

# Unit 4: Statistical Literacy

## Activate Your Prior Knowledge

### Learning Goals

- review mean, median and mode
- review range
- review ratios
- review percent increase and decrease

There are three measures of central tendency.

They are all different ways to state the *typical value* for a set of data.

**Mean** - The sum of values in a data set, divided by the number of values

**Median** - The middle value in a data set, when ordered from least to greatest

odd  $\rightarrow$  middle  
even  $\rightarrow$  add them up and  $\div 2$

**Mode** - The value that occurs most in a data set

if more than 1  $\rightarrow$  list all

For the following data, 85, 76, 91, 65, 68, 72, 78, 43 find

mean  $\frac{\text{sum}}{8} = \frac{578}{8} = 72.25$

median 43, 65, 68, 72, 76, 78, 85, 91

$$\frac{72 + 76}{2} = 74$$

mode none

The measure of spread that is used in this course is **range**.

**Range**  $\longrightarrow$  The difference between the greatest and least numbers in a data set.

*subtract*

Find the range of the test scores:

85, 76, 91, 65, 68, 72, 78, 43

$$91 - 43 = 48$$

**Ratio** - comparison of two or more quantities

There are 20 apples, 30 bananas and 10 oranges.

Find the following ratios.

apples to bananas  $= 20 : 30 = \frac{20}{30} = \frac{2}{3}$

apples to tropical fruit  $= 20 : 40 = 1 : 2$   
 $= 2 : 3$

**NOTE:**

Does not tell actual amount.

For every 2 apples we have 3 bananas

There are apples and bananas in a basket in the ratio of 3:7. If there are 9 apples, how many bananas are there?

$$\begin{array}{ccc} a & b & a & b \\ 3 & 7 & = & 9 & : & b \\ \downarrow & \uparrow & & \downarrow & \uparrow \\ & \times 3 & & \times 3 & \\ b = 7(3) & & & & \\ b = 21 & & \Rightarrow & & \end{array}$$

$$\begin{array}{r} \frac{3}{7} \Rightarrow \frac{9}{b} \\ 3b = 7(9) \\ \frac{3b}{3} = \frac{63}{3} \\ b = 21 \\ \therefore 21 \text{ bananas} \end{array}$$

b.) If there are 40 fruits all together, how many are apples?

$$\begin{array}{ccc} a & b & \text{together} \\ 3 & 7 & : 10 = a : b : 40 \end{array}$$

$$\begin{array}{r} \frac{3}{10} \Rightarrow \frac{a}{40} \\ 10a = 3(40) \\ \frac{10a}{10} = \frac{120}{10} \\ a = 12 \\ \therefore 12 \text{ apples} \end{array}$$

## Percent Change - how quantities change over time

$$\text{Percent Change} = \frac{\text{New price} - \text{Original price}}{\text{Original price}}$$

Often the change in quantities over time is described as percent increase or percent decrease.

Example: The Nintendo Wii was originally priced at \$200. Then the anticipation of its release drove the price up to \$249. A shortage during the first Christmas season since its release shot the price up to \$350. The price of the Wii then stabilized at \$270.

- a) What was the percent increase in price of the Wii from its original price to the price it was released at?

$$\frac{249 - 200}{200} = \frac{49}{200} = 0.245 = 24.5\%$$

$\therefore$  increase of 24.5%

- b) What was the percent increase in price of the Wii from price that it was released at to the price at Christmas?

$$\frac{350 - 249}{249} = 0.41 = 41\%$$

$\therefore$  increase of 41%

- c) What was the percent decrease in price of the Wii from the price at Christmas to its current price?

$$\frac{270 - 350}{350} = -0.23 = -23\%$$

$\therefore$  decrease of 23%

**On the Boards...**

- Thirty people tasted a new brand of cheese. Twenty of them liked the taste.
  - What is the ratio of those who liked the taste to the total number who tried it?
  - Write an equivalent ratio with each second term:
    - 6
    - 100

a.)  $20:30$   
 $= 2:3$

b.)  $20:30 = \frac{4}{6}$   
↗  
÷5

$20:30 = \underline{\quad} : 100$

$$\frac{20}{30} = \frac{x}{100}$$

$$30x = 20(100)$$

$$30x = 2000$$

$$x = 66.\bar{6}$$

- There are 700 students enrolled in a high school. The ratio of girls to boys is 4:3.
  - How many boys and how many girls go to this school?
  - The average class size is 28 students. Suppose this class is representative of all the students in the school. How many students in the class are girls? How many are boys?

Boys : Girls : Total

$$3 : 4 : 7 = \underline{b} : \underline{g} : 700$$

Boys

$$3 : 7 = b : 700$$

$$b = 3(100)$$

$$b = 300$$

Girls

$$4 : 7 = g : 700$$

$$g = 4(100)$$

$$g = 400$$

b.)  $3 : 4 : 7 = \underline{12} : \underline{16} : \underline{28}$

⏟  
x4

$\therefore$  12 boys, 16 girls

1. The heights, in metres, of trees in a woodlot are as follows:

18.0	21.3	17.1	23.5	19.8	17.9	17.0	21.5	19.2	19.0	20.6	19.5
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- a) Calculate the mean, median, and mode tree height.  
b) Determine the range of this data set.

mean 19.5  
median 19.4  
mode none  
range 6.5

2. Which measure of central tendency best describes the data in question 1? Explain.

no outliers  
∴ mean or median

1. The population of a city was 18 500 last year.  
This year the population is 21 300.  
What is the percent increase in population?

$$\frac{21300}{18500} = \frac{2800}{18500} = 15.1\%$$

increase

2. Ms. Voisin was trying to sell her house for \$325 000.  
When it had not sold after several weeks, she lowered the asking price to \$298 000.  
What is the percent decrease in price?  
Use this information to write an advertisement headline for the house.

$$\frac{298000 - 325000}{325000} = \frac{-27000}{325000} = -8.3\%$$

decrease

Seatwork

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