

# Interpolation

# Extrapolation

Linear Relationships  
The x value is inside the data set

The x-value is outside the data set  
Name: \_\_\_\_\_  
Date: \_\_\_\_\_ Pd: \_\_\_\_\_

oz	32	128
cost	2.19	7.69

1. A quart (32 ounces) of milk costs \$2.19; a gallon of milk costs \$7.69. (\*\*There are four quarts in a gallon)

a. Identify the independent and dependent variables.

I: # oz      D: Cost

(oz, cost)

b. Write the linear equation for this relationship.

$$y = .06x + .36$$

(32, 2.19) (128, 7.69)

c. What is the meaning of the slope?

$$m = \frac{.06 \leftarrow \text{cost}}{1 \leftarrow \text{oz}}$$

The cost of milk increases  $\frac{\$0.06 \text{ per oz}}{m}$

d. What is the meaning of the y-intercept? Why isn't it zero?

(0, .36)  
↑  
oz cost

zero oz of milk cost

\$0.36



e. Using the linear model you created, how much should you pay for a half-gallon of milk?

How much should you pay for a pint (16 ounces)?

How much should you pay for two liters (1 liter=33.8 ounces)?

\$1.27

\$4.23

$$y = .06(67.6) + .36$$

$$y = \$4.42$$

f. How many ounces of milk can I buy with \$15.43?

(263.1, 15.43)

263.1 oz

2. I left Raleigh on Thursday at 4:00 and drove to Wilmington, a distance of 160 miles, arriving at 6:45. Next Friday I'm leaving at 2:30 to make the 210 mile drive to Boone.

a. If I sketch a graph for this data, what goes on the x-axis and y-axis?

I: time      D: distance

(0, 0) (2.75, 160)  
 $\frac{45 \text{ min}}{60 \text{ min}} = .75$

b. What is my driving rate? Write this as a linear equation.

What is the y-intercept (how far have I drive in 0 hours)?

$$y = 58.2x + 0 \quad 58.2 \text{ mph}$$

c. How long will it take me to get to Boone?

What time will I get there?

$$y = 210 \quad (3.6, 210)$$

$$.6(60) = 36$$

6:06

3 hours = 36 min

d. How long would it take to drive 542 miles?

9.3 hours

e. If I start driving at 8:00am on Saturday and drive until 12:40pm, how far will I have traveled?

271.2 hours

3. Mr Morton is very old. In 1992, he was born weighing 9 pounds. Now he weighs 200 pounds.

a. Determine the independent and dependent variables.

I: year (0, 9)  
D: # of pounds (27, 200)

b. Write an equation for the relationship between his weight and age.

$$y = 7.1x + 9$$

c. Why isn't the y-intercept zero? What does the y-intercept mean?

(0, 9) when Mr. Morton was born, he weighed nine pounds

d. Using the model, how much do you think he'll weigh in 2022? Is this realistic?

221.2 pounds

yr 30

How much does he weigh in 1988? Explain.

-19.3 Extrapolation

4. Miss Beehive has produced 520 pounds of honey from her bees. She uses 2 pounds of honey in every jar she sells at the Farmer's Market.

a. How many pounds will she have remaining if she sells 5 jars? 42 jars?

510 436

b. The relationship between pounds of honey remaining and number of jars sold is linear. What is the independent variable? Dependent?

I: # of jars sold D: # of pounds of honey left

c. Write a linear equation for this relationship.

$$y = -2x + 520$$

d. What is the meaning of the slope and the y-intercept?

(0, 520) At the beginning there were 520 lbs of honey

e. She needs to keep 82 pounds in reserve in order to keep the bees happy. What is the greatest number of jars she can sell?

219 jars

$m = -2$  The # of pounds of honey decreased 2 pounds per jar sold.

5. If  $C = \frac{5}{9}(F - 32)$  relates the temperatures in Fahrenheit and Celsius. Find the Fahrenheit temperature which corresponds to  $30^{\circ}\text{C}$ .