

2. Measurements

Exercise 2.1

1 A. Question

Choose the correct answer:

Area of a semicircle is _____ times the area of the circle.

- A. two
- B. four
- C. one-half
- D. one-quarter

Answer

As a semicircle is exact one-half of a full circle, the area of a semicircle is one-half times the area of the circle.

1 B. Question

Choose the correct answer:

Perimeter of a semicircle is _____

A. $\left(\frac{\pi + 2}{2}\right)r$ units

- B. $(\pi + 2)r$ units
- C. $2r$ units
- D. $(\pi + 4)r$ units

Answer

Perimeter of a full circle = $2\pi r$

Thus, Perimeter of a semicircle is = $\frac{2\pi r}{2} + 2r$

$$= \pi r + 2r$$

$$= (\pi + 2)r \text{ units}$$

1 C. Question

Choose the correct answer:

If the radius of a circle is 7 m, then the area of the semicircle is _____

- A. 77 m^2
- B. 44 m^2
- C. 88 m^2
- D. 154 m^2

Answer

$$\text{Area of a semi-circle} = \frac{\pi r^2}{2}$$

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

$$= 77 \text{ m}^2$$

1 D. Question

Choose the correct answer:

If the area of a circle is 144 cm^2 , then the area of its quadrant is _____

- A. 144 cm^2
- B. 12 cm^2
- C. 72 cm^2
- D. 36 cm^2

Answer

$$\text{Given, Area of a circle} = 144 \text{ cm}^2$$

$$\text{Thus, area of its quadrant is} = \frac{144}{4}$$

$$= 36 \text{ cm}^2$$

1 E. Question

Choose the correct answer:

The perimeter of the quadrant of a circle of diameter 84 cm is _____

- A. 150 cm
- B. 120 cm

C. 21 cm

D. 42 cm

Answer

Given, Diameter = 84 cm

$$\text{So, Radius} = \frac{84}{2}$$

$$= 42 \text{ cm}$$

$$\text{Perimeter of the quadrant of a circle} = \frac{2\pi r}{4} + 2r$$

$$= \frac{2 \times \frac{22}{7} \times 42}{4} + 2 \times 42$$

$$= 66 + 84$$

$$= 150 \text{ cm}$$

1 F. Question

Choose the correct answer:

The number of quadrants in a circle is _____

A. 1

B. 2

C. 3

D. 4

Answer

A quadrant is one-fourth of anything.

Hence, the number of quadrants in a circle is 4.

1 G. Question

Choose the correct answer:

Quadrant of a circle is _____ of the circle.

A. one-half

B. one-fourth

C. one-third

D. two-thirds

Answer

A quadrant of a circle is always one-fourth of the full circle .

Hence, Quadrant of a circle is one-fourth of the circle.

1 H. Question

Choose the correct answer:

The central angle of a semicircle is _____

- A. 90°
- B. 270°
- C. 180°
- D. 360°

Answer

The central angle of a semicircle is always 180° .

1 I. Question

Choose the correct answer:

The central angle of a quadrant is _____

- A. 90°
- B. 180°
- C. 270°
- D. 0°

Answer

The central angle of a quadrant is always 90° .

1 J. Question

Choose the correct answer:

If the area of a semicircle is 84 cm^2 , then the area of the circle is _____

- A. 144 cm^2
- B. 42 cm^2
- C. 168 cm^2
- D. 288 cm^2

Answer

$$\text{Area of a semicircle} = 84 \text{ cm}^2$$

Since a circle is twice of semi-circle,

$$\text{Thus, Area of the circle} = 2 \times 84$$

$$= 168 \text{ cm}^2$$

2 A. Question

Find the perimeter and area of semicircles whose radii are,

35 cm

Answer

$$\text{We know, Perimeter of semicircle} = \pi r + 2r$$

- Remember that the perimeter is the distance round the outside. A semicircle has **two edges**. One is **half of a circumference** and the other is a **diameter**
- So, the formula for the perimeter of a semicircle is:

$$\text{Perimeter} = \pi r + 2r$$



And,

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

$$\text{Radius} = 35 \text{ cm}$$

$$\text{Perimeter of semicircle} = \pi r + 2r$$

$$= \frac{22}{7} \times 35 + 2 \times 35$$

$$= 180 \text{ cm}$$

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

$$= \frac{22}{7} \times \frac{35 \times 35}{2}$$

$$= 1925 \text{ cm}^2$$

2 B. Question

Find the perimeter and area of semicircles whose radii are,

10.5 cm

Answer

We know, Perimeter of semicircle = $\pi r + 2r$

- Remember that the perimeter is the distance round the outside. A semicircle has **two edges**. One is **half of a circumference** and the other is a **diameter**
- So, the formula for the perimeter of a semicircle is:

