

# Probability and Counting Principles

Algebra 1 • Section 10.5

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 12

## Quick Review and Helpful Hints

Data questions are about choosing the right summary. Read the labels carefully, identify the total or condition being used, and connect each statistic to what it tells about the data.

▷ **Example:** Find the mean of 6, 8, 10, 12.

**Work:** Add the values to get 36, then divide by 4 values.

★ **Answer:** 9

## ◆ Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

- |   |  |
|---|--|
| 1. A bag has 3 red and 5 blue marbles. Find $P(\text{red})$ .<br>_____  | 7. Two independent events have probabilities $\frac{1}{2}$ and $\frac{3}{4}$ . Find both.<br>_____ |
| 2. Flip a coin and roll a die. How many outcomes?<br>_____              | 8. A code has 3 letters then 2 digits. Repeats allowed. How many?<br>_____                         |
| 3. How many ways to arrange 4 different books?<br>_____                 | 9. Roll two dice. Find probability of sum 7.<br>_____  |
| 4. Choose 2 students from 6. How many groups?<br>_____                  | 10. Pick one card from 10 numbered cards. Find $P(\text{multiple of } 3)$ .<br>_____               |
| 5. Find $P(\text{even})$ on a fair die.<br>_____                        |  |
| 6. Find $P(\text{not red})$ if $P(\text{red}) = \frac{2}{5}$ .<br>_____ |  |

## ◆ Word Problems

11. A menu has 4 entrees, 3 drinks, and 2 desserts. How many meals?  
\_\_\_\_\_
12. A spinner has 8 equal sections, 2 green. Find probability not green.  
\_\_\_\_\_



## Answer Keys

1.  $\frac{3}{8}$

2. 12

3. 24

4. 15

5.  $\frac{1}{2}$

6.  $\frac{3}{5}$

7.  $\frac{3}{8}$

8.  $26^3 \cdot 10^2$

9.  $\frac{1}{6}$

10.  $\frac{3}{10}$

11. 24

12.  $\frac{3}{4}$

### Step-by-Step Explanations

1. Probability is favorable over total — 3 red marbles out of 8 marbles altogether gives  $\frac{3}{8}$ .

2. For each of the 2 coin results you could get any of 6 die faces, so multiply:  $2 \cdot 6 = 12$ .

3. Order matters here, so it's a factorial:  $4 \cdot 3 \cdot 2 \cdot 1 = 24$  different arrangements.

4. Since the group's order doesn't matter, use combinations:  $\binom{6}{2} = 15$ .

5. Three faces are even — 2, 4, 6 — out of six total, and  $3/6$  simplifies to  $\frac{1}{2}$ .

6. Something either happens or it doesn't, so 'not red' is whatever's left:  $1 - \frac{2}{5} = \frac{3}{5}$ .

7. When events don't affect each other, the chance of both is found by multiplying:  $\frac{1}{2} \cdot \frac{3}{4} = \frac{3}{8}$ .

8. Each slot fills independently — 26 choices per letter, 10 per digit — so multiply them all together.

9. There are 36 equally likely pairs, and 6 of them add to 7, so the probability is  $6/36 = \frac{1}{6}$ .

10. From 1 to 10, the multiples of 3 are 3, 6, and 9 — that's 3 winners out of 10.

11. Each course is a separate choice, so multiply the options together:  $4 \cdot 3 \cdot 2 = 24$  meals.

12. If 2 sections are green, the other 6 aren't — so 'not green' is  $6/8$ , which trims to  $\frac{3}{4}$ .



## Want Even More Algebra 1 Practice?



### Vermont Algebra I Preparation Bundle

18 full-length practice tests across three books  
Fresh test practice, detailed explanations, and  
organized review



**18 Tests**  
**3 Books**  
**One Bundle**

**Important:** These Algebra 1 resources are made for extra practice after the worksheet. Use the QR code for the state or program bundle connected with this worksheet.

#### Skill Review

- ✓ Strengthens equations, functions, systems, and modeling
- ✓ Supports steady review before tests
- ✓ Good for tutoring, homework, and independent practice

**Build the foundation.**

#### Test Practice

- ✓ Full-length practice tests for realistic pacing
- ✓ Detailed answer explanations for every test
- ✓ Useful after students finish topic worksheets

**Practice with purpose.**

#### Confidence

- ✓ Turns mistakes into targeted review
- ✓ Helps students see progress over time
- ✓ Keeps preparation organized and calm

**Move forward prepared.**