RD SHARMA

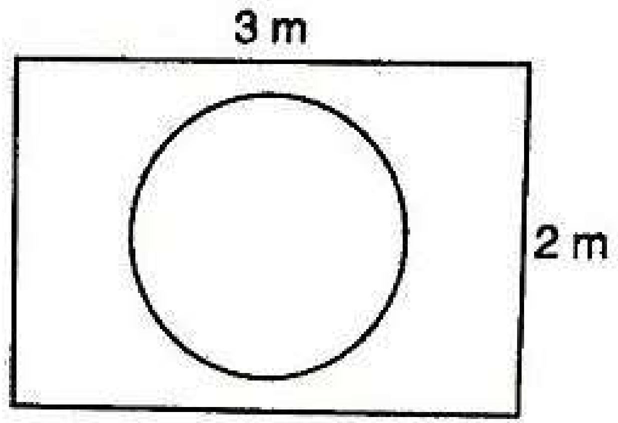
Solutions

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

A circle = $(0.5)^2 (0.5)^2$ = $0.25\pi m^2 0.25\pi m^2$

Area of rectangle = 3 x 2 = $6m^2 6m^2$

Probability (geometric) = measureofspecifiedregionpartmeasureofwholeregion $\frac{measureofspecifiedregionpart}{measureofwholeregion}$

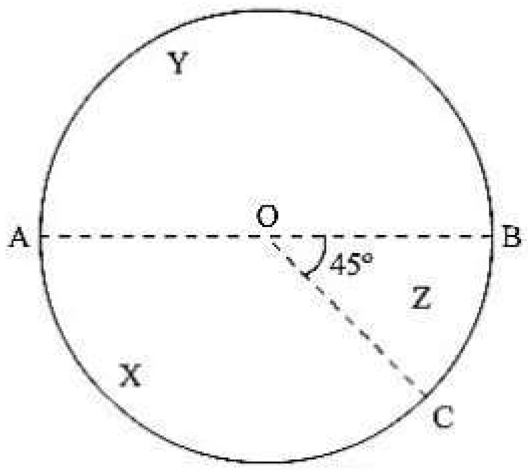
Probability that tie will land inside the circle with diameter 1m

= areaofcircleareaofrectangle $\frac{areaofcircle}{areaofrectangle}$

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

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

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 ∠BOC ∠BOC = 45°. What is the probability that the spinner will land in the region X?



Solution:

Given,

$\angle BOC \angle BOC$ = 45°

$\angle AOC \angle AOC$ = 180 – 45 = 135°

Area of circle = $\pi r^2 \pi r^2$

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

= $135360 \times \pi r^2 \frac{135}{360} \times \pi r^2$

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

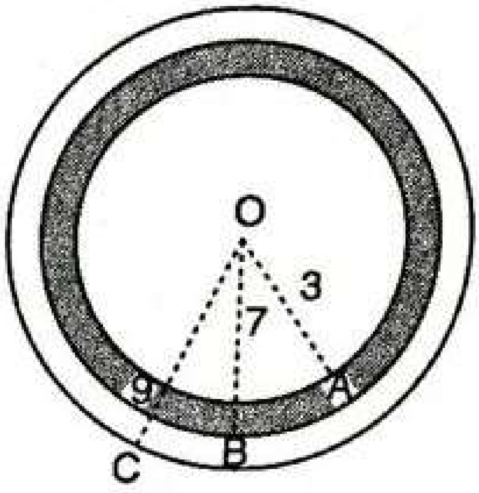
Probability that the spinner will land in the region

X = AreaofregionxTotalareaofcircle $\frac{\text{Areaofregionx}}{\text{Totalareaofcircle}}$

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

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:

1st circle – with radius 3

2nd circle – with radius 7

3rd circle – with radius 9

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

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

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

Area of shaded region = Area of 2nd circle – area of 1st circle

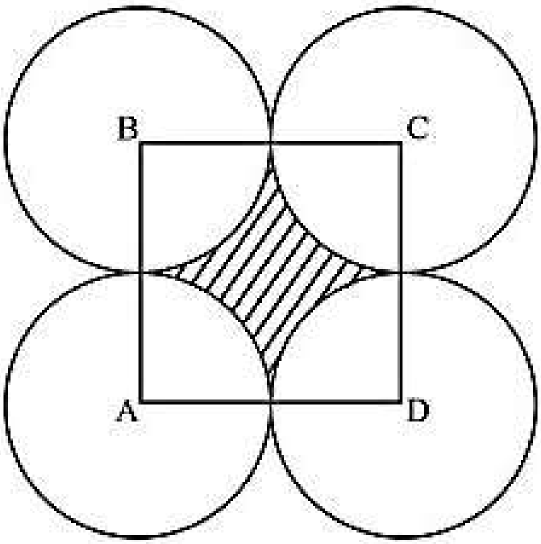
= $49\pi - 9\pi 49\pi - 9\pi$

= $40\pi 40\pi$

Probability that it will land on the shaded region = areaofshadedregionareaofthirdcircle $\frac{\text{areaofshadedregion}}{\text{areaofthirdcircle}}$

