

GRADE 6

Probability

Complete Probability Practice Pack

6 Worksheets • Theory + Experiments + Reasoning • Separate Answer Keys

Worksheet 1 — Probability Language

Instructions: Give probabilities as simplified fractions where possible. Show your reasoning for challenge questions.

1. Classify each event as impossible, unlikely, even chance, likely, or certain: rolling a 7 on a standard die.
2. Classify: getting a number less than 7 when rolling a standard die.
3. Classify: choosing a red card from a bag containing 9 red and 1 blue card.
4. Classify: getting heads when tossing a fair coin.
5. A spinner has 8 equal sections: 5 blue and 3 yellow. Is landing on blue likely or unlikely?
6. Give one example of an impossible event when rolling a standard die.
7. Give one example of a certain event when rolling a standard die.
8. Put these in order from least likely to most likely: $0/10$, $2/10$, $5/10$, $9/10$, $10/10$.

Answer Key — Probability Language

1. Impossible
2. Certain
3. Likely
4. Even chance
5. Likely
6. Example: rolling an 8.
7. Example: rolling a number from 1 to 6.
8. $0/10$, $2/10$, $5/10$, $9/10$, $10/10$.

Worksheet 2 — Theoretical Probability

Instructions: Give probabilities as simplified fractions where possible. Show your reasoning for challenge questions.

1. Find the probability of rolling a 4 on a fair six-sided die.
2. Find the probability of rolling an even number on a fair die.
3. Find the probability of rolling a number greater than 4.
4. A bag has 3 red, 5 blue and 2 green counters. Find $P(\text{red})$.
5. Using the same bag, find $P(\text{blue})$.
6. Using the same bag, find $P(\text{not green})$.
7. A standard deck has 52 cards. What is the probability of drawing a heart? (There are 13 hearts.)
8. A spinner has 10 equal sections numbered 1–10. Find $P(\text{prime number})$.

Answer Key — Theoretical Probability

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

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

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

4. $\frac{3}{10}$

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

6. $\frac{4}{5}$

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

8. $\frac{4}{10} = \frac{2}{5}$.

Worksheet 3 — Sample Spaces

Instructions: Give probabilities as simplified fractions where possible. Show your reasoning for challenge questions.

1. List the sample space for tossing one fair coin.
2. List the sample space for rolling one standard die.
3. A coin is tossed twice. List all possible outcomes.
4. A spinner has equal sections numbered 1, 2, 3 and 4. List the sample space.
5. A die is rolled and a coin is tossed. How many outcomes are possible?
6. Two standard dice are rolled. How many ordered outcomes are possible?
7. A spinner has colours red, blue and green, and a coin is tossed. How many combined outcomes are possible?
8. For two coin tosses, what is the probability of getting exactly one head?

Answer Key — Sample Spaces

1. H, T
2. 1, 2, 3, 4, 5, 6
3. HH, HT, TH, TT
4. 1, 2, 3, 4
5. 12
6. 36
7. 6
8. $2/4 = 1/2$.

Worksheet 4 — Experimental Probability

Instructions: Give probabilities as simplified fractions where possible. Show your reasoning for challenge questions.

1. A coin is tossed 50 times and lands heads 27 times. Find the experimental probability of heads.
2. A die is rolled 60 times and a 6 appears 8 times. Find the experimental probability of rolling 6.
3. A spinner is spun 80 times. Blue occurs 34 times. Find $P(\text{blue})$ experimentally.
4. A bag experiment gives 42 red outcomes in 100 draws. Find the experimental probability of red.
5. A die is rolled 120 times. Even numbers occur 63 times. Find the experimental probability of even.
6. Why might experimental probability differ from theoretical probability?
7. A coin gives 46 heads in 100 tosses. Is this result reasonably close to the theoretical probability? Explain.
8. If an experiment is repeated many more times, what generally happens to experimental probability?

Answer Key — Experimental Probability

1. $27/50 = 0.54$
2. $8/60 = 2/15 \approx 0.133$
3. $34/80 = 17/40 = 0.425$
4. $42/100 = 0.42$
5. $63/120 = 0.525$
6. Random variation means actual results do not always match theoretical probability exactly.
7. Yes. 0.46 is reasonably close to 0.50.
8. It generally tends to get closer to the theoretical probability.

Worksheet 5 — Probability with Fractions & Complements

Instructions: Give probabilities as simplified fractions where possible. Show your reasoning for challenge questions.

1. A bag contains 4 red and 6 blue counters. Find $P(\text{red})$ and $P(\text{blue})$.
2. If $P(\text{rain}) = \frac{3}{10}$, find $P(\text{no rain})$.
3. A spinner has 12 equal sections. 5 are green. Find $P(\text{not green})$.
4. A die is rolled. Find $P(\text{not rolling a 6})$.
5. A class survey shows $P(\text{walk to school}) = \frac{7}{20}$. Find $P(\text{do not walk to school})$.
6. A box contains 2 yellow, 3 red and 5 blue counters. Find $P(\text{yellow or blue})$.
7. A game has probability $\frac{3}{8}$ of a player winning. What is the probability of not winning?
8. Can the probability of an event be $\frac{7}{5}$? Explain.

Answer Key — Probability with Fractions & Complements

1. $P(\text{red})=2/5$; $P(\text{blue})=3/5$.
2. $7/10$
3. $7/12$
4. $5/6$
5. $13/20$
6. $7/10$
7. $5/8$
8. No. Probability must be between 0 and 1 inclusive.

Worksheet 6 — Probability Challenge

Instructions: Give probabilities as simplified fractions where possible. Show your reasoning for challenge questions.

1. A bag contains 5 red, 3 blue and 2 green counters. One counter is chosen. What is $P(\text{not blue})$?
2. A fair die is rolled. What is the probability of rolling a number that is both even and greater than 2?
3. Two fair coins are tossed. What is the probability of getting at least one head?
4. A spinner has 8 equal sections: 3 red, 2 blue and 3 green. What is $P(\text{red or green})$?
5. A game costs \$2 to play. A player wins a \$10 prize with probability $\frac{1}{5}$. Ignoring other outcomes, what is the expected prize value? Is the average prize value equal to the cost?
6. A die is rolled 200 times. A 4 appears 39 times. Compare the experimental probability with the theoretical probability.
7. A bag has only red and blue counters. $P(\text{red}) = \frac{3}{7}$. What fraction of the counters are blue?
8. A student says, "If an event has probability $\frac{1}{4}$, it will happen exactly once every four trials." Explain why this is not guaranteed.

Answer Key — Probability Challenge

1. $7/10$
2. $2/6 = 1/3$ (2 or 4).
3. $3/4$.
4. $6/8 = 3/4$.
5. Expected prize value = \$2; in the long run it equals the \$2 cost, based only on the stated prize outcome.
6. Experimental = $39/200 = 0.195$; theoretical = $1/6 \approx 0.167$. The experimental result is higher due to random variation.
7. $4/7$.
8. Probability describes likelihood over many trials; random outcomes can occur in clusters and do not follow an exact repeating pattern.