$$\text{Perimeter} = \pi r + 2r$$



And,

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

Radius = 10.5 cm

Perimeter of semicircle = $\pi r + 2r$

$$= \frac{22}{7} \times 10.5 + 2 \times 10.5$$

$$= 54 \text{ cm}$$

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

$$= \frac{22}{7} \times \frac{10.5 \times 10.5}{2}$$

$$= 173.25 \text{ cm}^2$$

2 C. Question

Find the perimeter and area of semicircles whose radii are,

6.3 m

Answer

We know, Perimeter of semicircle = $\pi r + 2r$

- Remember that the perimeter is the distance round the outside. A semicircle has **two edges**. One is **half of a circumference** and the other is a **diameter**
- So, the formula for the perimeter of a semicircle is:

$$\text{Perimeter} = \pi r + 2r$$



And,

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

Radius = 6.3 cm

Perimeter of semicircle = $\pi r + 2r$

$$= \frac{22}{7} \times 6.3 + 2 \times 6.3$$

$$= 32.4 \text{ cm}$$

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

$$= \frac{22}{7} \times \frac{6.3 \times 6.3}{2}$$

$$= 62.37 \text{ cm}^2$$

2 D. Question

Find the perimeter and area of semicircles whose radii are,

4.9 m

Answer

We know, Perimeter of semicircle = $\pi r + 2r$

- Remember that the perimeter is the distance round the outside. A semicircle has **two edges**. One is **half of a circumference** and the other is a **diameter**
- So, the formula for the perimeter of a semicircle is:

$$\text{Perimeter} = \pi r + 2r$$



And,

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

Radius = 4.9 cm

Perimeter of semicircle = $\pi r + 2r$

$$= \frac{22}{7} \times 4.9 + 2 \times 4.9$$

$$= 25.2 \text{ cm}$$

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

$$= \frac{22}{7} \times \frac{4.9 \times 4.9}{2}$$

$$= 37.73 \text{ cm}^2$$

3 A. Question

Find the perimeter and area of semicircles whose diameters are,

2.8 cm

Answer

- Remember that the perimeter is the distance round the outside. A semicircle has **two edges**. One is **half of a circumference** and the other is a **diameter**
- So, the formula for the perimeter of a semicircle is:

$$\text{Perimeter} = \pi r + 2r$$



Diameter = 2.8 cm

$$\text{Radius} = \frac{2.8}{2}$$

$$= 1.4 \text{ cm}$$

Perimeter of semicircle = $\pi r + 2r$

$$= \frac{22}{7} \times 1.4 + 2 \times 1.4$$

$$= 28 \text{ cm}$$

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

$$= \frac{22}{7} \times \frac{1.4 \times 1.4}{2}$$

$$= 3.08 \text{ cm}^2$$

3 B. Question

Find the perimeter and area of semicircles whose diameters are,

56 cm

Answer

- Remember that the perimeter is the distance round the outside. A semicircle has **two edges**. One is **half of a circumference** and the other is a **diameter**
- So, the formula for the perimeter of a semicircle is:

$$\text{Perimeter} = \pi r + 2r$$



Diameter = 56 cm

$$\text{Radius} = \frac{56}{2}$$

= 28 cm

Perimeter of semicircle = $\pi r + 2r$

$$= \frac{22}{7} \times 28 + 2 \times 28$$

= 144 cm

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

$$= \frac{22}{7} \times \frac{28 \times 28}{2}$$

= 1232 cm²

3 C. Question

Find the perimeter and area of semicircles whose diameters are,

84 cm

Answer

- Remember that the perimeter is the distance round the outside. A semicircle has **two edges**. One is **half of a circumference** and the other is a **diameter**
- So, the formula for the perimeter of a semicircle is:

$$\text{Perimeter} = \pi r + 2r$$



Diameter = 84 cm

$$\text{Radius} = \frac{84}{2}$$

= 42 cm

Perimeter of semicircle = $\pi r + 2r$

$$= \frac{22}{7} \times 42 + 2 \times 42$$

= 216 cm

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

$$= \frac{22}{7} \times \frac{42 \times 42}{2}$$

= 2772 cm²

3 C. Question

Find the perimeter and area of semicircles whose diameters are,

112 m

Answer

- Remember that the perimeter is the distance round the outside. A semicircle has **two edges**. One is **half of a circumference** and the other is a **diameter**
- So, the formula for the perimeter of a semicircle is:

$$\text{Perimeter} = \pi r + 2r$$



Diameter = 112 cm

$$\text{Radius} = \frac{112}{2}$$

= 56 cm

Perimeter of semicircle = $\pi r + 2r$

$$= \frac{22}{7} \times 56 + 2 \times 56$$

$$= 288 \text{ cm}$$

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

$$= \frac{22}{7} \times \frac{56 \times 56}{2}$$

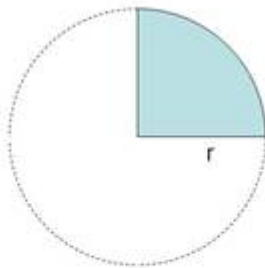
$$= 288 \text{ cm}^2$$

4 A. Question

Calculate the perimeter and area of a quadrant of the circles whose radii are,
98 cm

