

Probability of Compound Events

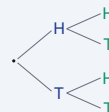
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Quick Review and Helpful Hints

For *independent* events, $P(A \text{ and } B) = P(A) \cdot P(B)$ – multiply. For *mutually exclusive* events, $P(A \text{ or } B) = P(A) + P(B)$ – add. Every probability is a number between 0 and 1, often written as a fraction.

▶ **Example:** A coin is flipped twice. Find $P(\text{heads and heads})$.

Work: Each flip has $P(H) = \frac{1}{2}$. Multiply: $\frac{1}{2} \cdot \frac{1}{2}$. ★ **Answer:** $\frac{1}{4}$



Multiply along the branches.

Practice Problems

Find each probability.

- | | | | |
|--|-------|--|-------|
| 1. Two coins, $P(H \text{ and } H)$ | _____ | 8. $P(\text{red or blue})$ if each is $\frac{1}{4}$ | _____ |
| 2. Roll a die twice, $P(6 \text{ and } 6)$ | _____ | 9. Roll a die, $P(\text{odd})$ | _____ |
| 3. $P(\text{red}) = \frac{1}{2}$, $P(\text{blue}) = \frac{1}{3}$: $P(\text{red and blue})$ | _____ | 10. Spinner of 4 equal parts, $P(\text{one part})$ | _____ |
| 4. Coin and die: $P(H \text{ and } 4)$ | _____ | 11. Two draws, $P(\text{ace and ace})$ if $P(\text{ace}) = \frac{1}{13}$ | _____ |
| 5. $P(1 \text{ or } 2)$ on a die | _____ | 12. $P(3 \text{ or } 5)$ on a die | _____ |
| 6. $P(\text{even})$ on a die | _____ | 13. Two coins, $P(H \text{ then } T)$ | _____ |
| 7. Two coins, $P(T \text{ and } T)$ | _____ | 14. $P(\text{not } 6)$ on a die | _____ |

Word Problems

15. Flip a coin and roll a die. Find $P(\text{tails and a } 3)$. _____
16. A bag is $\frac{1}{2}$ red. Draw twice with replacement. Find $P(\text{red then red})$. _____
17. Roll two dice. Find $P(\text{both show } 1)$. _____
18. On one die, find $P(\text{rolling a } 2 \text{ or a } 5)$. _____



Answer Keys

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

2. $\frac{1}{36}$

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

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

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

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

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

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

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

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

11. $\frac{1}{169}$

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

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

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

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

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

17. $\frac{1}{36}$

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

Step-by-Step Explanations

1. Start by naming the process: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$. So the final answer is $\frac{1}{4}$.

2. A good way to think about this is: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$. So the final answer is $\frac{1}{36}$.

3. Step by step: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{2} \cdot \frac{1}{3} = \frac{1}{6}$. So the final answer is $\frac{1}{6}$.

4. Take it one move at a time: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{2} \cdot \frac{1}{6} = \frac{1}{12}$. So the final answer is $\frac{1}{12}$.

5. Start by naming the process: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \frac{1}{3}$. So the final answer is $\frac{1}{3}$.

6. A good way to think about this is: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\{2, 4, 6\}$: $\frac{3}{6} = \frac{1}{2}$. So the final answer is $\frac{1}{2}$.

7. Step by step: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$. So the final answer is $\frac{1}{4}$.

8. Take it one move at a time: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$. So the final answer is $\frac{1}{2}$.

9. Start by naming the process: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\{1, 3, 5\}$: $\frac{3}{6} = \frac{1}{2}$. So the final answer is $\frac{1}{2}$.

10. A good way to think about this is: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is One of four equal parts: $\frac{1}{4}$. So the final answer is $\frac{1}{4}$.

11. Step by step: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{13} \cdot \frac{1}{13} = \frac{1}{169}$. So the final answer is $\frac{1}{169}$.

12. Take it one move at a time: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{6} + \frac{1}{6} = \frac{1}{3}$. So the final answer is $\frac{1}{3}$.

13. Start by naming the process: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$. So the final answer is $\frac{1}{4}$.

14. A good way to think about this is: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is 5 faces are not 6: $\frac{5}{6}$. So the final answer is $\frac{5}{6}$.

15. Step by step: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{2} \cdot \frac{1}{6} = \frac{1}{12}$. So the final answer is $\frac{1}{12}$.

16. Take it one move at a time: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$. So the final answer is $\frac{1}{4}$.

17. Start by naming the process: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$. So the final answer is $\frac{1}{36}$.

18. A good way to think about this is: For compound probability, find each probability first and multiply them when the events happen together. The setup/work is $\frac{1}{6} + \frac{1}{6} = \frac{1}{3}$. So the final answer is $\frac{1}{3}$.



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