Perimeter and Area: Exercise 11.4

Q.1 A garden is 90 m long and 75 m broad. A path 5 m wide is to be built outside and around it. Find the area of the path. Also find the area of the garden in hectare.

Sol: **Given:** Dimension of rectangle garden, length = 90 m and breadth = 75 m

So, area of the garden = length x breadth

= 90 x 75

= 6750 m^2

Since, 1 hectare = 10000 m^2

So, area of garden (in hectare) = 6750/10000

= 0.675 hectare

Since, a path 5 m wide is to be built outside and around the garden.

So, length of garden with path = 90 + 10 = 100 m

Breadth of garden with path = 75 +10 = 85 m

Now, area of garden with path = 100 x 85

= 8500 m^2

So, path area = area of garden with path - area of garden

= 8500 – 6750

= 1750 m^2

Thus, path area = 1750 m^2

Q.2 A 3 m wide path runs outside and around a rectangular park of length 125 m and breadth 65 m. Find the area of the path.

Sol: **Given:** Dimension of rectangular park, length =125 m and breadth = 65

Since, a 3 m wide path runs outside and around a rectangular park.

So, length of park with path = 125 + 6 = 131 m

And breadth of park with path = 65 + 6 = 71 m

So, area of path = area of the park with path – Area of park

= (131 x 71) – (125 x 65)

= 9301 – 8125

= 1176 m^2

Q.3 A picture is painted on a cardboard 8 cm long and 5 cm wide such that there is a margin of 1.5 cm along each of its sides. Find the total area of the margin.

Sol: **Given:** Dimension of cardboard, length = 8 cm and breadth = 5 cm

Since, there is a margin of 1.5 cm along each of its sides.

So, Dimension of painted picture, length = 8-3 = 5 and breadth = 5 – 3 = 2 cm

Area of margin = Area of the cardboard – Area of the cardboard without margin

Area of margin = (8 x 5) – (5 x 2)

= 40-10

= 30 cm^2

Q.4 A verandah of width 2.25 m is constructed all along outside a room which is 5.5 m long and 4 m wide. Find:
(i) The area of the verandah.
(ii) The cost of cementing the floor of the verandah at the rate of ₹ 200 per m^2.

Sol: **Given:** Dimension of room, length = 5.5 m and breadth = 4 m
Since, A verandah of width 2.25 m is constructed all along outside a room.
So, dimension of room with verandah, length = 5.5 + 4.5 = 10m and breadth = 4 + 4.5 = 8.5 m
(i) The area of verandah = Area of the room with verandah – Area of the room without verandah
= (10 x 8.5) – (5.5 x 4)
= 85 – 22
= 63 m^2
(ii) Since, the cost of cementing the floor of the verandah = ₹ 200 per m^2
So, the cost of cementing the area 63 m^2 area of floor of the verandah = 200 × 63
= ₹ 12600

Q.5 A path 1 m wide is built along the border and inside a square garden of side 30 m. Find:
(i) the area of the path
(ii) the cost of planting grass in the remaining portion of the garden at the rate of ₹ 40 per m^2.

Sol: **Given:** Side of square garden = 30 m
Since, a path 1 m wide is built along the border.
So, Side of square garden with boarder = 30 – 2 = 28 m
(i) Thus, area of path = Area of the square garden with path – Area of the square garden without path
= $(30)^2 – (28)^2$
= 900 – 984
= 116 m^2
(ii) Since, the cost of planting grass in the remaining portion of the garden = ₹ 40 per m^2
So, the cost of planting the grass in area of 784 m^2 of the garden = 784 × 40
= ₹ 31360

Q.6 Two cross roads, each of width 10 m, cut at right angles through the centre of a rectangular park of length 700 m and breadth 300 m and parallel to its sides. Find the area of the roads. Also find the area of the park excluding cross roads. Give the answer in hectares.

Sol: **Given:** Dimension of rectangle park, length = 700 m and breadth = 300 m
Width of two cross road = 10 m
Length of horizontal road = 700 m
And length of vertical road = 300 m
So, Area of both cross roads = Area of horizontal road + Area of vertical length – Area of centered road
= (700 x 10) + (300 x 10) – (10 x 10)
= 7000 + 3000 – 100
= 9900 m^2
Thus, Area of both cross roads = 9900 m^2
Since, 1 hectare = 10000 m^2
So, area of roads in hectare = 9900/10000
= 0.99 hectare
Now, Area of park including cross roads = 700 x 300
= 210000 m^2
Area of park excluding cross roads = Area of park including cross roads - Area of both cross roads
= 210000 – 9900
= 200100 m^2
Or 200100/1000 = 20.01 hectare.

