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 $P(\text{red})$.

2. Flip a coin and roll a die. How many outcomes?

3. How many ways to arrange 4 different books?

4. Choose 2 students from 6. How many groups?

5. Find $P(\text{even})$ on a fair die.

6. Find $P(\text{not red})$ if $P(\text{red}) = \frac{2}{5}$.

7. Two independent events have probabilities $\frac{1}{2}$ and $\frac{3}{4}$. Find both.

8. A code has 3 letters then 2 digits. Repeats allowed. How many?

9. Roll two dice. Find probability of sum 7.

10. Pick one card from 10 numbered cards. Find $P(\text{multiple of } 3)$.

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. $\boxed{\frac{3}{8}}$
2. $\boxed{12}$
3. $\boxed{24}$
4. $\boxed{15}$
5. $\boxed{\frac{1}{2}}$
6. $\boxed{\frac{3}{5}}$
7. $\boxed{\frac{3}{8}}$
8. $\boxed{26^3 \cdot 10^2}$
9. $\boxed{\frac{1}{6}}$
10. $\boxed{\frac{3}{10}}$
11. $\boxed{24}$
12. $\boxed{\frac{3}{4}}$

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 $\frac{3}{4}$.

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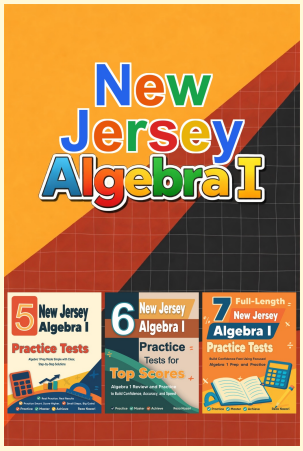

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