Answer

Perimeter of quarter-circle



Circumference of a circle = πd

Perimeter of a semi-circle = $\pi \times \text{Radius} + \text{Diameter}$
 $= \pi r + d$

Perimeter of quadrant = $\frac{1}{2} \pi r + 2r$

Radius = 98 cm

$$\text{Perimeter of quadrant} = \frac{\pi r}{2} + 2r$$

$$= \frac{22}{7} \times \frac{98}{2} + 2 \times 98$$

$$= 50 \text{ cm}$$

$$\text{Area of quadrant} = \frac{\pi r^2}{4}$$

$$= \frac{22}{7} \times \frac{35 \times 35}{4}$$

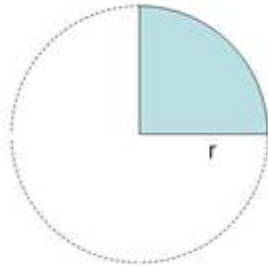
$$= 962.5 \text{ cm}^2$$

4 B. Question

Calculate the perimeter and area of a quadrant of the circles whose radii are,
70 cm

Answer

Perimeter of quarter-circle



Circumference of a circle = πd

Perimeter of a semi-circle = $\pi \times \text{Radius} + \text{Diameter}$
 $= \pi r + d$

Perimeter of quadrant = $\frac{1}{2} \pi r + 2r$

Radius = 70 cm

$$\text{Perimeter of quadrant} = \frac{\pi r}{2} + 2r$$

$$= \frac{22}{7} \times \frac{70}{2} + 2 \times 70$$

$$= 250 \text{ cm}$$

$$\text{Area of quadrant} = \frac{\pi r^2}{4}$$

$$= \frac{22}{7} \times \frac{70 \times 70}{4}$$

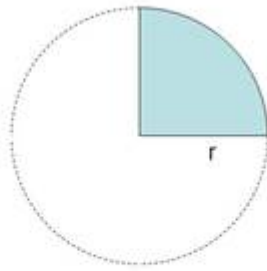
$$= 3850 \text{ cm}^2$$

4 C. Question

Calculate the perimeter and area of a quadrant of the circles whose radii are,
42 m

Answer

Perimeter of quarter-circle



Circumference of a circle = πd

Perimeter of a semi-circle = $\pi \times \text{Radius} + \text{Diameter}$
= $\pi r + d$

Perimeter of quadrant = $\frac{1}{2} \pi r + 2r$

Radius = 42 cm

$$\text{Perimeter of quadrant} = \frac{\pi r}{2} + 2r$$

$$= \frac{22}{7} \times \frac{42}{2} + 2 \times 42$$

$$= 150 \text{ cm}$$

$$\text{Area of quadrant} = \frac{\pi r^2}{4}$$

$$= \frac{22}{7} \times \frac{42 \times 42}{4}$$

$$= 1386 \text{ cm}^2$$

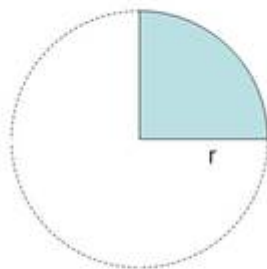
4 D. Question

Calculate the perimeter and area of a quadrant of the circles whose radii are,

28 m

Answer

Perimeter of quarter-circle



Circumference of a circle = πd

Perimeter of a semi-circle = $\pi \times \text{Radius} + \text{Diameter}$
= $\pi r + d$

Perimeter of quadrant = $\frac{1}{2} \pi r + 2r$

Radius = 28 cm

$$\text{Perimeter of quadrant} = \frac{\pi r}{2} + 2r$$

$$= \frac{22}{7} \times \frac{28}{2} + 2 \times 28$$

$$= 100 \text{ cm}$$

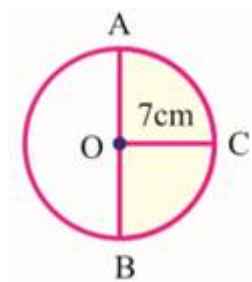
$$\text{Area of quadrant} = \frac{\pi r^2}{4}$$

$$= \frac{22}{7} \times \frac{28 \times 28}{4}$$

$$= 616 \text{ cm}^2$$

5. Question

Find the area of the semicircle ACB and the quadrant BOC in the given figure.



Answer

Radius = 7 cm

So,

$$\text{Area of semicircle ACB} = \frac{\pi r^2}{2}$$

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

$$= 77 \text{ cm}^2$$

$$\text{Area of quadrant BOC} = \frac{\pi r^2}{4}$$

$$= \frac{22}{7} \times \frac{7 \times 7}{4}$$

$$= 38.5 \text{ cm}^2$$

6. Question

A park is in the shape of a semicircle with radius 21 m. Find the cost of fencing it at the cost of ` 5 per metre.