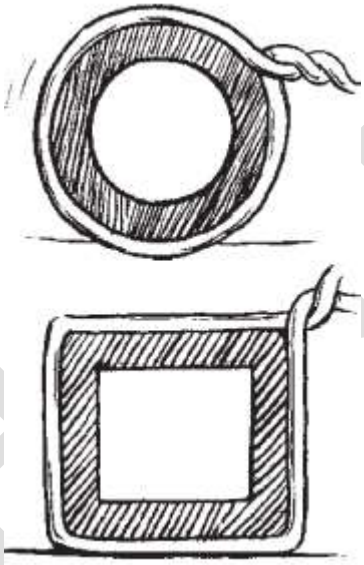
Q.7 Through a rectangular field of length 90 m and breadth 60 m, two roads are constructed which are parallel to the sides and cut each other at right angles through the centre of the fields. If the width of each road is 3 m, find
(i) the area covered by the roads.
(ii) the cost of constructing the roads at the rate of ₹ 110 per m^2.

Sol: **Given:** Dimension of rectangle field, length = 90m and breadth = 60 m
Width of roads = 3 m
Length of horizontal road = 90 m
And length of vertical road = 60 m

(i) So, Area of both cross roads = Area of horizontal road + Area of vertical length – Area of centered road
= (90 x 3) + (60 x 3) – (3 x 3)
= 270 + 180 – 9
= 441 m^2

(ii) Since, the cost of constructing the roads = ₹ 110 per m2.
So, the cost of constructing the area of 441 m^2 roads = 441 × 110
= ₹ 48510

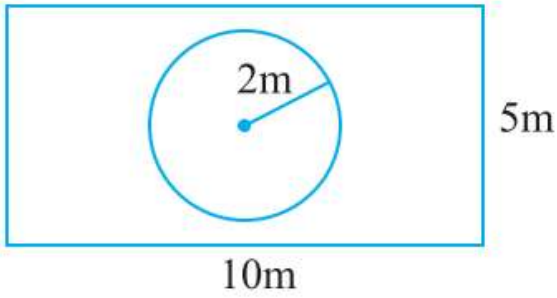
Q.8 Pragya wrapped a cord around a circular pipe of radius 4 cm (adjoining figure) and cut off the length required of the cord. Then she wrapped it around a square box of side 4 cm (also shown). Did she have any cord left? (π = 3.14)



Sol: **Given:** Radius of circular pipe = 4 cm
So, perimeter of the circular pipe = 2πr
= 2 × 3.14 × 4
= 25.12 cm
Now, side of square = 4 m
Perimeter of the square = 4 x 4 = 16 cm

So, the length of cord left = Perimeter of circular pipe – Perimeter of square
= 25.12 – 16
= 9.12 cm
Thus, 9.12 cm cord is left.

Q.9 The adjoining figure represents a rectangular lawn with a circular flower bed in the middle. Find:
(i) The area of the whole land
(ii) the area of the flower bed
(iii) The area of the lawn excluding the area of the flower bed
(iv) The circumference of the flower bed.

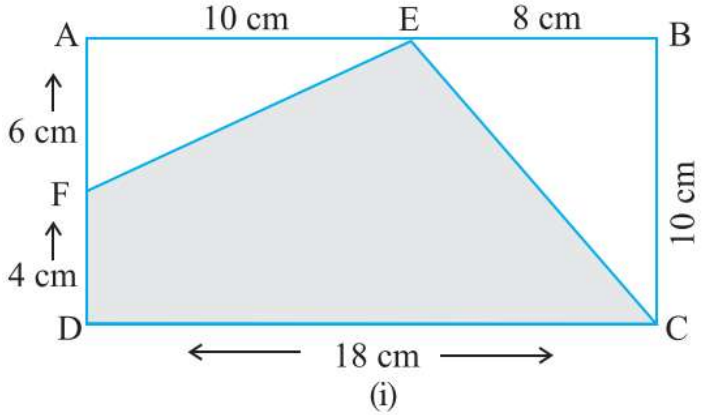


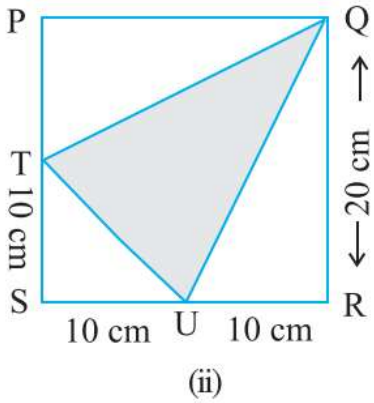
***Sol:* Given:** From the figure, length of rectangular lawn = 10 m and breadth = 5 m
Radius of circular bed = 2 m
(i) So, area of the whole rectangular lawn = length x breadth
= 10 x 5
= 50 m

