Theoretical Probability Worksheet

Grade 7 · Common Core 7.SP.C.7

> Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

Practice

Builds the skill step by step.

1. A spinner has 5 equal sections labeled A, B, C, D and E. What is the probability of landing on C?

2. A bag has 2 red, 3 green and 5 blue marbles. One is drawn at random. Find P(green).

3. A fair number cube (1 to 6) is rolled. Find P(a number greater than 4).

4. Which is a uniform probability model, where every outcome is equally likely?

   A. Spinning a spinner with one large section and two small ones

   B. Drawing a marble from a bag of 3 red and 1 blue

   C. Rolling a fair number cube

   D. Guessing a friend's favorite color

5. A letter is chosen at random from the word PROBABILITY. Find P(B).

6. A fair coin is flipped. What is P(tails)?

7. Ten cards are numbered 1 to 10. One is drawn at random. Find P(odd number).

8. Half of a spinner is red. Blue and green each take up one quarter. What is P(blue)?

   A. $\frac{1}{4}$

   B. $\frac{1}{3}$

   C. $\frac{1}{2}$

   D. $\frac{3}{4}$

9. In a class of 25 students, 10 have a sister. One student is chosen at random. Find P(has a sister).

10. A bag has 4 orange and 6 purple tiles. A tile is drawn and replaced 100 times. How many purple tiles would you expect?

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On Level

Grade-level practice.

1. A spinner has 8 equal sections: 3 red, 2 blue and 3 yellow. Find P(red or blue).

2. A whole number from 1 to 30 is chosen at random. Find P(a multiple of 3).

3. A spinner with sections A, B and C gave these results in 200 spins: A 98, B 52, C 50. Which model fits best?

   A. $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{4}$, $P(C) = \frac{1}{4}$

   B. Each section has probability $\frac{1}{3}$

   C. $P(A) = \frac{1}{4}$, $P(B) = \frac{1}{2}$, $P(C) = \frac{1}{4}$

   D. $P(A) = \frac{1}{4}$, $P(B) = \frac{1}{4}$, $P(C) = \frac{1}{2}$

4. A jar has 6 red, 4 white and 10 blue candies. One is drawn at random. Find P(not blue).

5. A spinner has P(A) = 0.5, P(B) = 0.3 and P(C) = 0.2. Predict the number of C results in 150 spins.

6. A fair number cube is rolled. Find P(a factor of 6).

7. A bag has 5 marbles: 1 red, 2 blue and 2 green. Is a model that gives each color a probability of $\frac{1}{3}$ correct?

   A. No; P(red) = $\frac{1}{5}$ and P(blue) = P(green) = $\frac{2}{5}$.

   B. Yes, because there are 3 colors.

   C. No; P(red) = $\frac{1}{2}$.

   D. Yes, because every color is in the bag.

8. A class has 14 girls and 16 boys. The teacher picks one student at random. Find P(girl) as a percent, rounded to the nearest whole percent.

9. A drawer has 8 black, 6 white and 2 gray socks. One sock is pulled out at random. Find P(white).

10. A spinner has P(win) = $\frac{1}{8}$. How many wins do you expect in 64 spins?

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Challenge

Multi-step and word problems that stretch it.

1. A bag of 24 marbles has red, blue and green marbles. P(red) = $\frac{1}{4}$ and P(blue) = $\frac{1}{3}$. How many marbles are green?

2. The table shows 400 spins of a spinner whose sections are not equal. Write a probability model using simple fractions.

Color	Red	Blue	Green
Times landed	205	98	97

3. A spinner has 3 sections. P(X) = 0.45 and P(Y) = 0.35. What is P(Z)?

   A. 0.8

   B. 0.2

   C. 0.1

   D. 0.35

4. A letter is chosen at random from the 26 letters of the alphabet. Find P(vowel), counting A, E, I, O and U as vowels.

5. A bag has 3 red marbles and some yellow marbles. P(yellow) = 0.7. How many yellow marbles are there?

6. A model says P(heads) = $\frac{1}{2}$. In 1,000 flips, heads came up 702 times. What does this suggest?

   A. The coin may not be fair, so the model may be wrong.

   B. The model is correct.

   C. 702 is exactly what was expected.

   D. Nothing at all.

7. A spinner has a red section with a 180° angle, a blue section with a 120° angle and a white section with a 60° angle. Find P(blue).

8. A game spinner lands on 1 point with probability $\frac{1}{2}$, 2 points with probability $\frac{1}{3}$ and 5 points with probability $\frac{1}{6}$. How many 5-point results do you expect in 90 spins?

9. A school has 240 students. 60 are in band only, 45 are in choir only and the rest are in neither. One student is chosen at random. Find P(neither).

10. A fair 10-sided die numbered 1 to 10 is rolled. Which event has the same probability as rolling an even number?

    A. Rolling a number greater than 5

    B. Rolling a 10

    C. Rolling a prime number

    D. Rolling a multiple of 3