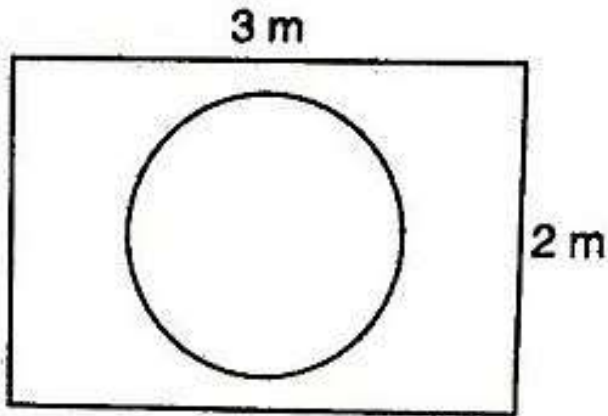


**RD SHARMA**  
**Solutions**  
**Class 10 Maths**  
**Chapter 13**  
**Ex 13.2**

**Q.1: 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 circle with radius 0.5 m

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

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

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

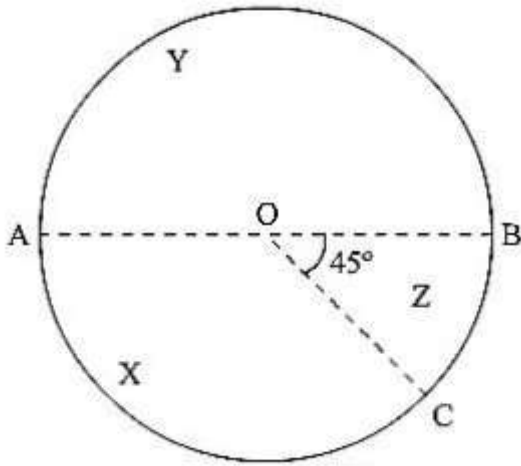
Probability that tie will land inside the circle with diameter 1 m

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

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

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

**Q.2: In the accompanying diagram, a fair spinner is placed at the center O of the circle. Diameter AOB and radius OC divide the circle into three regions labeled X, Y and Z. If  $\angle BOC = 45^\circ$ . What is the probability that the spinner will land in the region X?**



**Solution:**

Given,

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

$$\angle AOC = 180 - 45 = 135^\circ$$

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

$$\text{Area of region x} = \frac{\theta}{360} \times \pi r^2 = \frac{135}{360} \times \pi r^2$$

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

$$= 38 \times \frac{3}{8} \pi r^2$$

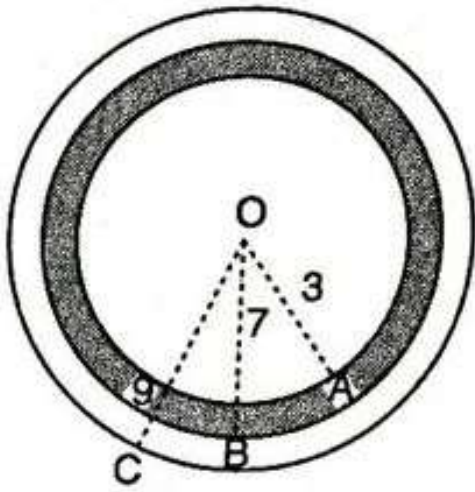
Probability that the spinner will land in the region

$$X = \frac{\text{Area of region x}}{\text{Total area of circle}} = \frac{\frac{3}{8} \pi r^2}{\pi r^2}$$

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

$$X = 38 \frac{3}{8}$$

**Q.3:** A target 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:**

1<sup>st</sup> circle – with radius 3

2<sup>nd</sup> circle – with radius 7

3<sup>rd</sup> circle – with radius 9

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

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

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

$$\text{Area of shaded region} = \text{Area of 2}^{\text{nd}} \text{ circle} - \text{area of 1}^{\text{st}} \text{ circle}$$

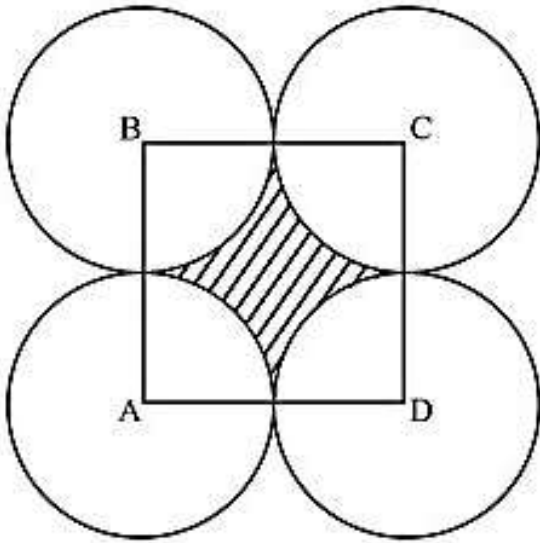
$$= 49\pi - 9\pi = 40\pi$$

$$= 40\pi$$

$$\text{Probability that it will land on the shaded region} = \frac{\text{area of shaded region}}{\text{area of third circle}}$$

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

**Q.4:** In below fig. points A, B, C and D are the centers of four circles that each has a radius of length one unit. If a point is selected at random from the interior of square ABCD. What is the probability that the point will be chosen from the shaded region?



