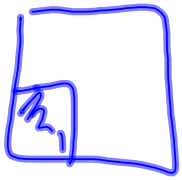
Probability: $\frac{\text{What you want}}{\text{What is possible}}$

P(E): Probability (chances) of an event happening.
E represents what you want to happen.

Example: P(Q): chances of picking a queen in a deck of cards.

Geometric Probability:
* Used when you want to find the chances of landing in a specific area.

$$\mathbf{P(E)=\frac{Area\ you\ want}{Total\ Area}}$$



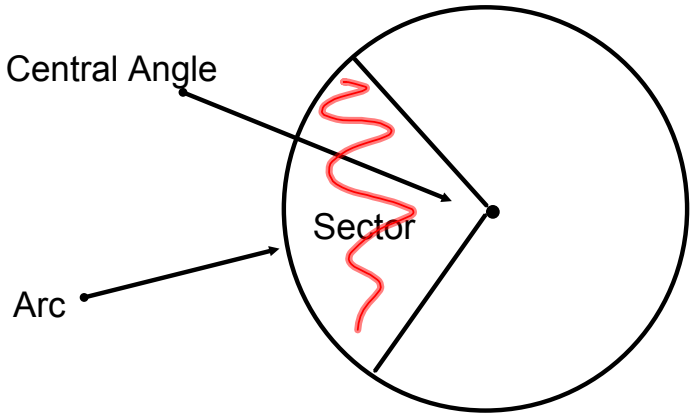
* Assume that it is equally likely that the object will land anywhere in the region.

* Assume that the object lands within the target area.

Sector:

* A region of the circle that is bounded by central angle and its intercepted arc.

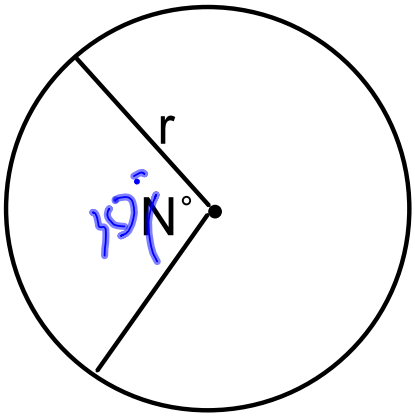
* Think of it as a slice of pizza or pie.



Area of Sector:

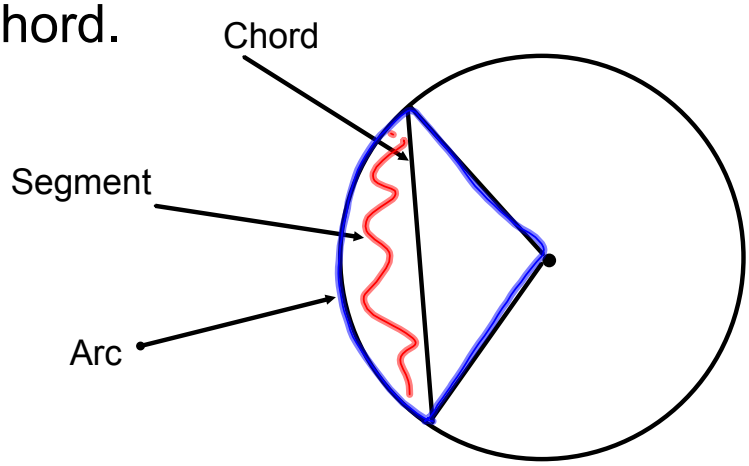
$$A = \frac{N}{360^\circ}\pi r^2$$

r: radius
N: central angle measure



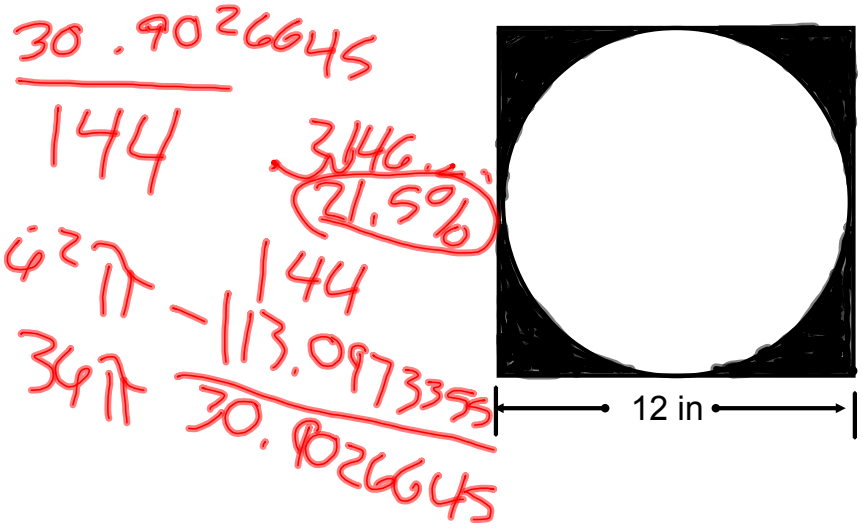
Segment of a Circle:

* The region of a circle bounded by an arc and a chord.



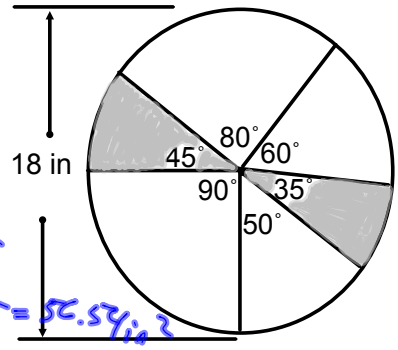
Area of a Segment = area sector - area triangle

1. A game board consists of a circle inscribed in a square. What is the chance that a dart thrown at the board will land in the shaded region?



2.

a. Find the area of the shaded sectors.



$A = \frac{N}{360} \cdot \pi r^2$

$A = \frac{80}{360} \cdot \pi \cdot 9^2 = 18\pi = 56.54 \text{ in}^2$

b. Find the probability that a point chosen at random lies in the shaded region.

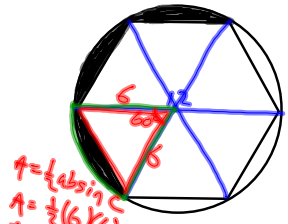
$P(\text{shaded region}) = \frac{18\pi}{\pi r^2} = \frac{18\pi}{9^2\pi} = \frac{18\pi}{81\pi}$

≈ 0.2

$\approx 22\%$

3. A regular hexagon is inscribed in a circle with a diameter of 12.

a. Find the area of the shaded regions.



$r = 6$ $360 \div 6 = 60°$

$A_{sector} = \frac{60}{360} \cdot \pi \cdot 6^2$

$= \frac{1}{6} \cdot 36\pi = 6\pi$

$A = \frac{1}{2} ab \sin C$

$A = \frac{1}{2}(6)(6)\sin 60°$

$A = 18\sin 60°$

$6\pi - 18\sin 60° = 3.26$

$\times 3$

$A = 9.78$

b. Find the probability that a point chosen at random lies in the shaded region.

$P(\text{shaded region}) = \frac{\text{area of shaded region}}{\text{area of circle}}$

$P(\text{shaded region}) = \frac{9.78}{6^2\pi}$

$P(\text{shaded region}) = 0.086$

$\approx 9\%$ 0.09

$9.78/(36\pi)$