

Grade 7 • Unit 8 Worksheet

Probability and Sampling

Name: _____

Date: _____

Part A • Likelihood Vocabulary

1. For each event, decide if it is impossible, unlikely, equally likely as not, likely, or certain.
- Rolling a 7 on a standard 6-sided die. _____
 - A coin lands on heads. _____
 - It will rain on at least one day this year. _____
 - Drawing a red card from a standard deck of 52 cards. _____

Part B • Computing Probabilities (Single Events)

2. A spinner is divided into 8 equal sections: 3 red, 2 blue, 2 green, 1 yellow.
- $P(\text{red}) = \frac{\quad}{\quad} = \frac{\quad}{\quad} \%$
 - $P(\text{blue or green}) = \frac{\quad}{\quad}$
 - $P(\text{NOT yellow}) = \frac{\quad}{\quad}$
 - If we spin 80 times, about how many times should we expect yellow? _____
3. A bag has 5 red, 3 blue, and 2 green marbles. One marble is drawn at random.
- $P(\text{red}) = \frac{\quad}{\quad}$
 - $P(\text{blue}) = \frac{\quad}{\quad}$
 - $P(\text{red or blue}) = \frac{\quad}{\quad}$
 - Compare: $P(\text{red}) + P(\text{blue}) + P(\text{green}) = \frac{\quad}{\quad}$. Why must this equal 1?

Part C • Multi-Step Events (Sample Spaces)

4. A coin is flipped twice.
- List all possible outcomes (HH, HT, ...): _____
 - Total outcomes in sample space: _____
 - $P(\text{both heads}) = \frac{\quad}{\quad}$
 - $P(\text{at least one tail}) = \frac{\quad}{\quad}$
5. Two number cubes (standard dice) are rolled.
- Total outcomes in the sample space: _____
- $P(\text{sum is 7}) = \frac{\quad}{\quad}$

$P(\text{sum is } 12) = \underline{\hspace{2cm}}$

$P(\text{sum is greater than } 9) = \underline{\hspace{2cm}}$

Part D • Experimental vs Theoretical Probability

6. Lin flipped a coin 20 times and got 13 heads.

a. Experimental $P(\text{heads})$ from her data: $\underline{\hspace{2cm}}$

b. Theoretical $P(\text{heads})$: $\underline{\hspace{2cm}}$

c. Should Lin conclude that her coin is unfair? Why or why not?

Part E • Sampling & Populations

7. A principal wants to know what percent of the school's 800 students walk to school. She surveys the first 50 students who arrive in the morning.

Is this a representative random sample? Why or why not?

Suggest a BETTER sampling method.

8. A sample of 60 students from a school of 1200 found that 45 own a bicycle.

Sample proportion that owns a bicycle: $\underline{\hspace{2cm}}\%$

Estimate how many students in the WHOLE school own a bicycle: $\underline{\hspace{2cm}}$

Part F • Comparing Populations + Error Analysis

9. Two random samples of test scores: • Class A: mean 78, MAD 5 • Class B: mean 84, MAD 4 Is there a meaningful difference between the classes?

Difference of means: _____

Compare to MAD. Is the difference roughly bigger than $2 \times \text{MAD}$, or about the same as MAD?

Conclusion: ☐ Meaningful difference ☐ Differences could be due to sampling variability.

10. Han claims: "I rolled a die 10 times and got six 5's. The die is rigged." Is Han's reasoning sound?

Compute theoretical $P(5)$ for a single roll: _____

Expected number of 5's in 10 rolls: _____

Is 10 rolls enough to conclude the die is rigged? Explain.
