Notes – Area Models/Geometric Probability Name: Key

Geometric Probability – The probability of landing in a specific region of a target. It is the ratio of the area of the shaded region to the area of the target.

**When determining geometric probability with targets, we are assuming that...

- ✓ The object lands within the target area.
- ✓ It is equally likely that the object will land anywhere in the region.

1. Your friend has an interesting collection of dartboards. If you throw a dart at random and it is guaranteed to hit the dartboard but you only get a point if it hits the shaded region, what is the probability that you will get a point on the dartboard below?

a) Determine the area of the entire dartboard.

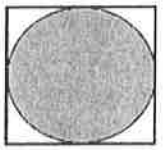
$A_D = L \cdot W$

$18 \cdot 18 = 324 in^2$

b) Determine the area of the shaded region.

$A_O = \pi r^2$

$3.14 \cdot 9^2 = 254.34 in^2$

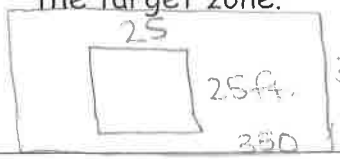


c) Determine the probability by comparing the area of the shaded region to the area of the entire dartboard. Be sure to convert your probability to a percent.

$$\frac{\text{area of the shaded region}}{\text{area of the entire dartboard}} = \frac{254.34}{324} = .785 = 78.5\%$$

d) Does your answer seem reasonable? yes.

2. During Raleigh's Freedom Balloon Fest, each balloon tries to land in a target zone. The target zone is a square that has a side length of 25 ft. The target zone is in the middle of a rectangular field that is 325 feet by 350 feet. Find the probability that the balloon lands in the target zone.



$A_D = l \cdot w = 25 \cdot 25 = 625$

$A_\square = l \cdot w = 325 \cdot 350 = 113750$

$P_{(target)} = \frac{sq}{Rect} = \frac{625}{113750}$

$.00549 = .5\%$

a) If the area of the target zone is doubled, how does the probability change?

$625 \cdot 2 = 1250$

$\frac{1250}{113750} = .01098 \approx 1.1\%$

increases about .6%

b) If each side of the target zone is doubled, how does the probability change?

$25 \cdot 2 = 50$

$L \cdot W$

$50 \cdot 50 = 2500$

$\frac{2500}{113750} = .02197$

$\approx 2.2\%$

increases 1.7%