

# Chance Check

Compare expected results with trial results.

GRADE 7 • MA.7.DP.2

**MA.7.DP.2** "Develop an understanding of probability. Find and compare experimental and theoretical probabilities."

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## TWO KINDS OF PROBABILITY

Theoretical probability is favorable outcomes / total equally likely outcomes. Experimental probability is times an event happens / total trials. To compare, write equivalent fractions with a common denominator.

## WORKED EXAMPLE

A bag has 11 blue and 16 red chips. In 54 draws with replacement, blue appears 24 times. Find and compare both probabilities.

1. Total chips:  $11 + 16 = 27$ .
2. Theoretical  $P(\text{blue}) = 11/27$ .
3. Experimental  $P(\text{blue}) = 24/54 = 4/9$ .
4.  $4/9 = 12/27$ , so experimental probability is higher.

**Answer: Theoretical: 11/27.  
Experimental: 4/9, higher.**

## PRACTICE 5 problems

- 1** An equal spinner has 10 sections. Three sections have stars. Find theoretical  $P(\text{star})$ .

ANSWER \_\_\_\_\_

- 2** A coin lands heads 13 times in 25 flips. Find experimental  $P(\text{heads})$ .

ANSWER \_\_\_\_\_

- 3** A number cube is rolled 40 times. A 6 appears 7 times. Find experimental  $P(6)$ .

ANSWER \_\_\_\_\_

- 4** A bag has 14 black beads and 6 white beads. Find theoretical  $P(\text{white})$ .

ANSWER \_\_\_\_\_

- 5** An app chooses 1 of 10 equal icons. A heart appears 20 times in 50 picks. Theoretical  $P(\text{heart})$  is  $1/10$ . Find the experimental probability. Is it higher or lower?

ANSWER \_\_\_\_\_

## APPLY IT Show your work

- 1** A playlist has 35 songs, including 14 hip-hop songs. After 45 shuffles, 21 first songs are hip-hop. Find and compare the theoretical and experimental probabilities.

WORK SPACE

ANSWER \_\_\_\_\_

- 2** A game chest has 8 rare skins and 22 common skins, all equally likely. A player opens 60 chests and gets 14 rare skins. Find and compare the theoretical and experimental probabilities.

WORK SPACE

ANSWER \_\_\_\_\_

## CHALLENGE One step up

### CHALLENGE

A game claims that blue should appear with probability  $\frac{2}{3}$ . Trial A gets blue 26 times in 39 tries. Trial B gets blue 21 times in 35 tries. Which trial is closer to the claim? Explain.

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## PART 1 • PRACTICE

| # | PROBLEM                                                                                                                                                                       | ANSWER             |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 1 | An equal spinner has 10 sections. Three sections have stars. Find theoretical $P(\text{star})$ .                                                                              | <b>3/10</b>        |
| 2 | A coin lands heads 13 times in 25 flips. Find experimental $P(\text{heads})$ .                                                                                                | <b>13/25</b>       |
| 3 | A number cube is rolled 40 times. A 6 appears 7 times. Find experimental $P(6)$ .                                                                                             | <b>7/40</b>        |
| 4 | A bag has 14 black beads and 6 white beads. Find theoretical $P(\text{white})$ .                                                                                              | <b>3/10</b>        |
| 5 | An app chooses 1 of 10 equal icons. A heart appears 20 times in 50 picks. Theoretical $P(\text{heart})$ is $1/10$ . Find the experimental probability. Is it higher or lower? | <b>2/5, higher</b> |

## PART 2 • APPLY IT

- Theoretical: 2/5. Experimental: 7/15. The experimental probability is higher by 1/15.** Theoretical probability is  $14/35 = 2/5$ . Experimental probability is  $21/45 = 7/15$ , and  $2/5 = 6/15$ .
- Theoretical: 4/15. Experimental: 7/30. The experimental probability is lower by 1/30.** Theoretical probability is  $8/30 = 4/15$ . Experimental probability is  $14/60 = 7/30$ .

## CHALLENGE

**Trial A. Its probability is  $26/39 = 2/3$  exactly. Trial B is  $21/35 = 3/5$ , which is  $1/15$  below  $2/3$ .**

Accept equivalent fractions and correct comparison statements. Students may compare using common denominators or simplified fractions.