Answer

Given, radius = 21 m

Cost of fencing per metre = Rs.5 per metre

Perimeter of semicircle = $\pi r + 2r$

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

$$= 108 \text{ m}$$

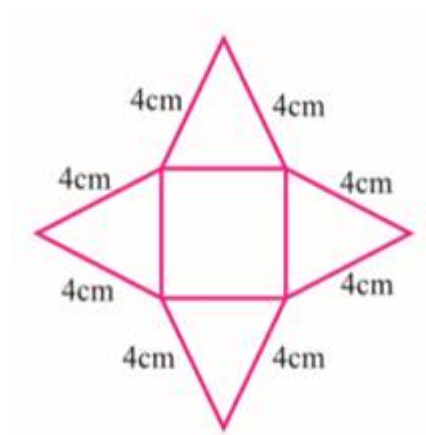
Thus, Cost of fencing per = 108×5

$$= 540 \text{ cm}^2$$

Exercise 2.2

1 A. Question

Find the perimeter of the following figures



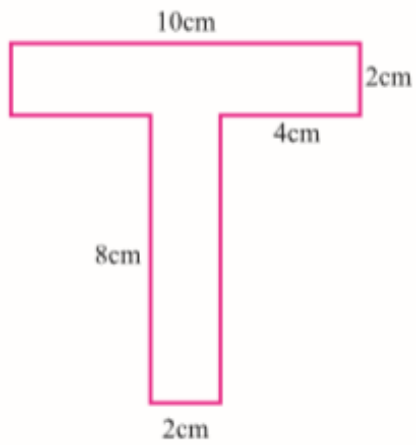
Answer

$$\text{Perimeter} = 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4$$

$$= 32 \text{ cm}$$

1 B. Question

Find the perimeter of the following figures

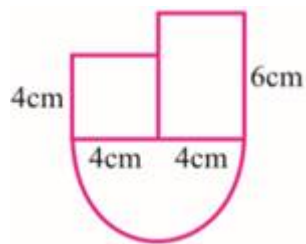


Answer

$$\begin{aligned}\text{Perimeter} &= 10 + 2 + 4 + 8 + 2 + 8 + 4 + 2 \\ &= 40 \text{ cm}\end{aligned}$$

1 C. Question

Find the perimeter of the following figures



Answer

$$\text{Radius of semi-circle} = 4 \text{ cm}$$

$$\text{Perimeter of semi-circle} = \pi r$$

$$= 3.14 \times 4$$

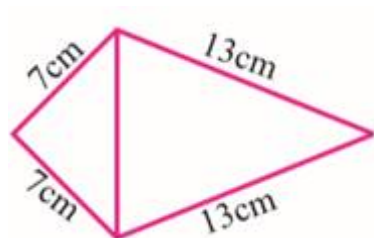
$$= 12.56 \text{ cm}$$

$$\text{Perimeter of figure} = 12.56 + 4 + 4 + (6-4) + 4 + 6$$

$$= 30.56 \text{ cm}$$

1 D. Question

Find the perimeter of the following figures



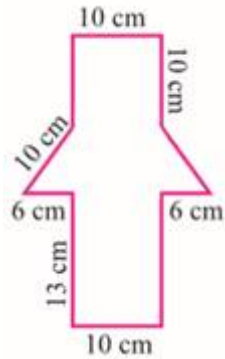
Answer

$$\text{Perimeter} = 7 + 13 + 13 + 7$$

$$= 40 \text{ cm}$$

1 E. Question

Find the perimeter of the following figures

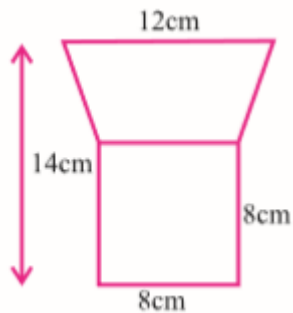
**Answer**

$$\text{Perimeter} = 10 + 10 + 10 + 6 + 13 + 10 + 13 + 6 + 10 + 10$$

$$= 98 \text{ cm}$$

2 A. Question

Find the area of the following figures

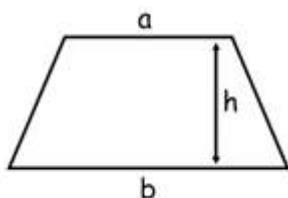
**Answer**

$$\text{Height of trapezium} = 14 - 8$$

$$= 6 \text{ cm}$$

Area of trapezium is given as, $A = \frac{1}{2} \times (a + b)h$,

As shown below:



Where, a is the shorter side.

B is the longer side.

