LESSON MAKER PRO

Predict the Wins

Use simulations to estimate what happens next.

GRADE 7 · 7A.DSP.C.31

7A.DSP.C.31 "Approximate the probability of an event by using data generated by a simulation (experimental probability) and compare it to theoretical probability. a. Observe the relative frequency of an event over the long run..."

NAME _____ DATE _____

THE BIG IDEA

Experimental probability is the number of times an event happens divided by the number of trials. Multiply that fraction by a future number of trials to predict how often the event will happen. Compare it with theoretical probability, which uses equally likely outcomes.

WORKED EXAMPLE

A spinner has 5 equal sections, 2 green. Use the simulation table to predict green in 150 spins. Compare the experimental and theoretical probabilities.

SPINNER SIMULATION

Spins	Green
75	33

1. Experimental probability: 33/75 = 11/25.
2. Theoretical probability: 2/5 = 10/25.
3. Prediction: 150 × 33/75 = 66.

Answer: About 66 green spins. The experimental probability, 11/25, is above the theoretical probability, 2/5.

PRACTICE 4 problems

1 A coin lands heads 27 times in 50 flips. Find the experimental and theoretical probabilities of heads.

ANSWER _____

2 A fair die shows 6 on 8 of 48 rolls. Use the simulation to predict how many 6s will appear in 96 rolls.

ANSWER _____

3 A star appears 45 times in 120 simulated draws. Predict stars in 240 draws.

ANSWER _____

4 A fair coin lands tails 39 times in 80 flips. Find both probabilities of tails. Is the experimental probability above or below theory?

ANSWER _____

_____

APPLY IT Show your work

1 A game drops 1 of 10 equally likely avatar frames. Three frames glow. Use the simulation table to predict glow frames in 500 drops. Compare the experimental and theoretical probabilities.

AVATAR FRAME SIMULATION

Drops	Glow frames
200	72

ANSWER _____

2 A playlist shuffles 8 songs equally often. Three are by your favorite artist. In 160 simulated plays, 54 were favorites. Predict favorites in 320 plays. Compare the experimental and theoretical probabilities.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A fair number cube has 1 winning face. The table shows running totals from a simulation. Which total gives an experimental probability closer to theory? Use that total to predict wins in 360 rolls. Explain.

RUNNING TOTALS

Rolls	Wins
36	9
180	32

WORK SPACE AND ANSWER

ANSWER KEY

Predict the Wins

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A coin lands heads 27 times in 50 flips. Find the experimental and theoretical probabilities of heads.	**Experimental: 27/50. Theoretical: 1/2.**
2	A fair die shows 6 on 8 of 48 rolls. Use the simulation to predict how many 6s will appear in 96 rolls.	**16**
3	A star appears 45 times in 120 simulated draws. Predict stars in 240 draws.	**90**
4	A fair coin lands tails 39 times in 80 flips. Find both probabilities of tails. Is the experimental probability above or below theory?	**Experimental: 39/80. Theoretical: 1/2. Experimental is below theory.**

PART 2 · APPLY IT

1. **About 180 glow frames. Experimental: 9/25. Theoretical: 3/10. Experimental is higher.** 72/200 = 9/25, so 500 × 9/25 = 180. Since 9/25 > 3/10, the simulation rate is higher.
2. **About 108 favorites. Experimental: 27/80. Theoretical: 3/8. Experimental is lower.** 54/160 = 27/80, so 320 × 27/80 = 108. The theoretical probability is 3/8 = 30/80.

CHALLENGE

The 180-roll total is closer. Theory is 1/6. The 36-roll rate is 9/36 = 1/4, which is 1/12 from theory. The 180-roll rate is 32/180 = 8/45, which is 1/90 from theory. Using that rate, 360 × 32/180 = 64 wins.

Accept equivalent fractions and predictions stated as approximate counts. For the challenge, accept a correct comparison using decimals or common denominators.