

Probability Problems

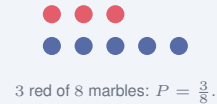
Name: _____ Date: _____ Score: _____ / 18

Quick Review and Helpful Hints

Probability = $\frac{\text{number of favorable outcomes}}{\text{total number of equally likely outcomes}}$. 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:** $\frac{3}{8}$



◆ **Practice Problems**

Find each probability. Write answers in simplest form.

- | | |
|--|---|
| <p>1. Roll a die: $P(4)$ _____</p> <p>2. Roll a die: $P(\text{even})$ _____</p> <p>3. Flip a coin: $P(\text{heads})$ _____</p> <p>4. Bag of 6 with 2 red: $P(\text{red})$ _____</p> <p>5. Roll a die: $P(\text{more than } 4)$ _____</p> <p>6. Spinner 1–8: $P(\text{odd})$ _____</p> <p>7. 4 red, 4 blue: $P(\text{blue})$ _____</p> | <p>8. Roll a die: $P(1 \text{ or } 2)$ _____</p> <p>9. Cards 1–10: $P(\text{prime})$ _____</p> <p>10. Roll a die: $P(\text{not } 6)$ _____</p> <p>11. 3 green of 9: $P(\text{green})$ _____</p> <p>12. Flip a coin twice: $P(\text{two heads})$ _____</p> <p>13. Roll a die: $P(\text{less than } 3)$ _____</p> <p>14. Spinner 1–5: $P(5)$ _____</p> |
|--|---|

◆ **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. $\frac{1}{6}$

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

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

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

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

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

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

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

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

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

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

12. $\frac{1}{4}$

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

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

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

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

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

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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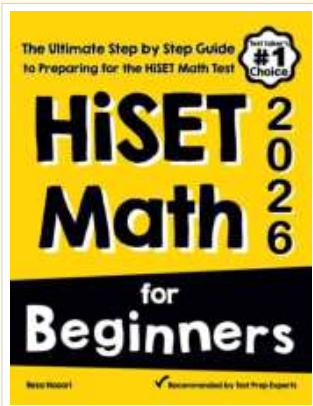
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