H is the distance between the two sides.

$$\Rightarrow \text{Area of trapezium} = \frac{1}{2} \times (12 + 8) \times 6$$

$$= 60 \text{ cm}^2$$

$$\text{Area of square} = 8 \times 8$$

$$= 64 \text{ cm}^2$$

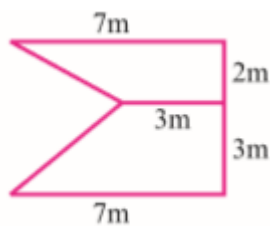
$$\text{Area of figure} = \text{Area of trapezium} + \text{Area of square}$$

$$= 60 + 64$$

$$= 124 \text{ cm}^2$$

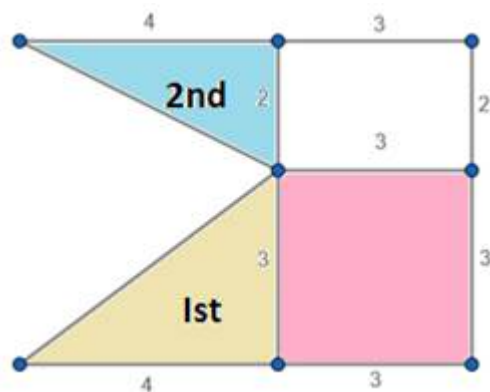
2 B. Question

Find the area of the following figures



Answer

The figure can be re-drawn as:



$$\text{Area of first triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$\Rightarrow A_1 = \frac{1}{2} \times 4 \times 3$$

$$= 6 \text{ cm}^2$$

$$\text{Area of second triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$\Rightarrow A_2 = \frac{1}{2} \times 4 \times 2$$

$$= 4 \text{ cm}^2$$

Area of rectangle = length $\times$ breadth

$$\Rightarrow A_3 = 3 \times 2$$

$$= 6 \text{ cm}^2$$

Area of square = (side)²

$$\Rightarrow A_4 = 3 \times 3$$

$$= 9 \text{ cm}^2$$

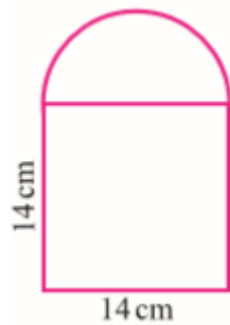
$$\therefore \text{Area of figure} = A_1 + A_2 + A_3 + A_4$$

$$= 6 + 4 + 6 + 9$$

$$= 25 \text{ cm}^2$$

2 C. Question

Find the area of the following figures



Answer

Diameter of semicircle = 14cm

$$\text{Radius of semicircle} = \frac{14}{2}$$

$$= 7 \text{ cm}$$

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

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

$$= 77 \text{ cm}^2$$

$$\text{Area of square} = (\text{side})^2 = 14 \times 14$$

$$= 196 \text{ cm}^2$$

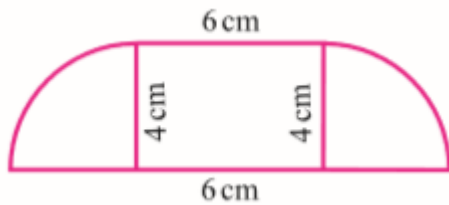
Area of figure = Area of semicircle + Area of square

$$= 77 + 196$$

$$= 273 \text{ cm}^2$$

2 D. Question

Find the area of the following figures

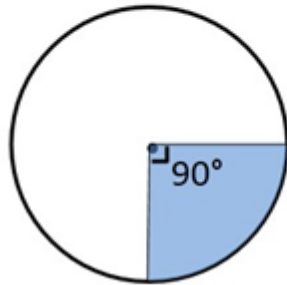


Answer

We know,

$$\text{Area of quadrant} = \frac{1}{4} \times \text{area of circle}$$

$$= \frac{1}{4} \times (\pi r^2)$$



$$\text{Area of two quadrants} = 2 \times \frac{\pi r^2}{4}$$

$$= 2 \times \frac{22}{7} \times \frac{4 \times 4}{4}$$

$$= 25.14 \text{ cm}^2$$

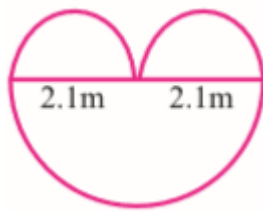
Area of rectangle = length $\times$ breadth

$$= 6 \times 4$$

$$= 24 \text{ cm}^2$$

2 E. Question

Find the area of the following figures



Answer

Radius of bigger semicircle = 2.1 m

Radius of smaller semicircles = $\frac{2.1}{2}$

= 1.05 m

Area of 2 smaller semicircles = $2 \times \frac{\pi r^2}{2}$

$\therefore$ Area of 2 smaller semicircles = πr^2

Hence, area of 2 smaller semicircles = $\frac{22}{7} \times \frac{1.05 \times 1.05}{2}$

= 1.7325 m²

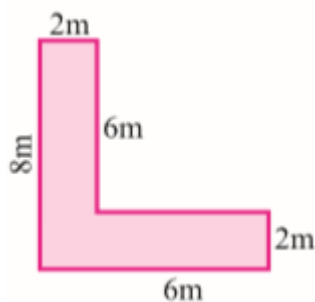
Area of bigger semicircle = $\frac{\pi r^2}{2}$

$\therefore$ Area of bigger semicircle = $\frac{22}{7} \times \frac{2.1 \times 2.1}{2}$

