

GRADE 7 MATHS

Probability

Complete Printable Worksheet Pack

6 Worksheets • Theoretical & Experimental Probability • Sample Spaces • Real-Life Applications • Challenge Problems

Worksheet 1: Probability Language & Scale

Name: _____ Date: _____

1. Write each probability as **impossible**, **unlikely**, **even chance**, **likely** or **certain**: (a) rolling a 7 on a standard die; (b) getting heads when tossing a fair coin; (c) the sun rising tomorrow; (d) choosing a red marble when 9 of 10 marbles are red.
2. Place these probabilities in increasing order: 0, $\frac{1}{4}$, 1, $\frac{3}{4}$, $\frac{1}{2}$.
3. A probability is 0.35. Is the event more likely or less likely than an even chance? Explain.
4. Give a probability between 0 and 1 for an event that is unlikely.
5. A bag contains 6 blue, 3 green and 1 yellow counter. Is choosing yellow more or less likely than choosing green?
6. A spinner has 8 equal sections: 5 red, 2 blue and 1 green. Which colour is most likely? Which is least likely?
7. Can a probability be 1.2? Explain.
8. An event has probability 0.8. What is the probability that it does not happen?
9. A weather report says there is a 70% chance of rain. Does this mean it will rain for exactly 70% of the day? Explain.
10. Create an event with probability 1 and another with probability 0.

Answer Key — Worksheet 1

1. (a) impossible; (b) even chance; (c) certain; (d) likely.
2. 0, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1.
3. Less likely than an even chance because $0.35 < 0.5$.
4. Any valid example such as 0.2 or 0.1.
5. Green is more likely: $\frac{3}{10}$ compared with $\frac{1}{10}$.
6. Most likely red; least likely green.
7. No. Probability must be between 0 and 1 inclusive.
8. 0.2 or 20%.
9. No. It means the estimated probability of rain is 70%, not that 70% of the day will be rainy.
10. Probability 1: rolling a number from 1–6 on a standard die. Probability 0: rolling a 7 on that die.

Worksheet 2: Theoretical Probability

Name: _____ Date: _____

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 drawing a heart from a standard deck of 52 cards.
4. A bag has 5 red, 7 blue and 8 green counters. Find $P(\text{blue})$.
5. A box contains 12 tickets numbered 1–12. Find $P(\text{multiple of 3})$.
6. A fair spinner has 10 equal sections numbered 1–10. Find $P(\text{number greater than 7})$.
7. A class chooses one of 20 equally likely raffle tickets numbered 1–20. Find $P(\text{prime number})$.
8. A bag contains 4 yellow, 6 red and 5 black counters. Find $P(\text{not red})$.
9. A die is rolled. Find $P(\text{number less than 5})$ and $P(\text{number at least 5})$.
10. A jar has 3 white and 9 purple counters. How many white counters should be added so that $P(\text{white})=1/3$?

Answer Key — Worksheet 2

1. $1/6$.
2. $3/6 = 1/2$.
3. $13/52 = 1/4$.
4. $7/20$.
5. Multiples are 3,6,9,12: $4/12 = 1/3$.
6. $3/10$.
7. Primes 2,3,5,7,11,13,17,19: $8/20 = 2/5$.
8. Not red = $9/15 = 3/5$.
9. Less than 5 = $4/6 = 2/3$; at least 5 = $2/6 = 1/3$.
10. Let x be added: $(3+x)/(12+x)=1/3$, so $9+3x=12+x$, $x=3$.

Worksheet 3: Sample Spaces & Compound Events

Name: _____ Date: _____

1. List the sample space for tossing one coin and rolling a 1–3 spinner.
2. A coin is tossed twice. List all equally likely outcomes.
3. A coin is tossed twice. Find $P(\text{exactly one head})$.
4. Two fair dice are rolled. How many ordered outcomes are in the sample space?
5. Two dice are rolled. Find $P(\text{sum} = 7)$.
6. Two dice are rolled. Find $P(\text{double numbers})$.
7. A coin is tossed and a die is rolled. How many equally likely outcomes are possible?
8. Find $P(\text{head and an even die result})$.
9. A spinner has 4 equal sections A, B, C, D. It is spun twice. Find $P(\text{two different letters})$.
10. Explain why the outcomes HT and TH are different when a coin is tossed twice.

Answer Key — Worksheet 3

1. {H1,H2,H3,T1,T2,T3}.
2. HH, HT, TH, TT.
3. $2/4 = 1/2$.
4. 36 ordered outcomes.
5. Six outcomes: (1,6),(2,5),(3,4),(4,3),(5,2),(6,1), so $6/36=1/6$.
6. Six doubles, so $6/36=1/6$.
7. $2 \times 6 = 12$.
8. $1/2 \times 1/2 = 1/4$.
9. First spin can be any; second must differ: $3/4$.
10. The order of the results is different: H then T is not the same sequence as T then H.

Worksheet 4: Experimental Probability

Name: _____ Date: _____

1. A coin is tossed 40 times and lands heads 23 times. Find the experimental probability of heads.
2. A spinner is spun 80 times. Red occurs 28 times. Find the experimental probability of red.
3. In 100 trials, an event occurs 62 times. Estimate its probability.
4. A die is rolled 120 times. The number 6 appears 17 times. Find the experimental probability of rolling 6.
5. A student predicts $P(\text{heads}) = 1/2$. In 20 tosses, heads occurs 13 times. Compare experimental and theoretical probability.
6. In 200 spins, blue occurs 74 times. What percentage of the results are blue?
7. A coin is tossed 1,000 times and heads occurs 507 times. What does this suggest about the theoretical probability?
8. Two students run experiments with a die. Student A rolls 30 times and gets 6 sixes. Student B rolls 300 times and gets 44 sixes. Which result is closer to $1/6$? Show calculations.
9. Why can experimental probability differ from theoretical probability?
10. If an experiment is repeated many more times, what usually happens to experimental probability?

