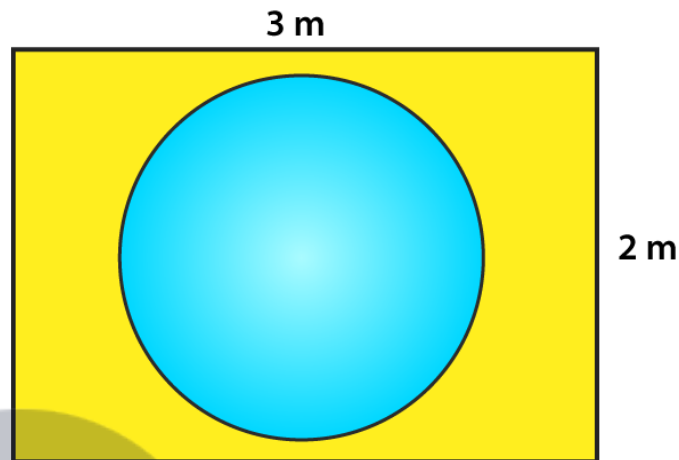


Exercise 13.2

Suppose you drop a tie at random on the rectangular region shown in fig. below. What is the probability that it will land inside the circle with diameter 1 m?

Solution:



Area of a circle with radius 0.5 m A circle = $(0.5)^2 = 0.25 \pi \text{m}^2$

Area of rectangle = $3 \times 2 = 6 \text{m}^2$

Probability (geometric) = $\frac{\text{measure of specified region part}}{\text{measure of whole region}}$

The probability that tie will land inside the circle with diameter 1m

$$= \frac{\text{area of circle}}{\text{area of rectangle}}$$

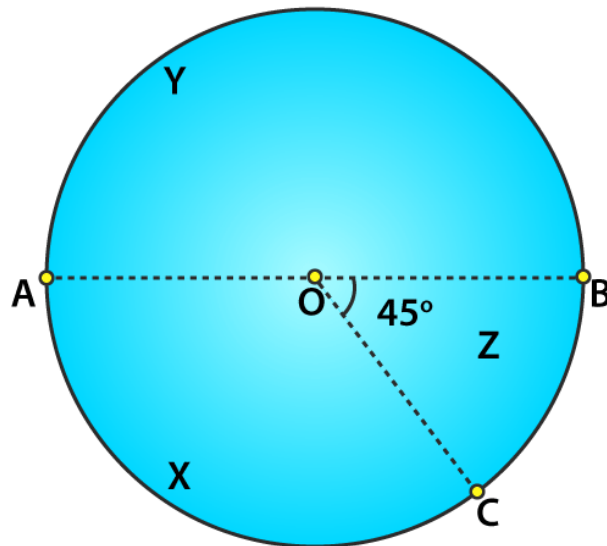
$$= \frac{0.25\pi \text{m}^2}{6 \text{m}^2}$$

$$= \frac{\pi}{24}$$

Therefore, the probability that the tie will land inside the circle = $\pi/24$

1. In the accompanying diagram, a fair spinner is placed at the centre O of the circle. Diameter AOB and radius OC divide the circle into three regions labelled X, Y and Z. If $\angle BOC = 45^\circ$. What is the probability that the spinner will land in the region X?

Solution:



Given,

$$\angle BOC = 45^\circ$$

$$\angle AOC = 180 - 45 = 135^\circ \quad [\text{Linear Pair}]$$

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

$$\begin{aligned} \text{Area of region x} &= \frac{\theta}{360} \times \pi r^2 \\ &= \frac{135}{360} \times \pi r^2 \\ &= \frac{3}{8} \times \pi r^2 \end{aligned}$$

The probability that the spinner will land in the region

$$x = \frac{\text{Area of region x}}{\text{Total area of circle}}$$

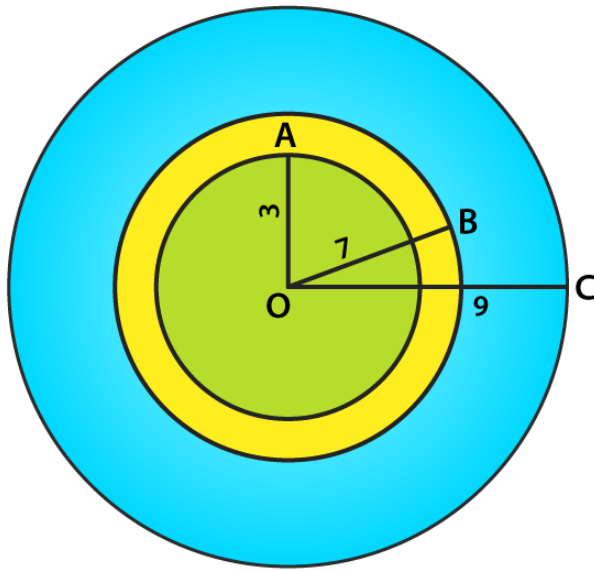
$$x = \frac{\frac{3}{8} \pi r^2}{\pi r^2}$$

$$x = \frac{3}{8}$$

Therefore, the probability that the spinner will land in region X is $\frac{3}{8}$.

2. A target is shown in fig. below consists of three concentric circles of radii, 3, 7 and 9 cm respectively. A dart is thrown and lands on the target. What is the probability that the dart will land on the shaded region?

Solution:



We have,

1st circle - with radius 3

2nd circle - with radius 7

3rd circle - with radius 9

So, their areas would be

$$\text{Area of 1st circle} = \pi(3)^2 = 9\pi$$

$$\text{Area of 2nd circle} = \pi(7)^2 = 49\pi$$

$$\text{Area of 3rd circle} = \pi(9)^2 = 81\pi$$

$$\begin{aligned} \text{Area of shaded region} &= \text{Area of 2nd circle} - \text{Area of 1st circle} \\ &= 49\pi - 9\pi \\ &= 40\pi \end{aligned}$$

Probability that it will land on the shaded region

$$= \frac{\text{area of shaded region}}{\text{area of third circle}}$$

$$= \frac{40\pi}{81\pi}$$

$$= \frac{40}{81}$$

Therefore, the probability that the dart will land on the shaded region is 40/81.