= 6.93 m²

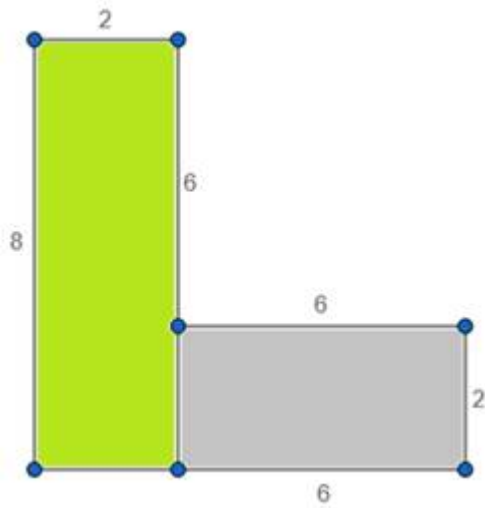
3 A. Question

Find the area of the coloured regions



Answer

The figure is given below:



Area of bigger rectangle (shaded in green) = length $\times$ breadth

$$= 8 \times 2$$

$$= 16 \text{ m}^2$$

Area of smaller rectangle (shaded in grey) = length $\times$ breadth

$$= 6 \times 2$$

$$= 12 \text{ m}^2$$

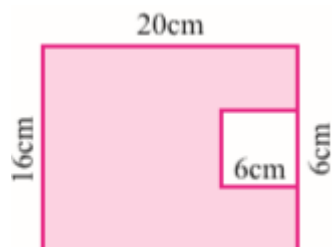
Area of the coloured regions = Area of bigger rectangle + Area of smaller rectangle

$$\text{Area of the coloured regions} = 16 + 12$$

$$= 28 \text{ m}^2$$

3 B. Question

Find the area of the coloured regions



Answer

Area of rectangle = length $\times$ breadth

$$= 16 \times 20$$

$$= 320 \text{ m}^2$$

Area of square = side $\times$ side

$$= 6 \times 6$$

$$= 36 \text{ m}^2$$

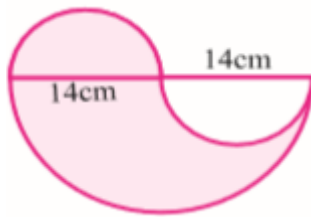
Area of the coloured regions = Area of rectangle + Area of square

$$\text{Area of the coloured regions} = 320 + 36$$

$$= 356 \text{ m}^2$$

3 C. Question

Find the area of the coloured regions



Answer

$$\text{Radius of smaller semicircle} = \frac{14}{2}$$

$$= 7 \text{ cm}$$

$$\text{Radius of bigger semicircle} = 14 \text{ cm}$$

$$\text{Area of smaller semicircle} = \frac{\pi r^2}{2}$$

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

$$= 77 \text{ cm}^2$$

$$\text{Area of bigger semicircle} = \frac{\pi R^2}{2}$$

$$= \frac{22}{7} \times \frac{14 \times 14}{2}$$

$$= 308 \text{ cm}^2$$

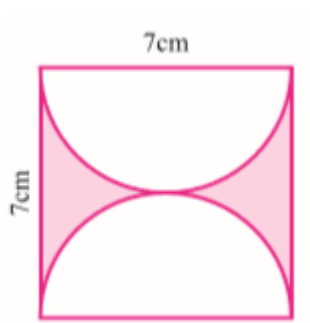
Area of the coloured regions = (Area of bigger semicircle - Area of smaller semicircle) + Area of smaller semicircle

$$\text{Area of the coloured regions} = (308 - 77) + 77$$

$$= 308 \text{ cm}^2$$

3 D. Question

Find the area of the coloured regions



Answer

$$\text{Area of square} = 7 \times 7$$

$$= 49 \text{ cm}^2$$

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

$$= \frac{22}{7} \times \frac{3.5 \times 3.5}{2}$$

$$= 19.25 \text{ cm}^2$$

$$\text{Area of coloured region} = \text{Area of square} - 2 \times \text{Area of semicircle}$$

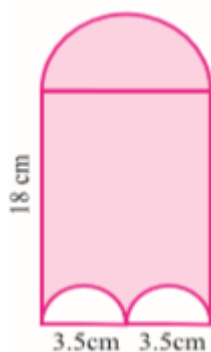
$$= 49 - 2 \times 19.25$$

$$= 49 - 38.5$$

$$= 10.5 \text{ cm}^2$$

3 E. Question

Find the area of the coloured regions



Answer

$$\text{Area of rectangle} = 18 \times 7$$

$$= 126 \text{ cm}^2$$

$$\text{Radius of bigger semicircle} = 3.5 \text{ cm}$$

$$\text{Area of bigger semicircle} = \frac{\pi R^2}{2}$$

$$= \frac{22}{7} \times \frac{3.5 \times 3.5}{2}$$

$$= 19.25 \text{ cm}^2$$

$$\text{Radius of smaller semicircle} = \frac{3.5}{2}$$

$$= 1.75 \text{ cm}$$

$$\text{Area of unshaded region} = \pi r^2$$

$$= \frac{22}{7} \times 1.75 \times 1.75$$

$$= 9.625 \text{ cm}^2$$

Area of coloured region = Area of bigger semicircle + (Area of Rectangle- Area of unshaded region)

