

2-6 Probability: Simple Probability and Odds

(Pages 96–101)

You can calculate the chance, or **probability**, that a particular event will happen by finding the ratio of the number of ways the event can occur to the number of possible outcomes. The probability of an event may be written as a fraction, decimal, or percent. When outcomes have an equal chance of occurring, they are **equally likely**. When an outcome is chosen without any preference, the outcome occurs at **random**.

Definition of Probability	probability of an event or $P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{total number of possible outcomes}}$
Definition of Odds	odds of an event = $\frac{\text{number of ways the event can occur}}{\text{number of ways the event cannot occur}}$ = successes : failures

Examples

- a. Find the probability of randomly choosing the letter *p* in the word “apple.”**

There are 2 *p*'s and 5 letters in all.

$$P(\text{choosing a } p) = \frac{2}{5}$$

The probability is $\frac{2}{5}$, 0.4, or 40%.

- b. Find the odds of randomly selecting the letter *p* in the word “Mississippi.”**

There are 11 letters in the word. Two letters are *p*'s and 11 – 2 or 9 letters are not *p*'s.

Odds of selecting a *p*

$$= \text{number of } p\text{'s} : \text{number not } p\text{'s}$$

$$= 2:9 \quad 2:9 \text{ is read “2 to 9.”}$$

Try These Together

- What is the probability of rolling a 1 or a 2 using a 6-sided number cube?
HINT: The number of favorable outcomes is 2.
- From a group of 125 boys and 150 girls, what are the odds of randomly selecting a girl?
HINT: Remember to simplify your ratio.

Practice

Determine the probability of each event.

- You toss a coin and get heads.
- A person was born on a weekday.

Find the probability of each outcome if a computer randomly chooses a letter in the word “mathematical.”

- the letter *t*
- the letter *a* or *c*
- the letter *d*
- not an *m*

Find the odds of each outcome if a computer randomly chooses a letter in the word “Alabama.”

- the letter *a*
- the letter *b*
- a consonant
- not a *g*

- 13. Standardized Test Practice** What are the odds of randomly selecting a dime from a dish containing 11 pennies, 6 nickels, 5 dimes, and 3 quarters?

A 5:1

B 1:5

C 1:4

D 4:1

Answers: 1. $\frac{1}{2}$ 2. $\frac{6}{25}$ 3. $\frac{2}{11}$ 4. $\frac{7}{5}$ 5. $\frac{1}{5}$ 6. $\frac{1}{6}$ 7. 0 8. $\frac{6}{5}$ 9. 4:3 10. 1:6 11. 3:4 12. 7:0 13. C