Probability Problems

Name: _____	Date: _____	Score: _____ / 18

Quick Review and Helpful Hints

Probability $=$ $\dfrac{\text{number of favorable outcomes}}{\text{total number of equally likely outcomes}}$. It is always between 0 (impossible) and 1 (certain). Write it as a fraction in simplest form. For two *independent* events both happening, multiply their probabilities.

▷ **Example:** A bag has 3 red and 5 blue marbles. Find the probability of drawing red. **Work:** There are 3 red marbles out of $3 + 5 = 8$ total, so $P(\text{red}) = \frac{3}{8}$.

★ **Answer:** $\frac{3}{8}$

3 red of 8 marbles: $P = \frac{3}{8}$.

Practice Problems

Find each probability. Write answers in simplest form.

1. Roll a die: $P(4)$ _____

2. Roll a die: $P(\text{even})$ _____

3. Flip a coin: $P(\text{heads})$ _____

4. Bag of 6 with 2 red: $P(\text{red})$ _____

5. Roll a die: $P(\text{more than } 4)$ _____

6. Spinner 1–8: $P(\text{odd})$ _____

7. 4 red, 4 blue: $P(\text{blue})$ _____

8. Roll a die: $P(1 \text{ or } 2)$ _____

9. Cards 1–10: $P(\text{prime})$ _____

10. Roll a die: $P(\text{not } 6)$ _____

11. 3 green of 9: $P(\text{green})$ _____

12. Flip a coin twice: $P(\text{two heads})$ _____

13. Roll a die: $P(\text{less than } 3)$ _____

14. Spinner 1–5: $P(5)$ _____

Word Problems

15. A bag has 5 red, 3 blue, and 2 green marbles. What is the probability of drawing red?

_____

16. A fair die is rolled. What is the probability of an odd number?

_____

17. A jar has 20 marbles, 8 of them yellow. What is the probability of drawing yellow?

_____

18. Two coins are flipped. What is the probability of getting two tails?

_____

Answer Keys

1. $\frac{1}{6}$	**7.** $\frac{1}{2}$	**13.** $\frac{1}{3}$
2. $\frac{1}{2}$	**8.** $\frac{1}{3}$	**14.** $\frac{1}{5}$
3. $\frac{1}{2}$	**9.** $\frac{2}{5}$	**15.** $\frac{1}{2}$
4. $\frac{1}{3}$	**10.** $\frac{5}{6}$	**16.** $\frac{1}{2}$
5. $\frac{1}{3}$	**11.** $\frac{1}{3}$	**17.** $\frac{2}{5}$
6. $\frac{1}{2}$	**12.** $\frac{1}{4}$	**18.** $\frac{1}{4}$

Step-by-Step Explanations

1. Start by naming the process: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is There is one 4 out of 6 equally likely faces, so $P = \frac{1}{6}$. So the final answer is $\frac{1}{6}$.

2. A good way to think about this is: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is Even faces are $\{2, 4, 6\} - 3$ out of 6: $\frac{3}{6} = \frac{1}{2}$. So the final answer is $\frac{1}{2}$.

3. Step by step: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is A coin has 2 sides, one of which is heads: $\frac{1}{2}$. So the final answer is $\frac{1}{2}$.

4. Take it one move at a time: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is 2 red out of 6 total: $\frac{2}{6} = \frac{1}{3}$. So the final answer is $\frac{1}{3}$.

5. Start by naming the process: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is Outcomes more than 4 are $\{5, 6\} - 2$ of 6: $\frac{2}{6} = \frac{1}{3}$. So the final answer is $\frac{1}{3}$.

6. A good way to think about this is: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is Odd numbers $\{1, 3, 5, 7\} - 4$ of 8: $\frac{4}{8} = \frac{1}{2}$. So the final answer is $\frac{1}{2}$.

7. Step by step: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is 4 blue out of 8: $\frac{4}{8} = \frac{1}{2}$. So the final answer is $\frac{1}{2}$.

8. Take it one move at a time: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is $\{1, 2\} - 2$ of 6: $\frac{2}{6} = \frac{1}{3}$. So the final answer is $\frac{1}{3}$.

9. Start by naming the process: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is Primes from 1 to 10 are $\{2, 3, 5, 7\} - 4$ of 10: $\frac{4}{10} = \frac{2}{5}$. So the final answer is $\frac{2}{5}$.

10. A good way to think about this is: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is Five of the six faces are not 6: $\frac{5}{6}$. So the final answer is $\frac{5}{6}$.

11. Step by step: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is 3 green out of 9: $\frac{3}{9} = \frac{1}{3}$. So the final answer is $\frac{1}{3}$.

12. Take it one move at a time: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is Independent events multiply: $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$. So the final answer is $\frac{1}{4}$.

13. Start by naming the process: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is $\{1, 2\} - 2$ of 6: $\frac{2}{6} = \frac{1}{3}$. So the final answer is $\frac{1}{3}$.

14. A good way to think about this is: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is One of five equal sections: $\frac{1}{5}$. So the final answer is $\frac{1}{5}$.

15. Step by step: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is 5 red out of $5 + 3 + 2 = 10$ total: $\frac{5}{10} = \frac{1}{2}$. So the final answer is $\frac{1}{2}$.

16. Take it one move at a time: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is Odd faces $\{1, 3, 5\} - 3$ of 6: $\frac{3}{6} = \frac{1}{2}$. So the final answer is $\frac{1}{2}$.

17. Start by naming the process: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is 8 yellow out of 20: $\frac{8}{20} = \frac{2}{5}$. So the final answer is $\frac{2}{5}$.

18. A good way to think about this is: Probability compares favorable outcomes to total equally likely outcomes, so write that ratio and simplify. The setup/work is Independent flips multiply: $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$. So the final answer is $\frac{1}{4}$.

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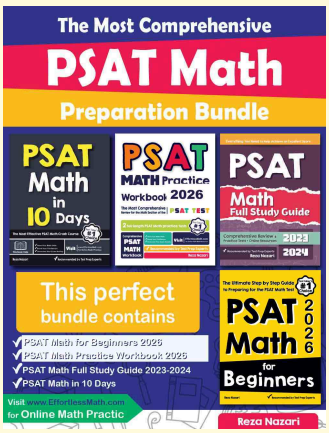

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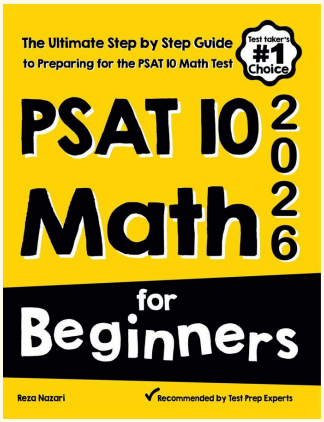

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