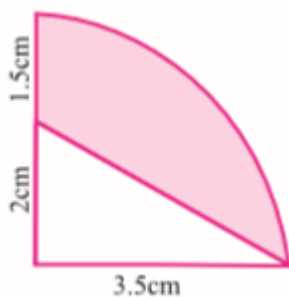
$$\text{Area of coloured region} = 19.25 + (126 - 9.625)$$

$$= 19.25 + 116.375$$

$$= 135.625 \text{ cm}^2$$

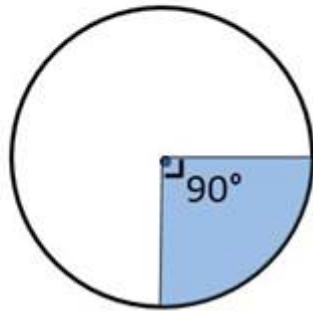
3 F. Question

Find the area of the coloured regions



Answer

$$\begin{aligned}\text{Area of quadrant} &= \frac{1}{4} \times \text{area of circle} \\ &= \frac{1}{4} \times (\pi r^2)\end{aligned}$$



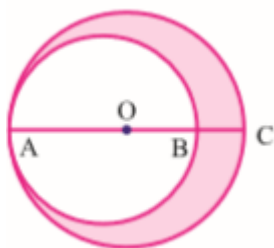
$$\begin{aligned}\text{Area of quadrants} &= \frac{\pi r^2}{4} \\ &= \frac{22}{7} \times \frac{3.5 \times 3.5}{4} \\ &= 9.625 \text{ cm}^2\end{aligned}$$

$$\begin{aligned}\text{Area of triangle} &= \frac{1}{2} \times \text{base} \times \text{height} \\ &= \frac{1}{2} \times 3.5 \times 2 \\ &= 3.5 \text{ cm}^2\end{aligned}$$

$$\begin{aligned}\text{Area of coloured region} &= \text{Area of quadrant} - \text{Area of triangle} \\ &= 9.625 - 3.5 \\ &= 6.125 \text{ cm}^2\end{aligned}$$

4. Question

In the given figure, find the area of the shaded portion if AC = 54 cm, BC = 10 cm, and O is the centre of bigger circle.



Answer

Given, AC = 54 cm

BC = 10 cm

$$AB = 54 - 10 = 44 \text{ cm}$$

$$\text{Radius of bigger circle} = \frac{54}{2}$$

$$= 27 \text{ cm}$$

$$\text{Area of bigger circle} = \pi r^2$$

$$= \frac{22}{7} \times 27 \times 27$$

$$= 2291.14$$

$$\text{Radius of smaller circle} = \frac{44}{2}$$

$$= 22 \text{ cm}$$

$$\text{Area of smaller circle} = \pi R^2$$

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

$$= 1521.14$$

$$\text{Area of the shaded portion} = \text{Area of bigger circle} - \text{Area of smaller}$$

$$\text{Circle}$$

$$= 2291.14 - 1521.14$$

$$= 769.99 \text{ cm}^2$$

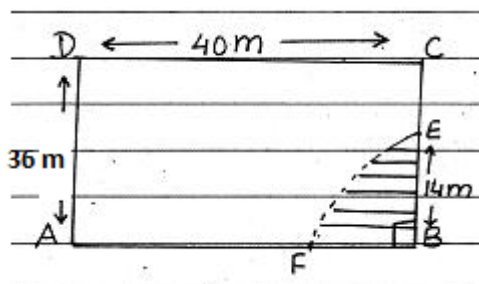
$$= 770 \text{ cm}^2$$

5. Question

A cow is tied up for grazing inside a rectangular field of dimensions 40 m × 36 m in one corner of the field by a rope of length 14 m. Find the area of the field left ungrazed by the cow.

Answer

The figure is shown below:



$$\text{Area of rectangular field} = 40 \times 36$$

$$= 1440 \text{ m}^2$$

$$\text{Area of grazed area} = \frac{\pi r^2}{4}$$

$$= \frac{22}{7} \times \frac{14 \times 14}{4}$$

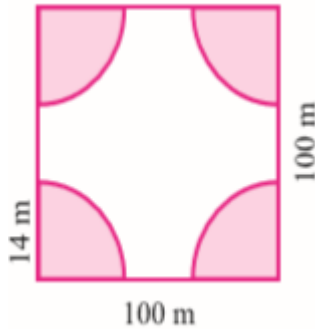
$$= 154 \text{ m}^2$$

Therefore, Area of the field left ungrazed by the cow = $1440 - 154$

$$= 1286 \text{ m}^2$$

6. Question

A square park has each side of 100 m. At each corner of the park there is a flower bed in the form of a quadrant of radius 14 m as shown in the figure. Find the area of the remaining portion of the park.



