12 = 48$ cm

4. Find the perimeter of a rectangle whose length = 22.5 m and breadth = 16 dm.

Solution:

It is given that

Length = 22.5 m

Breadth = 16 dm = 1.6 m

We know that

Perimeter of a rectangle = $2(l + b)$

Substituting the values

$$= 2(22.5 + 1.6)$$

So we get

$$= 2(24.1)$$

$$= 48.2 \text{ m}$$

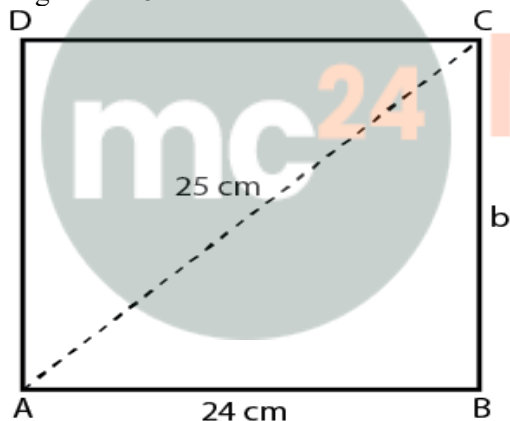
5. Find the perimeter of a rectangle with length = 24 cm and diagonal = 25 cm.

Solution:

It is given that

Length = 24 cm

Diagonal = 25 cm



Consider the breadth of a rectangle = b m

Using Pythagoras theorem in triangle ABC

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

Substituting the values

$$25^2 = 24^2 + b^2$$

$$625 = 576 + b^2$$

By further calculation

$$b^2 = 625 - 576 = 49$$

$$b = \sqrt{49} = 7 \text{ cm}$$

Here the perimeter of rectangle = $2(l + b)$

Substituting the values

$$= 2(24 + 7)$$

So we get

$$= 2(31)$$

= 62 cm

6. The length and breadth of rectangular piece of land are in the ratio of 5 : 3. If the total cost of fencing it at the rate of ₹48 per metre is ₹19,200, find its length and breadth.

Solution:

It is given that

Length and breadth of rectangular piece of land are in the ratio = 5 : 3

Cost of fencing = ₹19,200

Rate = ₹48 per metre

We know that

Perimeter of rectangular piece of land = $19,200/48 = 400$ m

Consider length = $5x$

Breadth = $3x$

So the perimeter = $2(l + b)$

Substituting the values

$$400 = 2(5x + 3x)$$

By further calculation

$$400 = 2(8x)$$

$$400 = 16x$$

So we get

$$x = 400/16 = 25$$

$$\text{Length} = 5x = 5 \times 25 = 125 \text{ m}$$

$$\text{Breadth} = 3x = 3 \times 25 = 75 \text{ m}$$

7. A wire is in the shape of square of side 20 cm. If the wire is bent into a rectangle of length 24 cm, find its breadth.

Solution:

It is given that

Side of square = 20 cm

So the perimeter of square = $4 \times 20 = 80$ cm

Perimeter of rectangle = 80 cm

We know that

Length of rectangle = 24 cm

So the perimeter of rectangle = $2(l + b)$

Substituting the values

$$80 = 2(24 + b)$$

By further calculation

$$40 = 24 + b$$

$$b = 40 - 24 = 16 \text{ m}$$

8. If P = perimeter of a rectangle, l = its length and b = its breadth; find:

(i) P, if $l = 38$ cm and $b = 27$ cm

(ii) b, if $P = 88$ cm and $l = 24$ cm

(iii) l, if $P = 96$ m and $b = 28$ m

Solution:

(i) It is given that

$$l = 38 \text{ cm}$$

$$b = 27 \text{ cm}$$

We know that

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

Substituting the values

$$= 2(38 + 27)$$

$$= 2(65)$$

$$= 130 \text{ cm}$$

(ii) It is given that

$$P = 88 \text{ cm}$$

$$l = 24 \text{ cm}$$

Consider b as the breadth

We know that

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

It can be written as

$$b = P/2 - l$$

Substituting the values

$$b = 88/2 - 24$$

$$b = 44 - 24$$

$$b = 20 \text{ cm}$$

(iii) It is given that

$$P = 96 \text{ m}$$

$$B = 28 \text{ m}$$

Consider l as the length

We know that

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

It can be written as

$$l = P/2 - b$$

Substituting the values

$$l = 96/2 - 28$$

$$l = 48 - 28$$

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

9. The cost of fencing a square field at the rate of ₹75 per meter is ₹67,500. Find the perimeter and the side of the square field.

Solution:

$$\text{Cost of fencing} = ₹67,500$$

$$\text{So the length of fence} = 67,500/75 = 900 \text{ m}$$

$$\text{We know that the perimeter of square field} = \text{length of fence} = 900 \text{ m}$$

Here

$$\text{Perimeter of a square} = 4 \times \text{Length of its side}$$

Substituting the values

$$\text{Length of the side of a square} = \text{Perimeter}/4$$

So we get

$$= 900/4$$

$$= 225 \text{ m}$$

10. The length and the breadth of a rectangle are 36 cm and 28 cm. If its perimeter is equal to the perimeter of a square, find the side of the square.

Solution:

It is given that

Length of a rectangle = 36 cm

Breadth of a rectangle = 28 cm

We know that

Perimeter = $2(l + b)$

Substituting the values

= $2(36 + 28)$

= $2(64)$

= 128 cm

It is given that

Perimeter of a square = Perimeter of a rectangle = 128 cm

So the side of square = perimeter/4

Substituting the value

= $128/4$

= 32 cm

11. The radius of a circle is 21 cm. Find the circumference (Take $\pi = 3 \frac{1}{7}$).

Solution:

It is given that

Radius of a circle = 21 cm

We know that $\pi = \frac{22}{7}$

So the circumference of a circle = $2\pi r$

Substituting the values

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

So we get

= $2 \times 22 \times 3$

= 132 cm

12. The circumference of a circle is 440 cm. Find its radius and diameter. (Take $\pi = \frac{22}{7}$).

Solution:

It is given that

Circumference of a circle = 440 cm

So the radius = $C/2\pi$

Substituting the values

= $(440 \times 7)/(2 \times 22)$

So we get

= $3088/44$

= 70 cm

Diameter of the circle = $2 \times$ radius

So we get

= 2×70

= 140 cm

13. The diameter of a circular field is 56 m. Find its circumference and cost of fencing it at the rate of ₹80 per m. (Take $\pi = 22/7$).

Solution:

It is given that

Diameter of a circular field = 56 m

So the radius = $56/2 = 28$ m

We know that

Circumference of the circle = $2\pi r$

Substituting the values

$$= 2 \times 22/7 \times 28$$

So we get

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

$$= 176 \text{ m}$$

Here the cost of fencing 176 m = $176 \times 80 = ₹ 14,080$

14. The radii of two circles are 20 cm and 13 cm. Find the difference between their circumferences. (Take $\pi = 22/7$).

Solution:

It is given that

Radius of first circle = 20 cm

We know that

Circumference of the circle = $2\pi r$

Substituting the values

$$= 2 \times 22/7 \times 20$$

So we get

$$= 880/7$$

$$= 122.8 \text{ cm}$$

Similarly

Radius of the second circle = 13 cm

We know that

Circumference of the circle = $2\pi r$

Substituting the values

$$= 2 \times 22/7 \times 13$$

So we get

$$= 572/7$$

$$= 81.7$$

So the difference of circumference of two circles = $122.8 - 81.7 = 41.1$ cm