

OBJECTIVE TYPE QUESTIONS

PAGE: 20.23

Mark the correct alternative in each of the following:

1. The sides of a rectangle are in the ratio 5: 4. If its perimeter is 72 cm, then its length is

- (a) 40 cm
- (b) 20 cm
- (c) 30 cm
- (d) 60 cm

Solution:

The option (b) is the correct answer.

Consider the sides of the rectangle as $5x$ and $4x$.We know that, perimeter of rectangle = $2(\text{Length} + \text{Breadth})$

By substituting the values

$$72 = 2(5x + 4x)$$

On further calculation

$$72 = 2 \times 9x$$

So we get

$$72 = 18x$$

By division

$$x = 72/18 = 4$$

Hence, the length of the rectangle = $5x = 5 \times 4 = 20$ cm**2. The cost of fencing a rectangular field 34 m long and 18 m wide at Rs 2.25 per meter is**

- (a) Rs 243
- (b) Rs 234
- (c) Rs 240
- (d) Rs 334

Solution:

The option (b) is the correct answer.

We must find the perimeter of the rectangle for fencing the field.

The dimensions of the rectangle are

$$\text{Length} = 34\text{m}$$

$$\text{Breadth} = 18\text{m}$$

We know that Perimeter = $2(\text{Length} + \text{Breadth})$

By substituting the values

$$\text{Perimeter of the rectangle} = 2(34 + 18) = 2 \times 52 = 104 \text{ m}$$

So the cost of fencing the field at the rate of Rs. 2.25 per meter = $104 \times 2.25 = \text{Rs. } 234$ **3. If the cost of fencing a rectangular field at Rs. 7.50 per meter is Rs. 600, and the length of the field is 24 m, then the breadth of the field is**

- (a) 8 m
- (b) 18 m
- (c) 24 m
- (d) 16 m

Solution:

The option (d) is the correct answer.

It is given that cost of fencing the rectangular field = Rs. 600

So the rate of fencing the field = Rs. 7.50 per m

We know that perimeter of the field = Cost of fencing/Rate of fencing

By substituting the values

Perimeter of the field = $600/7.50 = 80$ m

Length of the field = 24 m

So we get breadth of the field = $\text{Perimeter}/2 - \text{Length} = 80/2 - 24 = 16$ m

4. The cost of putting a fence around a square field at Rs 2.50 per meter is Rs 200. The length of each side of the field is

- (a) 80 m
- (b) 40 m
- (c) 20 m
- (d) None of these

Solution:

The option (c) is the correct answer.

It is given that cost of fencing the square field = Rs. 200

So the rate of fencing the field = Rs. 2.50

We know that, perimeter of the square field = Cost of fencing/Rate of fencing

By substituting the values

Perimeter of the square field = $200/2.50 = 80$ m

Perimeter of square = $4 \times \text{Side of the square}$

It can be written as

Side of the square = $\text{Perimeter}/4 = 80/4 = 20$ m

5. The length of a rectangle is three times of its width. If the length of the diagonal is $8\sqrt{10}$ m, then the perimeter of the rectangle is

- (a) $15\sqrt{10}$ m
- (b) $16\sqrt{10}$ m
- (c) $24\sqrt{10}$ m
- (d) 64 m

Solution:

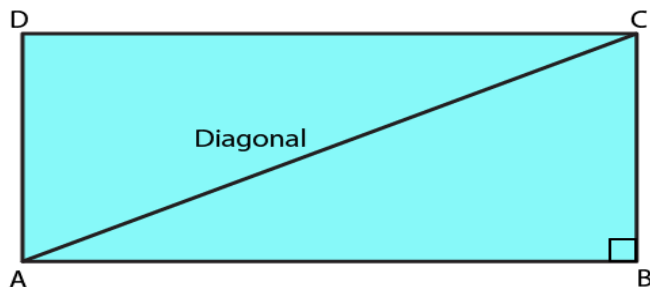
The option (d) is the correct answer.

Consider ABCD as a rectangle.

Assume that the width of the rectangle $BC = x$ m

We know that the length is three times width of the rectangle.