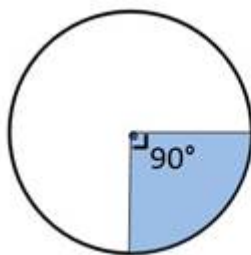
Answer

Radius = 14 cm

One flower bed is a quadrant of the circle.

We know,

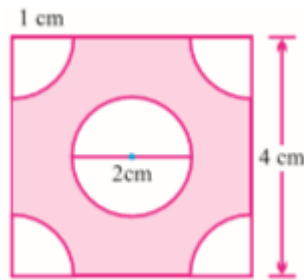
$$\begin{aligned} \text{Area of quadrant} &= \frac{1}{4} \times \text{area of circle} \\ &= \frac{1}{4} \times (\pi r^2) \end{aligned}$$



$\Rightarrow$ Area of one flower bed = $3.14 \times 14 \times 14 = 616 \text{ m}^2$
 Area of the square park = $100 \times 100 = 10000 \text{ m}^2$
 Area of the four-flower bed = $4 \times 616 = 2464 \text{ m}^2$
 Thus area of the remaining part = $(10000 - 2464) \text{ m}^2 = 7536 \text{ m}^2$

7. Question

Find the area of the shaded region shown in the figure. The four corners are quadrants. At the center, there is a circle of diameter 2 cm.



Answer

Area of square = side $\times$ side

$$= 4 \times 4$$

$$= 16 \text{ cm}^2$$

Area of unshaded region = 4 $\times$ Area of 1 quadrant + Area of circle

$$= 4 \times \frac{\pi r^2}{4} + \pi R^2$$

$$= \frac{22}{7} \times 1 \times 1 + \frac{22}{7} \times 1 \times 1$$

$$= \frac{22 + 22}{7}$$

$$= \frac{44}{7}$$

$$= 6.28 \text{ cm}^2$$

Therefore,

Area of shaded region = Area of square - Area of unshaded region

$$\text{Area of shaded region} = 16 - 6.28$$

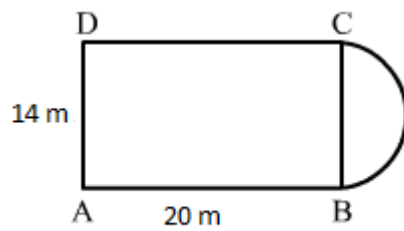
$$= 9.72 \text{ cm}^2$$

8. Question

A paper is in the form of a rectangle ABCD in which AB = 20 cm and BC = 14 cm. A semicircular portion with BC as diameter is cut off. Find the area of the remaining part.

Answer

The figure is given below:



Diameter of semi-circle = BC = 14cm

Radius of semi-circle = $\frac{14}{2}$

= 7cm

Area of semi-circle = $\frac{\pi r^2}{2}$

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

$$= 77 \text{ cm}^2$$

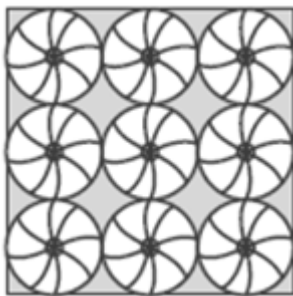
Area of sheet = $20 \times 14 = 280 \text{ cm}^2$

Thus, Area of remaining sheet = $280 - 77$

$$= 203 \text{ cm}^2$$

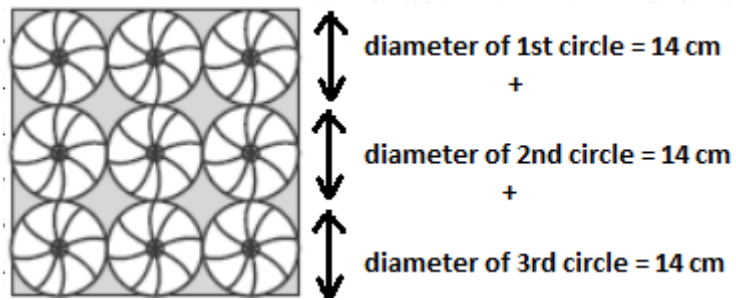
9. Question

On a square handkerchief, nine circular designs each of radius 7 cm are made. Find the area of the remaining portion of the handkerchief.



Answer

From the figure,



Hence, it can be observed that size of side of square = $14 + 14 + 14 = 42$ cm

$$\text{Area of square} = (\text{side})^2$$

$$= 42 \times 42$$

$$= 1764 \text{ cm}^2$$

$$\text{Area of each circle} = \pi r^2$$

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

$$= 154 \text{ cm}^2$$

$$\text{Area of 9 circles} = 9 \times 154$$

$$= 1386 \text{ cm}^2$$

$$\text{Area of unshaded region} = \text{Area of square} - \text{Area of 9 circle}$$

$$= 1764 - 1386$$

$$= 378 \text{ cm}^2$$