

**Warm up**

a) Evaluate: 60% of 20 =  $0.60 \times 20$   
= 12

b) Express  $\frac{6}{15}$  as a decimal & a percent.

$$\frac{6}{15} = 6 \div 15 = 0.4 = 40\%$$

$\nearrow$   
×100

c) Write  $\frac{12}{18}$  in lowest terms.

$$\frac{12 \div 6}{18 \div 6} = \frac{2}{3}$$

# EXPERIMENTAL PROBABILITY

**Learning goals**

- learn how to do and record results of an experiment
- analyze the results of an experiment

## Terminology

**Experiment** - consists of a number of trials to simulate the given situation

ex. flip a coin 5 times

**Trial** - is 1 round of a probability experiment

ex.

flip a coin once

**Event** - is a set of outcomes with the same result

ex. flip a coin → get tails

**Outcome** - is a possible result of an experiment

ex. head or tail

**Experimental Probability** - determined based on the results of an experiment

$$\text{Experimental Probability} = \frac{\text{\# of "successful" results}}{\text{total \# of trials}}$$

**Examples:****1) Flipping a coin**

20 times

Flip	Tally
Heads	7
Tails	13

$$P_E(\text{heads}) = \frac{7}{20}$$

↑  
experimental

**2) Rolling a dice**

20 times

Roll	Tally
1	4
2	4
3	3
4	2
5	2
6	5

$$P_E(\text{rolling a 4}) = \frac{2}{20}$$

$$= \frac{1}{10}$$

4. Students in a mathematics class pick a card from a standard deck of 52 cards, record the suit, and return the card to the deck. The results are shown.

Result	Frequency
hearts	5
diamonds	9
spades	8
clubs	6

a) How many students are in the class? **28**

b) What fraction of the students chose a red card?

c) Does your result for part b) make sense? Explain.

*→ hearts and diamonds =  $\frac{14}{28} = \frac{1}{2}$*

*→ yes, half the deck is red.*

5. The bar graph shows the music preference of a group of students.

Type of Music	Frequency
Rock	8
Rap	11
Metal	5
Alternative	14
Other	3

a) How many students were surveyed? **41**

b) What is the most popular type of music in this group?

c) What percent of students surveyed chose the most popular type of music?

*→ alt. → highest bar total is 41*

*→  $\frac{14}{41} = 0.34$*

*→  $= 34\%$*

## Do your own experiment.

Take three coins.  
 Toss them at the same time.  
 Record how many tails your got.  
 Repeat 50 times.  
 Create 2 tables.

# of tails	Frequency
0	
1	
2	
3	

Points	Frequency
0	
1	
3	

*→* (green arrow from 0 to 0)  
*→* (blue arrow from 1 to 1)  
*→* (red arrow from 3 to 3)

Use your TI-Nspire to make two bar graphs.

What did you notice?

$$P(0 \text{ tails}) = \frac{10}{50}$$

$$P(1 \text{ tail}) = \frac{16}{50}$$

$$P(2 \text{ tails}) = \frac{16}{50}$$

$$P(3 \text{ tails}) = \frac{8}{50}$$

$$P(0 \text{ points}) = \frac{10+16}{50} = \frac{26}{50}$$

$$P(1 \text{ point}) = \frac{16}{50}$$

$$P(3 \text{ points}) = \frac{8}{50}$$

Probability is always between 0 and 1.

The sum of all probabilities for the same experiment is 1.

### On the Boards...

#### EXAMPLE 1

- a) Two six-sided dice were rolled 20 times. Doubles were rolled 4 times. Determine the experimental probability of rolling doubles. Express your answer as a fraction in lowest terms, as a decimal, and as a percent.

$$\frac{4}{20} = \frac{1}{5} = 0.2 = 20\%$$

- b) Write the probability of NOT rolling doubles as a fraction in lowest terms, as a decimal and as a percent.

$$\frac{16}{20} = \frac{4}{5} = 0.8 = 80\%$$

$\uparrow$   
 $1 - \frac{4}{20}$

**EXAMPLE 2**

A coin was tossed 30 times. The experimental probability of turning up heads was  $\frac{2}{5}$ .

a) How many times did the coin turn up heads?

$$\frac{2}{5} = \frac{x}{30}$$

$$12 = x$$

b) How many times did the coin turn up tails?

$$30 - 12 = 18$$

c) What was the experimental probability of it turning up tails?

$$\frac{18}{30} = \frac{3}{5}$$

**EXAMPLE 3**

The results of rolling a six-sided die are displayed in the graph.

a) How many trials were there? 20

b) How many times was a 5 rolled? 3

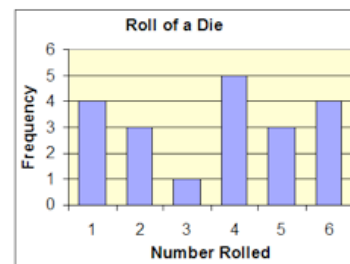
c) Find the experimental probability of rolling a 6.

$$\frac{4}{20} = \frac{1}{5}$$

d) Find the experimental probability of rolling a 3 or 5.

$$\left. \begin{array}{l} 3 \Rightarrow 1 \\ 5 \Rightarrow 3 \end{array} \right\} \text{total of 4}$$

$$\therefore \frac{4}{20} = \frac{1}{5}$$



Finish any board questions  
not completed.

For more practice  
Textbook pg 66 # 1, 4, 6, 9