(ii) Area of the circular flower bed = πr^2
= 3.14×2^2
= 3.14×4
= $12.56\ m^2$
(iii) The area of the lawn excluding the area of the flower bed = Area of rectangular lawn – Area of flower bed
= 50 – 12.56
= $37.44\ m^2$

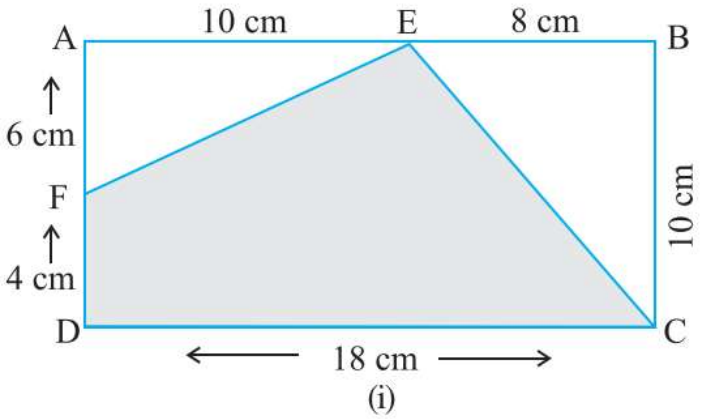
(iv) Circumference of the flower bed = $2\pi r$
= $2 \times 3.14 \times 2$
= 12.56 m

Q.10 In the following figures, find the area of the shaded portions:





Sol:
(i) Given figure:



(i)

Area of shaded region (EFDC) = Area of rectangle ABCD – (Area of right angled triangle AFE + Area of right angled triangle EBC)

Area of shaded region (EFDC) = [length x breadth] – [(½ x AF x AE) + (½ x BC x BE)]

= [18 x 10] – [(½ x 6 x 10) + (½ x 10 x 8)]

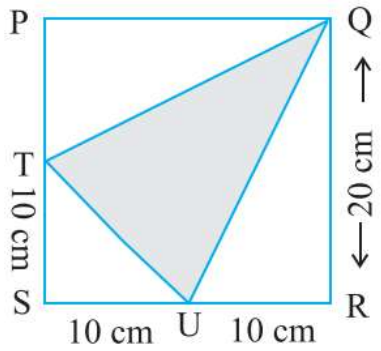
= 180 – (30 + 40)

= 180 – 70

= 110 cm^2

Thus, Area of shaded region (EFDC) is 110 cm^2.

(ii) Given figure:



(ii)

Area of shaded region (TUQ) = Area of square PQRS – (Area of right angled triangle TSU + Area of right angled triangle QRU + Area of right angled triangle PQT)

Area of shaded region (TUQ) = [$(side)^2$] – [(½ x 10 x 10) + (½ x 10 x 20) + (½ x 10 x 20)]

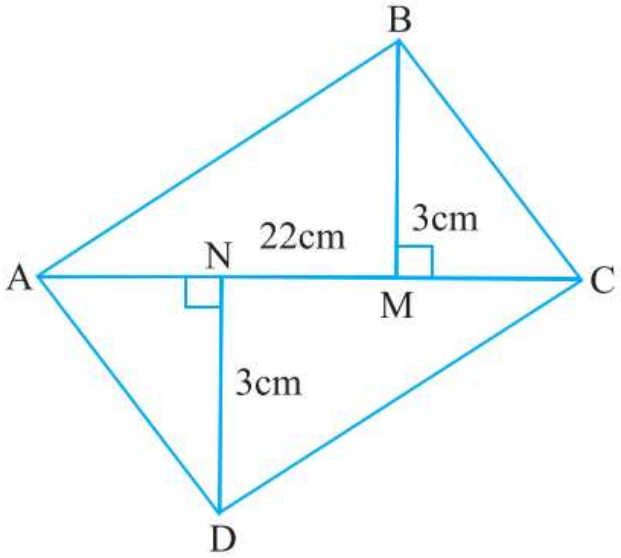
= [$(20)^2$] – [50 + 100 + 100]

= 400 – 250

= 150 cm^2

Thus, Area of shaded region (TUQ) is 150 cm^2.

Q.11 Find the area of the quadrilateral ABCD.
Here, AC = 22 cm, BM = 3 cm, DN = 3 cm, and BM ⊥ AC, DN ⊥ AC



Sol: **Given:** AC = 22 cm, BM = 3 cm, DN = 3 cm, and BM ⊥ AC, DN ⊥ AC

Since, Area of quadrilateral ABCD = Area of ΔABC + Area of ΔADC

= (½ x AC x BM) + (½ x AC x DN)

= (½ x 22 x 3) + (½ x 22 x 3)

= 33 + 33

= 66 cm^2

Thus, Area of quadrilateral ABCD = 66 cm^2