**Lesson 4.5 - Functions Fitted to Data**

* A \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ is a graph of data on a coordinate plane, where each data pair is represented by a point.
* Graphing a function on the same coordinate plane as a scatter plot for a data set allows us to see if the function is a \_\_\_\_\_\_\_\_\_ estimation of the relationship between the two variables in the data set.
* The graph and the equation of the function can be used to \_\_\_\_\_\_\_\_\_\_\_\_ coordinate pairs that are not included in the data set.

**Example 1**

Andrew wants to estimate his gas mileage, or miles

traveled per gallon of gas used. He records the number

of gallons of gas he purchased and the total miles he

traveled with that gas.



1. Create a scatter plot showing the relationship between gallons of gas and miles driven.

2. Would a linear or exponential function be a better estimate for the data? Explain.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Which function is a better estimate for the function that relates gallons to miles:

 $y=15x or y=22x?$

 a. Graph $y=15x$ (since it’s linear, you only need two points)

 b. Graph $y=22x$ (since it’s linear, you only need two points)

c. Identify which function comes closer to the data values (this function is the better

 estimate for the data). \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Interpret the equation in the context of the problem.

a. Determine the units of slope and the y-intercept. Slope: \_\_\_\_\_\_\_\_ Y-intercept: \_\_\_\_\_\_\_\_\_

b. Describe what the slope and y-intercept mean in the context of the problem.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



**Example 2**

The principal at Park High School records the total

number of students each year. The table below shows

the number of students for each of the last 8 years.

1. Create a scatter plot showing the relationship between the year and the total number of students.

2. Would a linear or exponential function be a better estimate for the data? Explain. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_3. Show that the function $y=600(1.05)^{x}$ is a good estimate for the relationship between the year and the population.

a. Graph $y=600(1.05)^{x}$ Make a table of points

b. Compare the graph of the function to the scatter plot of the data.

Why is it a good estimate of the data? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Approximately how many students will attend the high school in year 9? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (Hint: Use the function to estimate the population in year 9 by using x = 9 in the function.)

**You Try!**

A sandwich shop makes 100 sandwiches each morning

to prepare for the day’s orders. Each half hour, they

record the number of sandwiches remaining. Use the

data to answer the questions that follow.



1. Create a scatter plot showing the relationship between how many hours the shop has been open and the number of sandwiches remaining.

2. Would a linear or exponential function be a better estimate for the data? Explain. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Which function is a better fit for the data: $y=-3.8x+92 or y=-5.8x+99$?

 a. Graph $y=-3.8x+92$ (since it’s linear, you only need two points)

 b. Graph $y=-5.8x+99 $ (since it’s linear, you only need two points)

c. Identify which function comes closer to the data values (this function is the better

 estimate for the data). \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 4. Interpret the equation in the context of the problem.

a. Determine the units of slope and the y-intercept. Slope: \_\_\_\_\_\_\_\_Y-intercept: \_\_\_\_\_\_\_\_\_

b. Describe what the slope and y-intercept mean in the context of the problem.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Fifteen minutes after the shop opened, approximately how many sandwiches were remaining? \_\_\_\_\_

6. Approximately how long will it take for all the sandwiches to be sold? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_