

**Worksheet 10-5: Theoretical & Experimental Probability**

1. Which event is more likely: rolling a standard number cube and getting an even number, or flipping a coin and having it land heads up?

$$P(\text{even}) = \frac{1}{2}$$

$$P(\text{heads}) = \frac{1}{2}$$

*equally likely  
to occur.  
both equal  $\frac{1}{2}$*

2. A carnival game has 160 rubber ducks floating in a pool. The person playing the game takes out one duck and looks at it.

- If there's a red mark on the bottom of the duck, the person wins a small prize.
- If there's a blue mark on the bottom of the duck, the person wins a large prize.
- Many ducks do not have a mark.

After 50 people have played the game, only 3 of them have won a small prize, and none of them have won a large prize.

Estimate the number of the 160 ducks that you think have red marks on the bottom. Then estimate the number of ducks you think have blue marks. Explain your reasoning.

$$\frac{3}{50} = \frac{x}{160}$$

$$x = 9.6$$

*2 : blue*

*10 : red*

*148 : no mark.*

3. Lynn wants to know if flipping a quarter really does have a probability of  $\frac{1}{2}$  of landing heads up, so she flips a quarter 10 times. It lands heads up 3 times and tails up 7 times. Has she proven that the probability is not  $\frac{1}{2}$ ? Explain your reasoning.

*no. the experimental probability does not exactly match the theoretical probability.*

4. A 7<sup>th</sup> grade student surveyed 25 students at her school. She asked them how many hours a week they spend playing a sport or game outdoors. The results are listed in the table below.

Number of Hours	Tally	Frequency
0		<del>3</del>
1		4
2	++++	<del>5</del>
3	++++	<del>7</del>
4		<del>3</del>
5		0
6		2
7		0
8		1

a.  $P(3 \text{ hours}) = \frac{7}{25} = 0.28, 28\%$

b.  $P(8 \text{ hours}) = \frac{1}{25} = 0.04, 4\%$

c.  $P(6 \text{ or more hours}) = \frac{3}{25} = 0.12, 12\%$

d.  $P(3 \text{ or fewer hours}) =$

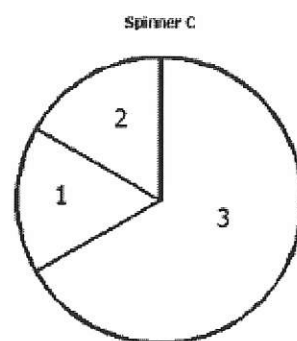
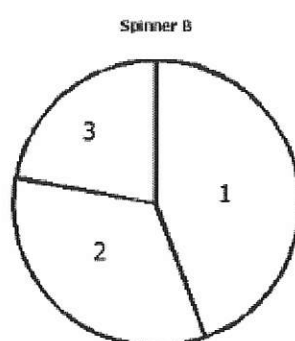
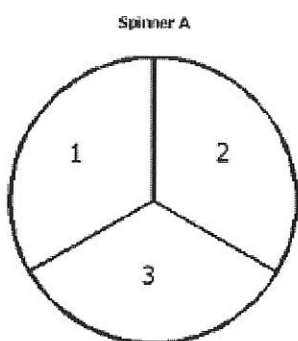
$\frac{19}{25} = 0.76, 76\%$

- e. If she surveyed another 25 students would you expect the same or different results?

*different results - each group is  
not exactly the same*

5. A student played a game using one of the spinners below. The table shows the results of 15 spins. Which spinner did the student use? Give a reason for your answer.

Spin	Results
1	1
2	1
3	2
4	3
5	1
6	2
7	3
8	2
9	2
10	1
11	2
12	2
13	1
14	3
15	1



$$\begin{array}{r} 1: 6 \\ 2: 6 \\ 3: 3 \\ \hline 15 \end{array}$$

Spinner B: 1 and 2 were more frequent than 3 so they should be a larger part of the circle.

6. Imagine that you have a bag containing 10 marbles of different colors.

You have drawn a marble, recorded its color and replaced it 50 times, with the following results:

9 purple, 16 orange, 6 yellow, and 19 green marbles.

Make a prediction for how many marbles of each color are in the bag. Show all of your work or explain your reasoning.

2 purple, 3 orange

1 yellow, 4 green

$$\frac{9}{50} = \frac{x}{10} \quad 1.8$$

$$\frac{6}{50} = \frac{x}{10} \quad 1.2$$

$$\frac{16}{50} = \frac{x}{10} \quad 3.2$$

$$\frac{19}{50} = \frac{x}{10} \quad 3.8$$

For #7-15, a game consists of rolling two fair number cubes and finding the sum. Find the probability. Use the chart from your notes to help you.

7. $P(\text{sum} = 3)$ $\frac{2}{36} = \frac{1}{18}$	8. $P(\text{sum} = 7)$ $\frac{6}{36} = \frac{1}{6}$	9. $P(\text{sum} = 9)$ $\frac{4}{36} = \frac{1}{9}$
10. $P(\text{sum} = 2)$ $\frac{1}{36}$	11. $P(\text{sum} = 4)$ $\frac{3}{36} = \frac{1}{12}$	12. $P(\text{sum} = 13)$ $\frac{0}{36}$
13. Complement of $P(\text{sum} > 8)$ $\textcircled{1} P(\text{sum} > 8) = \frac{10}{36} = \frac{5}{18}$	14. $P(\text{sum} \leq 12)$ $\frac{36}{36} = 1$	15. $P(\text{sum} < 7)$ $\frac{15}{36} = \frac{5}{12}$

Complement:

$$1 - \frac{5}{18} = \frac{18}{18} - \frac{5}{18}$$

$$\boxed{\frac{13}{18}}$$

(does not include 7)