Name:_____

Linear Functions

1. A department store has several retail outlets across the state. Each store has a different number of employees, and consequently produces varying amounts of annual sales.

Number of Employees	12	33	17	22	24	8
Annual Sales (Millions)	$250	$699	$350	$460	$501	$162

A) In this situation, identify what is represented by the independent and dependent variables.

Independent = _____

Dependent = _____

B) Place the data in the scatterplot.
Label each axis.

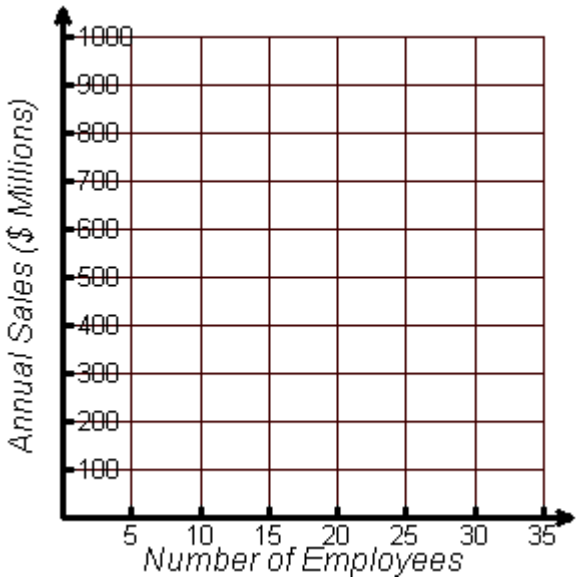
C) Would the data be discrete or continuous?

D) Is the function increasing or decreasing?

E) Determine a line of best fit for the data.

Equation: _____

Graph this line over the scatterplot.



F) The company is planning to open a new store with 19 employees. Predict the annual sales for this new store.

G) If a store needed to collect at least $610 million in sales, about how many total employees would they need to hire?

H) Find the *y*-intercept. What does it represent in the real world?

I) Explain the slope in terms of its units. What does the slope represent in the real world?

2. The number of dollars per month it costs you to own a car is a function of the number of kilometers a month you drive it. According to *Time* magazine, the cost varies linearly with the distance. The article states that driving 300 km costs $366 per month, but going 1,500 km in a month would cost $510.

A) What are the independent and dependent variables in the problem situation?

Independent = _____

Dependent = _____

B) Place the data in the scatterplot.
Label each axis.

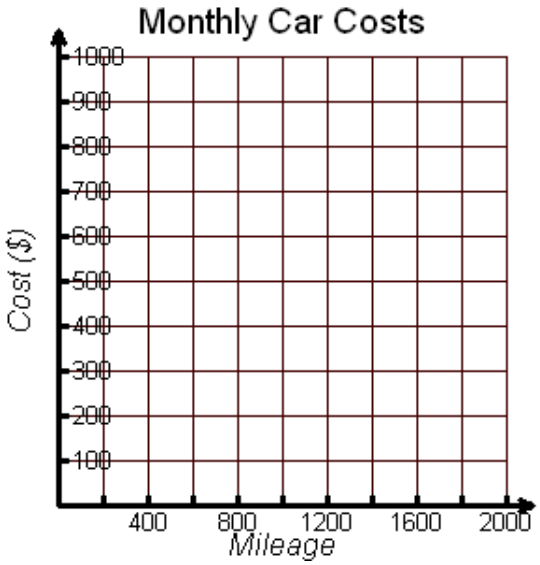
C) Would the data be discrete or continuous?

D) Is the function increasing or decreasing?

E) Determine a line of best fit for the data.

Equation: _____

Graph this line over the scatterplot.



F) Predict the monthly cost of owning a car for drivers who go 500 km/month, 1,000 km/month, and 2,000 km/month.

G) About how far could you drive in a month without exceeding a monthly cost of $600?

H) Explain the slope in terms of its units. What does the slope represent in the real world?

I) What is the *y*-intercept? What does it represent in the real world? Discuss reasons why it is greater than zero.

3. In a chemistry experiment, students kept track of the temperature of a solution as it was heated over a period of time. The data are displayed in the table below.

Time (Minutes)	5	15	25	30	32
Temperature (^oF)	77	127	177	202	212

A) Determine a function rule that relates y (temperature in °F) to x (time in minutes).

y = _____

B) Explain the process that you use to find this function rule.

C) About how long would it take to heat the solution to a temperature of 257°F?

Later in the semester, a second chemistry experiment will be conducted where the solution attains lower temperatures when heated over the same period of time.

D) What inequality could be used to describe temperatures in this second experiment?

E) Use the grid below to graph the possible values for the temperatures of the solution in the second experiment. Scale and label axes appropriately.