

Chance Check

Compare results from simulations with expected chances.

GRADE 7 • MA.7.DP.2.4

MA.7.DP.2.4 "Use a simulation of a simple experiment to find experimental probabilities and compare them to theoretical probabilities."

NAME _____

DATE _____

EXPERIMENTAL OR THEORETICAL?

Experimental probability is the number of times an outcome happens divided by the number of trials. Theoretical probability is the number of favorable equal outcomes divided by all equal outcomes.

WORKED EXAMPLE

A fair spinner has 7 equal sections. One section is blue. In a simulation of 28 spins, blue appears 9 times. Find and compare both probabilities.

1. Experimental probability = $9/28$.
2. Theoretical probability = $1/7$.
3. Since $9/28 > 1/7$, the experimental probability is greater.

**Answer: Experimental: $9/28$.
Theoretical: $1/7$.**

PRACTICE 5 problems

- 1** A fair coin is simulated 20 times. It lands heads 8 times. Find the experimental and theoretical probabilities of heads.

ANSWER _____

- 2** A number cube is rolled 24 times. A 5 appears 3 times. Find the experimental and theoretical probabilities of rolling a 5.

ANSWER _____

- 3** A bag has 3 red and 2 blue tiles. A simulation makes 15 draws with replacement. Red appears 8 times. Find both probabilities of red.

ANSWER _____

- 4** A spinner has 4 equal sections, and 1 is yellow. In 16 simulated spins, yellow appears 5 times. Find both probabilities of yellow.

ANSWER _____

- 5** A number cube is rolled 30 times. A 6 appears 11 times. Find both probabilities of rolling a 6. Is the experimental probability greater or less?

ANSWER _____

APPLY IT Show your work

- 1** A game app has a fair spinner with 8 equal icons. A player simulates 32 spins, and the star icon appears 3 times. Find both probabilities of landing on the star. How do they compare?

WORK SPACE

ANSWER _____

- 2** A music app shuffles 5 songs equally. In a simulation of 25 shuffles, Maya's favorite song plays first 6 times. Find both probabilities that her favorite song plays first. How do they compare?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Two students simulate a fair spinner with 5 equal sections. Student A gets a target section 11 times in 40 spins. Student B gets it 3 times in 12 spins. Whose experimental probability is closer to the theoretical probability? Explain.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A fair coin is simulated 20 times. It lands heads 8 times. Find the experimental and theoretical probabilities of heads.	Experimental: 2/5. Theoretical: 1/2.
2	A number cube is rolled 24 times. A 5 appears 3 times. Find the experimental and theoretical probabilities of rolling a 5.	Experimental: 1/8. Theoretical: 1/6.
3	A bag has 3 red and 2 blue tiles. A simulation makes 15 draws with replacement. Red appears 8 times. Find both probabilities of red.	Experimental: 8/15. Theoretical: 3/5.
4	A spinner has 4 equal sections, and 1 is yellow. In 16 simulated spins, yellow appears 5 times. Find both probabilities of yellow.	Experimental: 5/16. Theoretical: 1/4.
5	A number cube is rolled 30 times. A 6 appears 11 times. Find both probabilities of rolling a 6. Is the experimental probability greater or less?	Experimental: 11/30. Theoretical: 1/6. The experimental probability is greater.

PART 2 • APPLY IT

- Experimental: 3/32. Theoretical: 1/8. The experimental probability is 1/32 less.** There were 3 star results in 32 trials. One of 8 equal icons is a star, so $1/8 = 4/32$.
- Experimental: 6/25. Theoretical: 1/5. The experimental probability is 1/25 greater.** The simulation gives 6/25. With 5 equally likely songs, the theoretical probability is $1/5 = 5/25$.

CHALLENGE

Student B. The theoretical probability is 1/5. Student A is 3/40 away from 1/5, and Student B is 1/20 away, so Student B is closer.

Accept equivalent fractions, such as 8/20 for 2/5. Students may compare probabilities using equivalent fractions, decimals, or fraction subtraction.