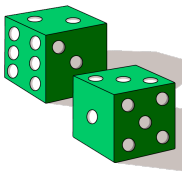
Algebra 6-6 Probability without Counting

Warm-Up

1. Suppose you have a 12-sided die with the sides numbered from 1 to 12. Assuming the die is fair, calculate the following:

(Part / whole)

1. P (tossing an even number) _____ $\frac{6}{12} = \frac{1}{2} = .5 = 50\%$



2. P (tossing a 7) _____ $\frac{1}{12}$
3. P (tossing a number less than 7) _____ $\frac{6}{12} = \frac{1}{2}$

2. **Multiple Choice.** A student flips a coin a 100 times and counted heads 47 times. Which phrase best describes the ratio 47/100?

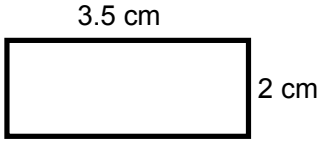
1. the probability of a coin toss landing on heads
2. the relative frequency of a coin toss landing on heads

real or experimental

Geometric Probability = $\frac{\text{favorable Area}}{\text{total Area}}$

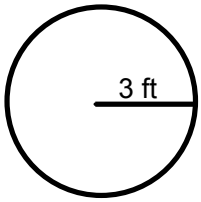
Formula Refresher

- **Area of a Rectangle =** $l \cdot w$



$A = 3.5(2)$
$= 7 \text{ cm}^2$

- **Area of a Circle =** πr^2

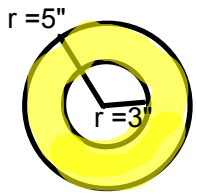


$A = \pi(3)^2 =$
$9\pi \text{ ft}^2$

Examples

For numbers 1-3, find the probability of a dart landing in the shaded area.

1.



Area of shaded / Total Area

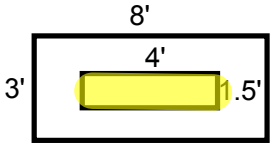
$25\pi - \pi(3)^2 = 25\pi - 9\pi = 16\pi$

$\frac{16\pi}{25\pi} = \frac{16}{25}$

$A_{large} = \pi(5)^2 = 25\pi$

= 64%

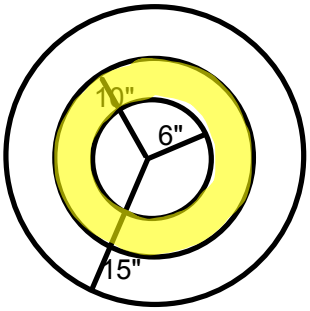
2.



25%

$\frac{\text{shaded}}{\text{total}} = \frac{4(1.5)}{3 \cdot 8} = \frac{6}{24} = \frac{1}{4} = .25 = 25\%$

3.

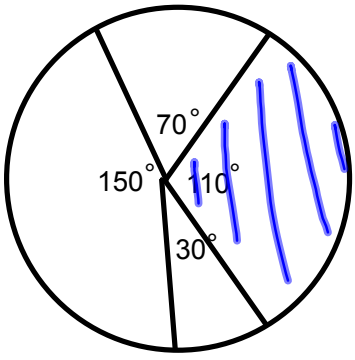


28%

$\frac{\text{shaded}}{\text{total}} = \frac{\pi(10)^2 - \pi 6^2}{\pi 15^2} = \frac{100\pi - 36\pi}{225\pi} = \frac{64\pi}{225\pi} = .28$

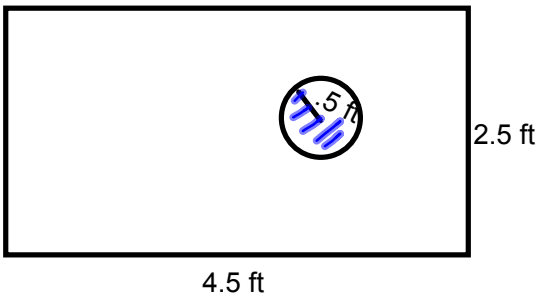
4. Find the probability of the spinner landing in the shaded region.

31%



$\frac{\text{shaded}}{\text{total}} = \frac{110}{360} = .305$

5. Find the probability of a beanbag landing in the hole.



$$\frac{\text{Shaded}}{\text{Total}} = \frac{\pi(.5)^2}{2.5(4.5)} \quad \frac{.25\pi}{11.25}$$

$$= .25(3.14) \div 11.25$$

$$= .069 = 6.9\%$$