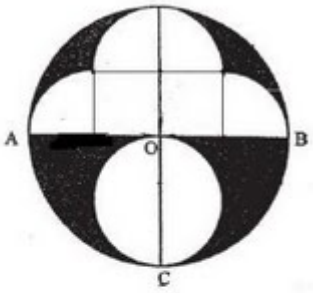
Solution
Redrawing....



Area of large circle → $\pi r^2 = (\frac{22}{7} \times 21 \times 21)\ cm^2 = 1386\ cm^2$

Area of small circle → $\pi r^2 = (\frac{22}{7} \times 10.5 \times 10.5)\ cm^2 = 346.5\ cm^2$

Area of 4 small quadrants = $4 \times \pi r^2 \times \frac{1}{4}$

$= 4 \times (\frac{22}{7} \times 10.5 \times 10.5)\ cm^2 \times \frac{1}{4} = 346.5\ cm^2$

Area of 1 square ----- (10.5 x 10.5)square cm = 110.25 square cm

Area of 2 squares ----- 2 x 110.5 square cm = 220.5 square cm

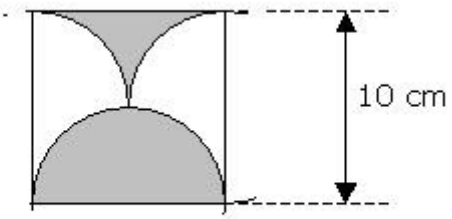
Area of shaded area is ---- Area of whole figure – area of 1 small circle – area of 4 small quadrants – area of 2 squares

(1386 - 346.5 - 346.5 - 220.5) square cm = 472.5 square cm

Answer: 472.5 square cm

he figure below is made up of a square and three identical semi-circles. Calculate the perimeter of the shaded region.

(Take $\pi = 3.14$)



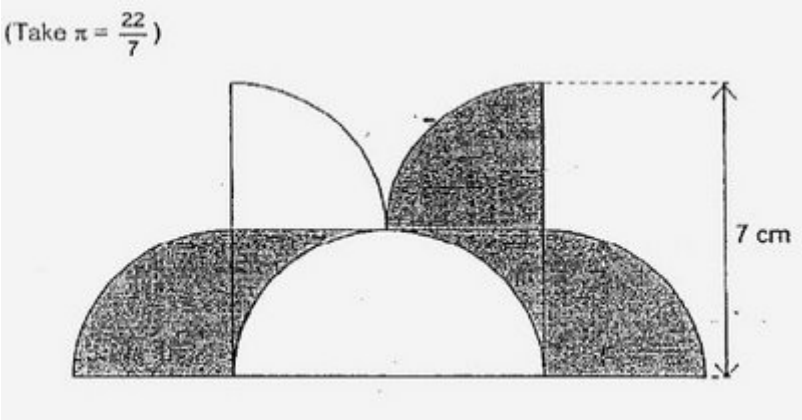
Solution

The perimeter of the shaded region is made up of one semi-circle with a radius of 5 cm, two arcs equivalent to 2 quadrants with radius 5 cm, and two straight lines which measure 10 cm each.

Perimeter ----- $2\pi r$ + 10 cm + 10cm

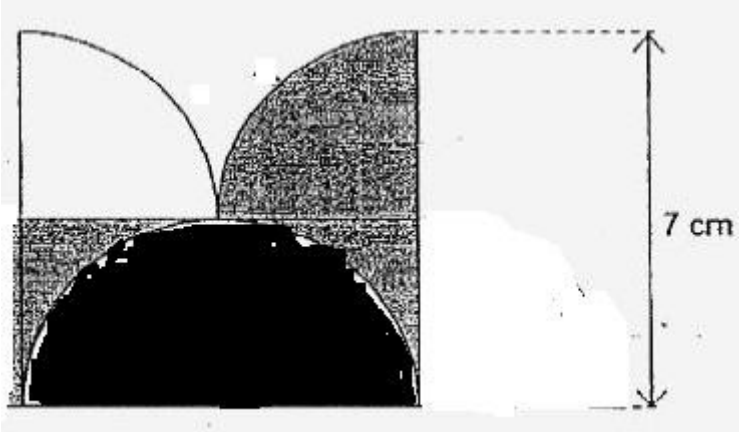
= (2 x 3.14 x 5 cm) + 10 cm + 10 cm
= 31.4 cm + 20 cm= **51.4 cm (Answer)**

The figure below is made up of a rectangle, a semi-circle and 4 identical quadrants.
a) What is the total area of the shaded parts?
b) What is the perimeter of the whole figure?



Solution

a) Redrawing



Area of shaded area
= Area of rectangle + Area of quadrant
= (7 cm x 3.5 cm) + (¼ x 22/7 x 3.5 cm 3.5 cm)
= (24.5 + 9.625) square cm
= **34.125 square cm (Answer)**

b)
Perimeter -----
Lengths of 4 quarter arcs + 6r
= 4 x (¼ x 2 x 22/7 x 3.5 cm) + (6 x 3.5) cm
= 22 cm + 21 cm
= **43 cm (Answer)**

Each corner of the floor mat shown above is made up of a quadrant of radius 4 cm. Find the perimeter of the floor mat.