**Solution:**

Radius of circle = 1 cm

Length of side of square = 1 + 1 = 2 cm

Area of square = 2 × 2 = 4 cm<sup>2</sup>

Area of shaded region = area of square – 4 × area of quadrant

$$= 4 - 4 \times \left(\frac{1}{4}\right) \times \pi(1)^2$$

$$= (4 - \pi) \text{ cm}^2$$

Probability that the point will be chosen from the shaded region =  $\frac{\text{Area of shaded region}}{\text{Area of square ABCD}}$

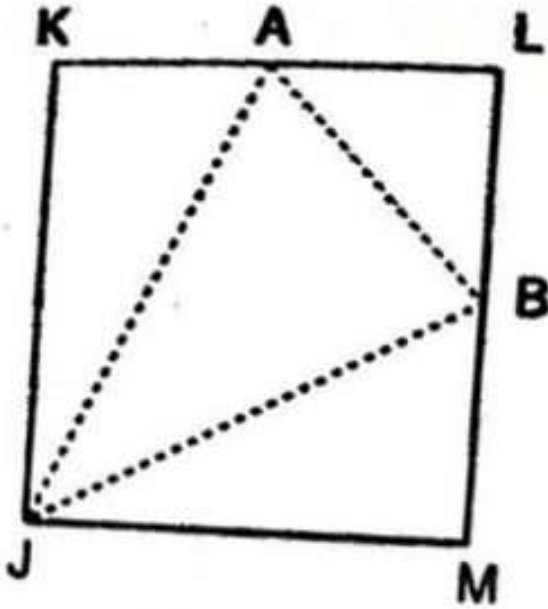
$$= \frac{4 - \pi}{4}$$

$$= 1 - \frac{\pi}{4}$$

Since geometrical probability,

$$P(E) = \frac{\text{Measure of specified part of region}}{\text{Measure of the whole region}}$$

**Q.5:** In the fig. below, JKLM is a square with sides of length 6 units. Points A and B are the midpoints of sides KL and LM respectively. If a point is selected at random from the interior of the square. What is the probability that the point will be chosen from the interior of triangle JAB?



**Solution:**

JKLM is a square with sides of length 6 units. Points A and B are the midpoints of sides KL and ML, respectively. If a point is selected at random from the interior of the square.

We have to find the probability that the point will be chosen from the interior of  $\Delta JAB$ .

Now,

Area of square JKLM is equal to  $6^2 = 36$  sq.units

Now, we have

$$\text{ar}(\Delta KAJ) = \frac{1}{2} \times AK \times KJ$$

$$= \frac{1}{2} \times 3 \times 6$$

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

$$\text{ar}(\Delta JMB) = \frac{1}{2} \times JM \times BM$$

$$= \frac{1}{2} \times 6 \times 3$$

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

$$\text{ar}(\Delta AJB) = \frac{1}{2} \times AL \times BL$$

$$= \frac{1}{2} \times 3 \times 3$$

$$= \frac{9}{2} \text{ unit}^2$$

Now, area of the triangle AJB

$$\text{ar}(\Delta AJB) = 36 - 9 - 9 = 18 \quad \text{ar}(\Delta AJB) = 36 - 9 - 9 = \frac{9}{2}$$

$$= 272 \text{ unit}^2 \frac{27}{2} \text{ unit}^2$$

We know that:

$$\text{Probability} = \frac{\text{Number of favourable events}}{\text{Total number of events}} = \frac{\text{Number of favourable events}}{\text{Total number of events}}$$

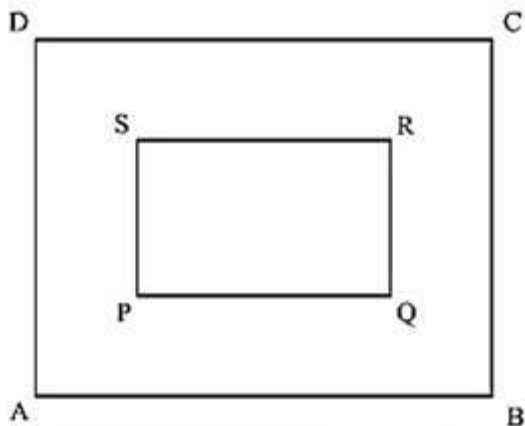
$$= \frac{27}{36}$$

$$= 272 \times 36 \frac{27}{2 \times 36}$$

$$= 38 \frac{3}{8}$$

Hence, the probability that the point will be chosen from the interior of  $\Delta AJB = 38 \Delta AJB = \frac{3}{8}$ .

**Q.6:** In the fig. below, a square dartboard is shown. The length of a side of the larger square is 1.5 times the length of a side of the smaller square. If a dart is thrown and lands on the larger square. What is the probability that it will land in the interior of the smaller square?



**Solution:**

Let, length of side of smaller square = a

Then length of side of bigger square = 1.5a

$$\text{Area of smaller square} = a^2$$

$$\text{Area of bigger square} = (1.5a)^2 = 2.25a^2$$

$$\text{Probability that dart will land in the interior of the smaller square} = \frac{\text{Area of smaller square}}{\text{Area of bigger square}}$$

$$= \frac{a^2}{2.25a^2}$$

$$= \frac{1}{2.25}$$

$$= \frac{4}{9}$$

Geometrical probability,

$$P(E) = \frac{\text{Measure of specified region part}}{\text{Measure of whole region}}$$