LESSON MAKER PRO

Chance Check

Predict outcomes, then compare them with results.

GRADE 7 · MT.7.SP.7

MT.7.SP.7 "Develop a theoretical probability model and use it to find probabilities of events, compare theoretical and experimental probabilities, and explain possible sources of discrepancy, if any exist."

NAME _____ DATE _____

TWO KINDS OF PROBABILITY

For equally likely outcomes, theoretical probability is favorable outcomes divided by all possible outcomes. Experimental probability is the number of times an event happens divided by the number of trials. The two probabilities can differ because results vary by chance.

WORKED EXAMPLE

A bag holds the tickets shown. A ticket is drawn, returned, and mixed each time. Teal appears 10 times in 22 draws. Find both probabilities of teal.

TICKETS IN THE BAG

Color	Tickets
Teal	6
Gold	5

1. Total tickets: 6 + 5 = 11.
2. Theoretical probability: 6/11.
3. Experimental probability: 10/22 = 5/11.

Answer: Theoretical: 6/11; experimental: 5/11.

PRACTICE 4 problems

1 A bag has 7 green tiles and 2 yellow tiles. Find the theoretical probability of picking yellow.

ANSWER _____

2 A jar has 9 orange beads and 4 purple beads. Find the theoretical probability of picking purple.

ANSWER _____

3 A coin is flipped 18 times. Heads appears 12 times. Find the experimental probability of heads.

ANSWER _____

4 A jar has 3 red tokens and 13 blue tokens. In 32 draws with replacement, red appears 8 times. Find the theoretical and experimental probabilities of red.

ANSWER _____

_____

APPLY IT Show your work

1 At an arcade, each prize in a mystery box is equally likely to be drawn. The table shows the box and the results of 32 draws with replacement. Find both probabilities of a sticker pack. Which is greater?

MYSTERY BOX DRAWS

Prize	In box	Times drawn
Sticker pack	7	18
Keychain	9	14

ANSWER _____

2 A game app has 3 common avatars and 1 rare avatar. Each avatar is equally likely. The rare avatar appears 9 times in 28 random unlocks. Find both probabilities of a rare avatar. Why might they differ?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Draw a card twice from the set shown, replacing it after the first draw. In 81 trials, two silver cards appeared 7 times. Find both probabilities of two silver cards. Explain a possible reason they differ.

CARDS IN THE SET

Card	Number
Silver	2
Black	7

WORK SPACE AND ANSWER

ANSWER KEY

Chance Check

GRADE 7 · MT.7.SP.7

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A bag has 7 green tiles and 2 yellow tiles. Find the theoretical probability of picking yellow.	**2/9**
2	A jar has 9 orange beads and 4 purple beads. Find the theoretical probability of picking purple.	**4/13**
3	A coin is flipped 18 times. Heads appears 12 times. Find the experimental probability of heads.	**2/3**
4	A jar has 3 red tokens and 13 blue tokens. In 32 draws with replacement, red appears 8 times. Find the theoretical and experimental probabilities of red.	**Theoretical: 3/16; experimental: 1/4.**

PART 2 · APPLY IT

1. **Theoretical: 7/16; experimental: 9/16. Experimental is greater.** There are 16 prizes, so the theoretical probability is 7/16. The experimental probability is 18/32 = 9/16.
2. **Theoretical: 1/4; experimental: 9/28. Results can vary by chance.** There are 4 avatars, so the theoretical probability is 1/4, or 7/28. The experimental probability is 9/28, which can differ because of chance.

CHALLENGE

Theoretical: 2/9 × 2/9 = 4/81; experimental: 7/81. They can differ because of chance.

Accept equivalent fractions. For explanations, accept that results vary by chance even when the theoretical model is correct.