

# Probability

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

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Score: \_\_\_\_\_ / 24

## Q Quick Review

**Probability** compares favorable outcomes to total possible outcomes:  $P = \frac{\text{favorable}}{\text{total}}$ . Probabilities range from 0 to 1. Use complements for "not" questions:  $P(\text{not } A) = 1 - P(A)$ . For independent events, multiply probabilities. For simple either/or events that do not overlap, add probabilities.

## PRACTICE

Find each probability.

- |  |       |   |       |
|--|-------|---|-------|
| 1. $P(\text{heads on one coin flip})$      | _____ | 12. $P(\text{at least one heads in two flips})$                                 | _____ |
| 2. $P(\text{rolling a 4 on a die})$        | _____ | 13. $P(\text{heart from a standard deck})$                                      | _____ |
| 3. $P(\text{rolling an even number})$      | _____ | 14. $P(\text{ace from a standard deck})$  | _____ |
| 4. $P(\text{rolling greater than 4})$      | _____ | 15. $P(\text{not ace})$   | _____ |
| 5. $P(\text{not rolling 1})$               | _____ | 16. $P(\text{spinner 1–8 lands on multiple of 3})$                              | _____ |
| 6. $P(\text{red from 3 red, 5 blue})$      | _____ | 17. $P(\text{random month has 31 days})$  | _____ |
| 7. $P(\text{blue from 3 red, 5 blue})$     | _____ | 18. $P(\text{choosing a vowel from A,E,I,O,U,B,C})$                             | _____ |
| 8. $P(\text{two heads in two coin flips})$ | _____ | 19. $P(A) = 0.35; P(\text{not } A)$   | _____ |
| 9. $P(\text{heads then tails})$            | _____ | 20. $P(A) = \frac{2}{5}, P(B) = \frac{3}{4}$ independent; $P(A \text{ and } B)$ | _____ |
| 10. $P(\text{rolling 6 twice})$            | _____ |   |       |
| 11. $P(\text{sum 7 with two dice})$        | _____ |   |       |

## ◆ Word Problems

21. A bag has 4 green marbles, 6 yellow marbles, and 10 purple marbles. What is the probability of drawing a yellow marble?

\_\_\_\_\_

22. A weather app says the chance of rain is 30%. What is the probability it does not rain?

\_\_\_\_\_

23. A student guesses on two true/false questions. What is the probability both answers are correct?

\_\_\_\_\_

24. A spinner has 10 equal sections numbered 1 through 10. Find the probability of landing on an even number or a number greater than 8.

\_\_\_\_\_



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## Answer Keys

- |   |  |
|---|--|
| <p>1. <math>\frac{1}{2}</math></p> <p>2. <math>\frac{1}{6}</math></p> <p>3. <math>\frac{1}{2}</math></p> <p>4. <math>\frac{1}{3}</math></p> <p>5. <math>\frac{5}{6}</math></p> <p>6. <math>\frac{3}{8}</math></p> <p>7. <math>\frac{5}{8}</math></p> <p>8. <math>\frac{1}{4}</math></p> <p>9. <math>\frac{1}{4}</math></p> <p>10. <math>\frac{1}{36}</math></p> <p>11. <math>\frac{1}{6}</math></p> <p>12. <math>\frac{3}{4}</math></p> | <p>13. <math>\frac{1}{4}</math></p> <p>14. <math>\frac{1}{13}</math></p> <p>15. <math>\frac{12}{13}</math></p> <p>16. <math>\frac{1}{4}</math></p> <p>17. <math>\frac{7}{12}</math></p> <p>18. <math>\frac{5}{7}</math></p> <p>19. 0.65</p> <p>20. <math>\frac{3}{10}</math></p> <p>21. <math>\frac{3}{10}</math></p> <p>22. 70%</p> <p>23. <math>\frac{1}{4}</math></p> <p>24. <math>\frac{3}{5}</math></p> |
|---|--|