Answer Key — Worksheet 4

1. $23/40 = 0.575 = 57.5\%$.
2. $28/80 = 0.35 = 35\%$.
3. $62/100 = 0.62$.
4. $17/120 \approx 0.142$.
5. Experimental = $13/20 = 0.65$; theoretical = 0.5, so experimental is higher.
6. $74/200 = 37\%$.
7. It is close to 0.5, supporting the theoretical probability of $1/2$.
8. $A = 6/30 = 0.20$; $B = 44/300 \approx 0.147$. B is closer to $1/6 \approx 0.167$.
9. Random variation means actual results do not always match expected results.
10. It usually gets closer to the theoretical probability, although it will not necessarily equal it.

Worksheet 5: Complements, Fractions & Real-Life Probability

Name: _____ Date: _____

1. The probability of winning a game is 0.35. Find the probability of not winning.
2. A bag contains 8 red, 5 blue and 7 green counters. Find $P(\text{red or green})$.
3. A school survey shows $P(\text{bus})=0.42$, $P(\text{walk})=0.18$ and $P(\text{car})=0.27$. What is the probability of using another method?
4. A fair die is rolled twice. Find $P(\text{no 6 is rolled})$.
5. A box has 4 defective and 96 good items. Find $P(\text{selecting a good item})$.
6. A spinner has 12 equal sections: 5 red, 4 blue and 3 yellow. Find $P(\text{not yellow})$.
7. A card numbered 1–20 is chosen at random. Find $P(\text{even or multiple of 5})$.
8. A weather model gives a 25% chance of snow on Saturday. What is the probability of no snow?
9. A bag has 5 red and 15 blue counters. One counter is chosen. How many red counters should be added so $P(\text{red})=1/2$?
10. A fair game pays \$20 with probability 0.2 and \$0 otherwise. Find the expected payout.

Answer Key — Worksheet 5

1. 0.65.
2. $(8+7)/20 = 15/20 = 3/4$.
3. $1-(0.42+0.18+0.27)=0.13$.
4. $P(\text{no 6 each roll})=5/6$, so $(5/6)^2=25/36$.
5. $96/100=24/25=0.96$.
6. $9/12=3/4$.
7. Evens: 10. Multiples of 5: 4. Overlap (10,20): 2. Total = $10+4-2=12$, so $12/20=3/5$.
8. 75%.
9. Let x be added: $(5+x)/(20+x)=1/2$, so $x=10$.
10. Expected payout = $0.2 \times 20 = \$4$.

Worksheet 6: Probability Challenge

Name: _____ Date: _____

1. A bag contains red and blue counters. $P(\text{red}) = \frac{3}{8}$. If there are 24 counters in total, how many are red?
2. A fair die is rolled. Find the probability of getting a number that is prime or greater than 4.
3. Two dice are rolled. Find $P(\text{sum is even})$.
4. A box contains 6 red, 4 blue and 5 green counters. Two counters are drawn without replacement. Find $P(\text{both are red})$.
5. A spinner has 5 equal sections: 2 red, 1 blue, 2 green. It is spun twice. Find $P(\text{at least one blue})$.
6. A class conducts 500 coin tosses and gets 267 heads. How many heads would you expect theoretically, and how does the experiment compare?
7. A game costs \$3 to play. You win \$15 with probability $\frac{1}{5}$ and \$0 otherwise. What is the expected net gain or loss per game?
8. A number from 1–30 is selected at random. Find $P(\text{multiple of 3 or 5})$.
9. A bag has 3 red, 5 blue and 2 yellow counters. Two are drawn without replacement. Find $P(\text{one red and one blue})$.
10. A probability model gives $P(A) = 0.4$ and $P(B) = 0.35$. If A and B cannot happen together, find $P(A \text{ or } B)$ and $P(\text{neither A nor B})$.

Answer Key — Worksheet 6

1. $3/8 \times 24 = 9$ red.
2. Prime numbers $\{2, 3, 5\}$; numbers > 4 are $\{5, 6\}$; union $\{2, 3, 5, 6\} = 4/6 = 2/3$.
3. An even sum occurs when both dice have the same parity: $(5/6 \times 5/6) + (1/2 \times 1/2)$? More directly, 18 of 36 outcomes have even sum, so $1/2$.
4. $6/15 \times 5/14 = 30/210 = 1/7$.
5. $P(\text{no blue}) = (4/5)^2 = 16/25$, so $P(\text{at least one blue}) = 9/25$.
6. Theoretical heads = 250. Experimental = 267, which is 17 more than expected; experimental proportion = 53.4%.
7. Expected win = $15 \times 1/5 = \$3$. Net expected gain = $\$3 - \$3 = \$0$.
8. Multiples of 3: 10; multiples of 5: 6; overlap multiples of 15: 2. Total 14, so $14/30 = 7/15$.
9. One red and one blue = $(3/10 \times 5/9) + (5/10 \times 3/9) = 30/90 = 1/3$.
10. $P(A \text{ or } B) = 0.75$; $P(\text{neither}) = 0.25$.