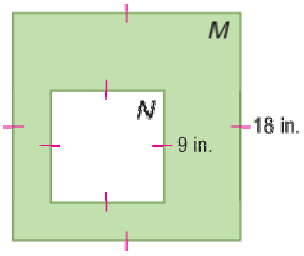
Lesson 5-3

Example 1

Let A = where the number cube lands in M, the pizza box, and let N = the paper square. Find $P(A$ lands within region $N)$.



Solution

Find the probability.

$$P = \frac{\text{area of } N}{\text{area of } M} \qquad \frac{\text{area of } N = \text{favorable outcome}}{\text{area of } M = \text{possible outcome}}$$

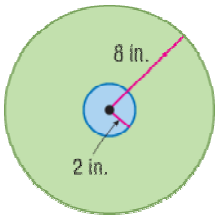
$$= \frac{81}{324}$$

$$= \frac{1}{4} \text{ or } 0.25$$

So the probability that the number cube will land on the paper square is $\frac{1}{4}$, or 0.25.

Example 2

A coin is dropped into a can whose bottom is shown at the right. What is the probability that the coin lands in the blue region? In the green region?



Solution

$$P(\text{blue}) = \frac{\text{area of blue circle}}{\text{area of larger circle}}$$

$$= \frac{(\pi)(2^2)}{(\pi)(8^2)}$$

$$= \frac{4}{64} = \frac{1}{16}$$

Since $P(\text{green or blue}) = 1$, then $P(\text{green}) = 1 - P(\text{blue})$. $P(\text{green}) = \frac{15}{16}$.

Example 3

A treasure chest was buried long ago beneath what is now school property. No one knows where the chest lies. If the school property is a rectangle measuring 500 ft by 620 ft, what is the probability that the chest could be found by excavating the baseball diamond, a square with sides 90 ft each?

Solution

$$P(\text{chest in diamond}) = \frac{\text{area of diamond}}{\text{area of property}}$$

area of diamond
$A = s^2$
$A = 90^2 = 8100$

area of property
$A = \ell w$
$A = (500)(620) = 310{,}000$

$$P(\text{chest in diamond}) = \frac{8100}{310{,}000} = 0.026$$

The probability is $\frac{8100}{310{,}000} = 0.026$.

Example 4

GAMES Twenty-five darts are thrown at random at a circular dartboard. Four hit the bull's-eye. If the diameter of the bull's-eye is 20 cm, what is the probable area of the target?

Solution

Since 4 of 25 darts landed in the bull's-eye, the probability of a single dart hitting the bull's-eye is $\frac{4}{25}$.

$$P(\text{dart landing in the bull's-eye}) = \frac{\text{area of bull's-eye}}{\text{area of target}} = \frac{4}{25}$$

Area of bull's-eye $= \pi r^2 \approx 3.14 \cdot 10^2 \approx 314 \text{ cm}^2$

Let x = area of target. $\frac{4}{25} \approx \frac{314}{x}$; $x \approx 1963$

The probable area of the target is about 1963 cm^2.