

Study Guide and Intervention

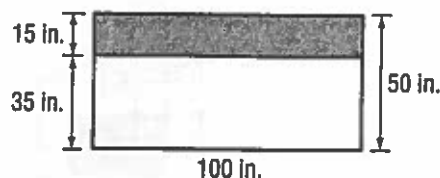
Probability and Area

Probability can be expressed as the ratio of areas.

The probability of landing in a specific region of a target is the ratio of the area of the specific region to the area of the target.

$$P(\text{specific region}) = \frac{\text{area of specific region}}{\text{area of the target}}$$

EXAMPLE 1 Find the probability that a randomly thrown dart will land in the shaded region of the dartboard. Assume it is equally likely for a dart to land anywhere in the rectangle.



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

Area of shaded region

$$\begin{aligned} \ell \times w &= 15 \times 100 \\ &= 1,500 \text{ sq in.} \end{aligned}$$

Area of dartboard

$$\begin{aligned} \ell \times w &= 50 \times 100 \\ &= 5,000 \text{ sq in.} \end{aligned}$$

$$P(\text{shaded region}) = \frac{1,500}{5,000} \text{ or } \frac{3}{10}$$

So, the probability that a randomly thrown dart will land in the shaded region is $\frac{3}{10}$, 0.30, or 30%.

EXAMPLE 2 Predict how many times a dart will land in the shaded area above if 30 darts are randomly thrown.

Write a proportion that compares the number of darts landing in the shaded region to the number of darts thrown. Let n = the number of darts landing in the shaded region.

$$\frac{n}{30} = \frac{3}{10} \quad \leftarrow \begin{array}{l} \text{darts landing in the shaded region} \\ \text{darts thrown} \end{array}$$

$$n \times 10 = 30 \times 3 \quad \text{Write the cross products.}$$

$$10n = 90 \quad \text{Multiply.}$$

$$\frac{10n}{10} = \frac{90}{10} \quad \text{Divide each side by 10.}$$

$$n = 9$$

So, if 30 darts are randomly thrown, 9 darts will land in the shaded region.

EXERCISES

Use the dartboard from Example 1.

1. What is the probability that a randomly thrown dart will land in the region that is not shaded?
2. Predict the number of darts that will land in the region that is not shaded if 40 darts are randomly thrown.

Practice: Word Problems

Probability and Area

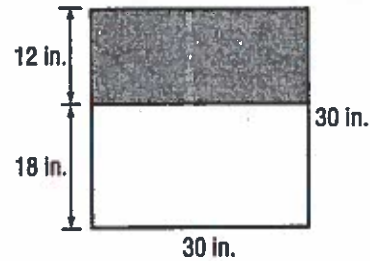
GAMES For Exercises 1–5, use the following information and the game boards below.

Game Board 1 is for a beanbag toss game in which you are blindfolded and toss a beanbag at the board. The game board shows a bird's head with eyes, beak, and a hole for a mouth. Game Board 2 is for a dart game in which you randomly throw a dart at the board.

Game Board 1



Game Board 2



<p>1. Refer to Game Board 1. The shaded region represents the mouth hole. Dawn will randomly throw a beanbag at the board. What is the probability that the beanbag will go into the mouth hole? What is the probability that the beanbag will not go into the mouth hole?</p>	<p>2. Use your answer from Exercise 1. Predict how many beanbags will go into the mouth hole if Dawn throws 20 beanbags. Explain.</p>
<p>3. Use your answer from Exercise 1. Predict how many beanbags will not go into the mouth hole if Dawn throws 40 beanbags.</p>	<p>4. Refer to Game Board 2. Pam will randomly throw a dart at the dartboard. What is the probability that her dart will land in the shaded region? Explain.</p>
<p>5. Use your answer from Exercise 4. Predict the number of darts that will land in the shaded area if Pam randomly throws 60 darts.</p>	<p>6. SKYDIVING A skydiver is dropped from a plane above a field that is 35 yards by 16 yards. In the center is a region of sand that is 7 yards by 7 yards. What is the probability that the skydiver will land in the sandy region?</p>