(Take $\pi = 3.14$)

Solution
4 quadrants make 1 full circle
Perimeter of arcs of 4 quadrants above -----
2 x 3.14 x 4 cm = 25.12 square cm

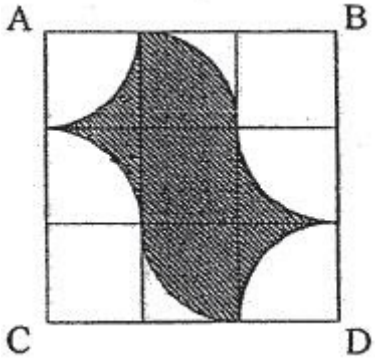
Consider length of mat -----
40 cm – 4 cm – 4 cm = 32 cm

Consider breadth of mat -----
30 cm – 4 cm – 4 cm = 22 cm

Perimeter of mat -----
(25.12 + 32 cm + 32 cm + 22 cm + 22 cm)
= **133.12 cm (Answer)**

In the figure, ABCD is a square with a perimeter of 84 cm. It is made up of identical squares and quarter-circles.
a) Find the perimeter of the shaded region.
b) Find the area of the shaded region.

(Take $\pi = \frac{22}{7}$)



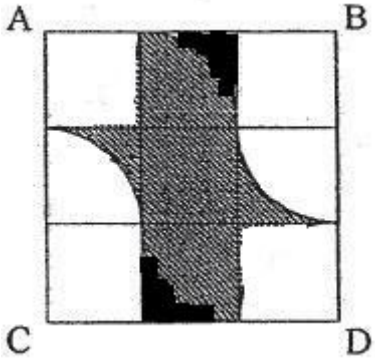
Solution

a)
The perimeter of square ABCD is 84 cm.

1 side of square ABCD ----- 84 cm divided by 4 = 21 cm
Radius of the 6 quadrants ----- 21 cm divided by 3 = 7 cm

The shaded area is made up of 6 quadrants -----
6 x ¼ x 2 x 22/7 x 7 cm = **66 cm (Answer)**

b) Redrawing the figure….



Area of 1 quadrant -----
¼ x 22/7 x 7 cm x 7 cm = 38.5 square cm

Area of 1 small partially shaded square ----
Area of 1 small square – Area of 1 quadrant ----- (7 cm x 7 cm) – 38.5 square cm = 10.5 square cm

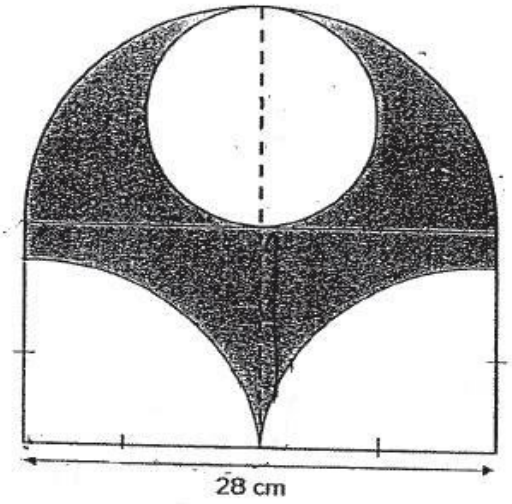
Area of 2 such small partially shaded squares -----
10.5 square cm x 2 = 21 square cm

Area of 3 small shaded squares -----
(3 x 7 x 7) square cm = 147 square cm

Total shaded area ------
(21 + 147) square cm = **168 square cm (Answer)**

The figure below is made up of a semicircle and a rectangle. Find the area of the unshaded region.

$(\text{Take } \pi = \frac{22}{7})$



Solution

The base of the figure is 28 cm. The diameter of the unshaded circle is half the base, hence, it is 14 cm. This also means that the radius of the circle is 7 cm.

The radius of the 2 quadrants is 14 cm.

Area of circle ----- 22/7 x 7 cm x 7 cm = 154 square cm

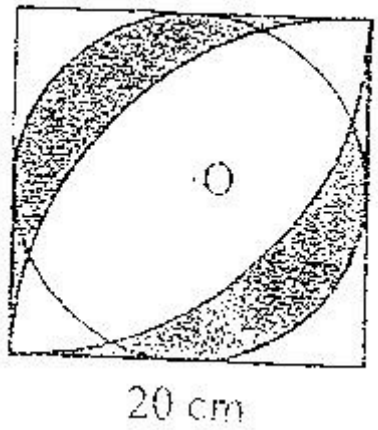
Area of 1 quadrant ----- 22/7 x 14 cm x 14 cm x ¼ = 154 square cm

Area of 2 quadrants ----- 154 square cm x 2 = 308 square cm

Total unshaded area ----- (154 + 308) square cm

= **462 square cm (Answer)**

The figure below shows a circle and two quadrants enclosed within a square. O is the centre of the circle. Find the total area of the shaded parts in the figure shown. (Take =3.14)



Solution

Redrawing…..