10.3: Experimental and Theoretical Probability

You have a bag filled with 6 red marbles,   
4 blue marbles, and 8 yellow marbles.   
Explain to a partner how to find the   
probability of pulling out a red marble.

A number cube is rolled. Determine the probability of each event.

1. Rolling a 5 2. Rolling an even number

3. Rolling a 3 or 4 4. Rolling a 6

5. Rolling a 1, 5, or 6 6. Rolling an odd number

Review with a partner how to find relative frequency. Use an example to explain.

You have three sticks. Each stick has one red side and one blue side. You throw the sticks   
10 times and record the results. Use the table   
to find the relative frequency of the event.

1. Tossing 3 red

|  |  |
| --- | --- |
| Outcome | Frequency |
| 3 red | 2 |
| 3 blue | 4 |
| 1 red, 2 blue | 0 |
| 1 blue, 2 red | 4 |

2. Tossing 1 red, 2 blue

3. Tossing 1 blue, 2 red

4. *Not* tossing all red

Relative Frequency:

Experimental Probability:

Theoretical Probability:

You have two sticks. Each stick has one blue   
side and one pink side. You throw the sticks   
10 times and record the results. Use the table   
to find the experimental probability of the event.

|  |  |
| --- | --- |
| **Outcome** | **Frequency** |
| 2 blue | 1 |
| 2 pink | 3 |
| 1 blue, 1 pink | 6 |

1. Tossing 2 pink

2. Tossing 1 blue and 1 pink

3. *Not* tossing all pink

4. You check 15 bananas. Six of the bananas are bruised.

a. What is the experimental probability that a banana is bruised?

b. What is the experimental probability that a banana is *not* bruised?

5. Sixteen students have cell phones. Five of the cell phones have touch screens.

1. What is the experimental probability that a student’s cell phone has a touch screen?
2. Out of 144 students’ cell phones, how many would you expect to have touch screens?

You flip a coin twice. You repeat this process   
12 times. The table gives the results.

|  |  |
| --- | --- |
| **Outcome** | **Frequency** |
| 2 Heads | 2 |
| 1 Head, 1 Tail | 7 |
| 2 Tails | 3 |

6. Use the first table to find the experimental   
probability of each outcome.

7. Based upon experimental probability, which   
outcome is most likely?

8. The second table gives the possible outcomes of  
flipping a coin twice. Each of these outcomes is  
equally likely. What is the theoretical probability   
of flipping 1 tail?

|  |  |
| --- | --- |
| **1st Flip** | **2nd Flip** |
| Head | Head |
| Head | Tail |
| Tail | Head |
| Tail | Tail |

9. Compare your answers to Exercises 7 and 8.