So, length of the rectangle $AB = 3x$ m



AC is the diagonal of rectangle
 Consider ABC as a right angled triangle.
 $AC^2 = AB^2 + BC^2$
 By substituting the values
 $640 = 9x^2 + x^2$
 We get
 $640 = 10x^2$
 On further calculation
 $x^2 = 640/10 = 64$
 $x = \sqrt{64} = 8$ m

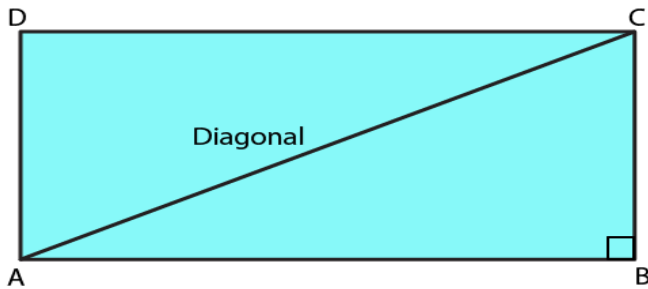
So the breadth of the rectangle $x = 8$ m
 Length of the rectangle $3x = 3 \times 8 = 24$ m
 Perimeter = 2 (Length + Breadth)
 By substituting the values
 Perimeter = 2 (24 + 8) = 2 \times 32 = 64 m

6. If a diagonal of a rectangle is thrice its smaller side, then its length and breadth are in the ratio

- (a) 3: 1
- (b) $\sqrt{3}$: 1
- (c) $\sqrt{2}$: 1
- (d) $2\sqrt{2}$: 1

Solution:

The option (d) is the correct answer.
 Assume that the length of the smaller side of the rectangle $BC = x$
 Length of the larger side $AB = y$
 It is given that the length of the diagonal is three times that of the smaller side.



Diagonal of the rectangle $3x = AC$
 By using Pythagoras theorem
 $(AC)^2 = (AB)^2 + (BC)^2$
 By substituting the values
 $(3x)^2 = (x)^2 + (y)^2$
 On further calculation
 $9x^2 = x^2 + y^2$
 We get
 $8x^2 = y^2$
 By taking square roots of both sides,
 $2\sqrt{2} x = y$

Hence, the ratio of the larger side to the smaller side is $2\sqrt{2}$: 1.

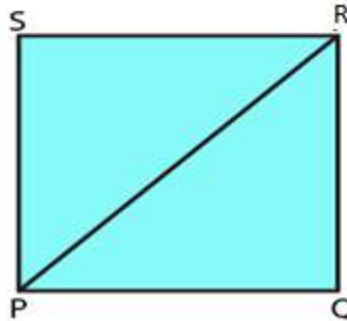
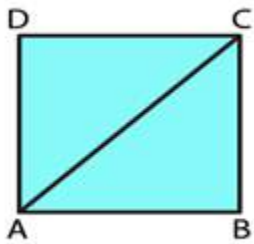
7. The ratio of the areas of two squares, one having its diagonal double than the other, is

- (a) 1: 2
- (b) 2: 3
- (c) 3: 1
- (d) 4: 1

Solution:

The option (d) is the correct answer.

Consider ABCD and PQRS as the two squares. We know that, the diagonal of square PQRS is twice the diagonal of square ABCD.



$$PR = 2 AC$$

$$\text{Area of the square} = \text{Diagonal}^2/2$$

$$\text{Area of PQRS} = PR^2/2$$

$$\text{In the same way, area of ABCD} = AC^2/2$$

From the question, we know that:

If $AC = x$ units, we get $PR = 2x$ units

$$\text{Area of PQRS}/\text{Area of ABCD} = (PR^2 \times 2) / (2 \times AC^2)$$

By substituting the value

$$\text{Area of PQRS}/\text{Area of ABCD} = [(2x)^2 \times 2] / [2 \times x^2] = 4/1$$

Hence, the ratio of the areas of squares PQRS and ABCD is 4: 1.