### Step-by-Step Tutor Notes

1. This is a good place to slow down, check the notation, and simplify cleanly. One favorable outcome out of two equally likely outcomes. So the answer is  $\frac{1}{2}$ .
2. Focus on the main idea of the problem, then simplify carefully. One favorable face out of six. So the answer is  $\frac{1}{6}$ .
3. Focus on the main idea of the problem, then simplify carefully. Even outcomes are 2, 4, 6, so  $3/6 = 1/2$ . So the answer is  $\frac{1}{2}$ .
4. Take it one clear step at a time and keep the original question in mind. Outcomes 5, 6 give  $2/6 = 1/3$ . So the answer is  $\frac{1}{3}$ .
5. Use the clue in the question first, then let the arithmetic finish the job. Use complement:  $1 - \frac{1}{6} = \frac{5}{6}$ . So the answer is  $\frac{5}{6}$ .
6. Start with the definition the problem is testing, then apply it directly. There are 3 red out of 8 total. So the answer is  $\frac{3}{8}$ .
7. Use the clue in the question first, then let the arithmetic finish the job. There are 5 blue out of 8 total. So the answer is  $\frac{5}{8}$ .
8. Start with the definition the problem is testing, then apply it directly.  $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$ . So the answer is  $\frac{1}{4}$ .
9. Start with the definition the problem is testing, then apply it directly. Each specified flip has probability  $\frac{1}{2}$ . So the answer is  $\frac{1}{4}$ .
10. Use the clue in the question first, then let the arithmetic finish the job.  $\frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$ . So the answer is  $\frac{1}{36}$ .
11. Focus on the main idea of the problem, then simplify carefully. There are 6 favorable sums out of 36. So the answer is  $\frac{1}{6}$ .
12. Take it one clear step at a time and keep the original question in mind. Use complement: not at least one head means both tails, probability  $\frac{1}{4}$ . So the answer is  $\frac{3}{4}$ .
13. This is a good place to slow down, check the notation, and simplify cleanly. There are 13 hearts out of 52 cards. So the answer is  $\frac{1}{4}$ .
14. Use the clue in the question first, then let the arithmetic finish the job. There are 4 aces out of 52. So the answer is  $\frac{1}{13}$ .
15. Focus on the main idea of the problem, then simplify carefully. Complement of ace:  $1 - \frac{1}{13} = \frac{12}{13}$ . So the answer is  $\frac{12}{13}$ .
16. This is a good place to slow down, check the notation, and simplify cleanly. The multiples are 3 and 6, so  $2/8 = 1/4$ . So the answer is  $\frac{1}{4}$ .
17. Use the clue in the question first, then let the arithmetic finish the job. Seven months have 31 days. So the answer is  $\frac{7}{12}$ .
18. Focus on the main idea of the problem, then simplify carefully. There are 5 vowels out of 7 letters. So the answer is  $\frac{5}{7}$ .
19. Use the clue in the question first, then let the arithmetic finish the job. Complement:  $1 - 0.35 = 0.65$ . So the answer is 0.65.
20. Work one inverse operation at a time and keep both sides balanced. Multiply independent probabilities:  $\frac{2}{5} \cdot \frac{3}{4} = \frac{3}{10}$ . After simplifying, the answer is  $\frac{3}{10}$ .
21. Use the given numbers to build the model, then finish the calculation. There are 20 marbles total and 6 are yellow, so  $6/20 = 3/10$ .
22. Set up the model from the story, then calculate carefully. Use the complement:  $100\% - 30\% = 70\%$ .
23. Name the quantities first so the model is easy to read. Each guess has probability  $1/2$ , and the guesses are independent:  $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$ .
24. Even numbers are 2, 4, 6, 8, 10. Numbers greater than 8 are 9, 10. The union is 2, 4, 6, 8, 9, 10, so  $6/10 = 3/5$ .



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