= $40\pi 81\pi \frac{40\pi}{81\pi}$ = $4081 \frac{40}{81}$

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 x 2= $4cm^2 4cm^2$

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

= $4-4\times(14)\times\pi(1)^2 4-4\times(\frac{1}{4})\times\pi(1)^2$

= $(4-\pi)cm^2 (4-\pi)cm^2$

Probability that the point will be chosen from the shaded region = AreaofshadedregionAreaofsquareABCD $\frac{\text{Areaofshadedregion}}{\text{AreaofsquareABCD}}$

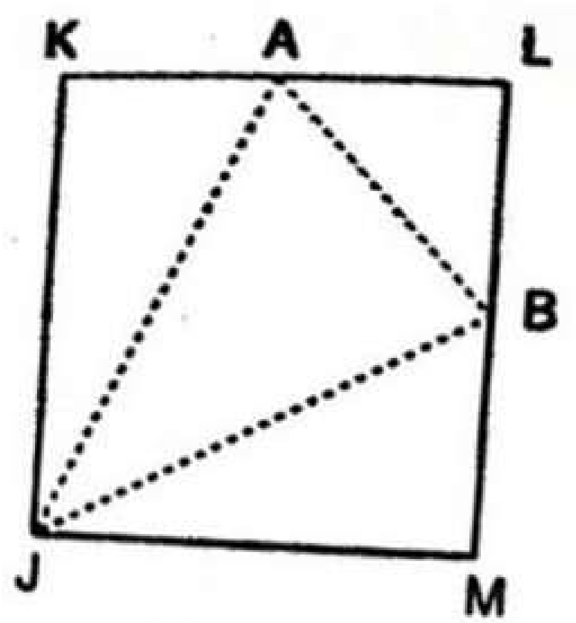
= $4-\pi 4 \frac{4-\pi}{4}$

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

Since geometrical probability,

P(E) = MeasureofspecifiedpartofregionMeasureofthewholeregion $\frac{\text{Measureofspecifiedpartofregion}}{\text{Measureofthewholeregion}}$

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 ΔJAB .

Now,

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

Now, we have

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

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

$= 9\ unit^2$

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

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

$= 9\ unit^2$

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

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

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

Now, area of the triangle AJB

ar(ΔAJB)=36–9–9–=92 $ar(\Delta AJB) = 36 - 9 - 9 - = \frac{9}{2}$

= 272 unit2 $\frac{27}{2}\ unit^2$

We know that:

Probability = Numberoffavourableevents Totalnumberofevents $\frac{\text{Number of favourable events}}{\text{Totalnumber of events}}$

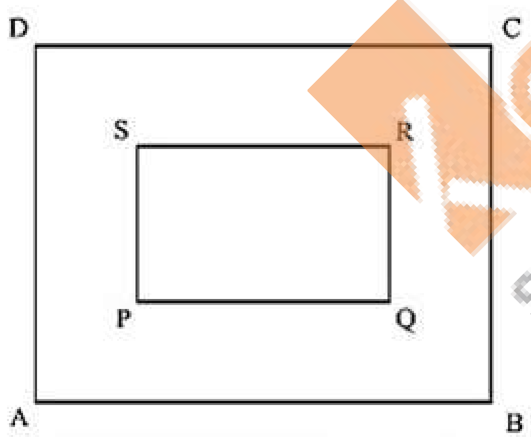
= 272 36 $\frac{\frac{27}{2}}{36}$

= 272×36 $\frac{27}{2 \times 36}$

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

Hence, the probability that the point will be chosen from the interior of ΔAJB= 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

Area of smaller square = a2 a^2

Area of bigger square = (1.5)2a2 $(1.5)^2 a^2$ = 2.25a2 $2.25a^2$

Probability that dart will land in the interior of the smaller square = AreaofsmallersquareAreaofbiggersquare $\frac{\text{Areaofsmallersquare}}{\text{Areaofbiggersquare}}$

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

= 12.25 $\frac{1}{2.25}$

= 49 $\frac{4}{9}$

Geometrical probability,

P(E) = MeasureofspecifiedregionpartMeasureofwholeregion $\frac{\text{Measureofspecifiedregionpart}}{\text{Measureofwholeregion}}$