8. If the ratio of areas of two squares is 225 : 256, then the ratio of their perimeters is

- (a) 225 : 256
- (b) 256 : 225
- (c) 15 : 16
- (d) 16 : 15

Solution:

The option (c) is the correct answer.

Consider ABCD and PQRS as the two squares.

Let the lengths of each side of ABCD and PQRS be x and y .

We know that

$$\text{Area of sq. ABCD}/\text{Area of sq. PQRS} = x^2/y^2$$

$$\text{So we get } x^2/y^2 = 225/256$$

By taking square roots on both sides,

$$x/y = 15/16$$

By taking the ratio of their perimeters, we get

$$\text{Perimeter of sq. ABCD/Perimeter of sq. PQRS} = (4 \times \text{side of sq. ABCD}) / (4 \times \text{side of sq. PQRS}) = 4x/4y$$

By removing common terms in numerator and denominator

$$\text{Perimeter of sq. ABCD/Perimeter of sq. PQRS} = x/y$$

$$\text{So perimeter of sq. ABCD/Perimeter of sq. PQRS} = 15/16$$

Hence, the ratio of their perimeters = 15: 16

9. If the sides of a square are halved, then its area

(a) remains same

(b) becomes half

(c) becomes one fourth

(d) becomes double

Solution:

The option (c) is the correct answer.

Consider x as the side of the square.

$$\text{We know that area of a square} = \text{Side} \times \text{Side} = x \times x = x^2$$

If the sides are halved, we get new side = $x/2$

$$\text{So the new area} = (x/2)^2 = x^2/4$$

From this we know that the area has become one fourth of its previous value.

10. A rectangular carpet has area 120 m^2 and perimeter 46 meters. The length of its diagonal is

(a) 15 m

(b) 16 m

(c) 17 m

(d) 20 m

Solution:

The option (c) is the correct answer.

$$\text{It is given that area of the rectangle} = 120 \text{ m}^2$$

$$\text{Perimeter of the rectangle} = 46 \text{ m}$$

Consider l and b as the length and breadth.

$$\text{Area of the rectangle} = l \times b = 120 \text{ m}^2$$

$$\text{Perimeter of the rectangle} = 2(l + b) = 46$$

So we get

$$(l + b) = 46/2 = 23 \text{ m}$$

$$\text{Length of the diagonal of the rectangle} = l^2 + b^2$$

It can be written as

$$(l^2 + b^2) = (l + b)^2 - 2(l \times b)$$

By substituting the values

$$(l^2 + b^2) = (23)^2 - 2(120) = 529 - 240 = 289$$

By adding square roots on both sides

$$\text{Length of the diagonal of the rectangle} = \sqrt{l^2 + b^2} = \sqrt{289} = 17 \text{ m}$$

Hence, the length of the diagonal of the rectangle is 17m.

11. If the ratio between the length and the perimeter of a rectangular plot is 1: 3, then the ratio between the length and breadth of the plot is

(a) 1: 2

(b) 2: 1

(c) 3: 2

(d) 2: 3

Solution:

The option (b) is the correct answer.

Given that Length of rectangle/Perimeter of rectangle = $1/3$

So we get

$$l / (2l + 2b) = 1/3$$

By cross multiplication, we get:

$$3l = 2l + 2b$$

On further calculation

$$l = 2b$$

We get

$$l / b = 2/1$$

Hence, the ratio of the length and the breadth is 2: 1.

12. If the length of the diagonal of a square is 20 cm, then its perimeter is

(a) $10\sqrt{2}$ cm

(b) 40 cm

(c) $40\sqrt{2}$ cm

(d) 200 cm

Solution:

The option (c) is the correct answer.

It is given that length of the diagonal = 20 cm

So the length of the side of a square = Length of Diagonal/ $\sqrt{2}$ = $20/\sqrt{2} = (2 \times 10)/\sqrt{2}$

We get

Length of the side of a square = $(\sqrt{2} \times \sqrt{2} \times 10)/\sqrt{2} = 10\sqrt{2}$ cm

Hence, perimeter of the square = $4 \times \text{Side} = 4 \times 10\sqrt{2} = 40\sqrt{2}$ cm