

Name Key

Date _____

Mrs. Roubos

8R Period _____

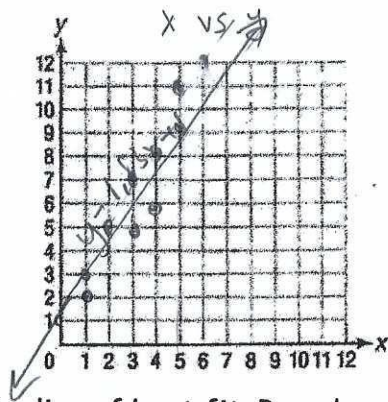
Scatter Plots and Line of Best Fit Day III

1)

a) Make a scatter plot from the data in the table.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|----|----|
| x | 0 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 |
| y | 1 | 3 | 2 | 5 | 7 | 5 | 6 | 8 | 9 | 11 | 12 |

use smallest & largest x-values when determining the equation



b) Determine the equation for the line of best fit. Round your values to the nearest hundredth.

$(0, 1)$ $(6, 12)$
 x_1, y_1 x_2, y_2
 $m = \frac{y_2 - y_1}{x_2 - x_1}$
 $m = \frac{12 - 1}{6 - 0}$ $m = \frac{11}{6}$ $m = 1.83$

$y = mx + b$ $(0, 1)$ $m = 1.83$
 $1 = 1.83(0) + b$
 $1 = 0 + b$
 $1 = b$
 $y = mx + b$
 $m = 1.83$
 $b = 1$
 $y = 1.83x + 1$

c) Draw your line of best fit

d) Use your equation to determine what y would be when x was 30.

$y = 1.83x + 1$
 $y = 1.83(30) + 1$
 $y = 54.9 + 1$
 $y = 55.9$

start here

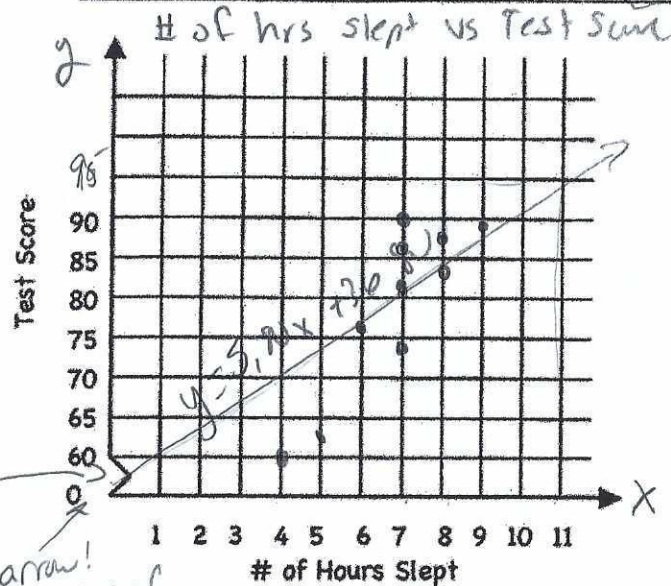
Did you interpolate or extrapolate in part d?

Extrapolating B/C 30 is outside the plotted values and the given graph

2)

a) A math teacher asked her students how many hours of sleep they had the night before a test. The data below shows the number of hours the student slept and their score on the exam. Create a scatter plot from the data in the table.

| | | | | | | | | | | |
|-------------|----|----|----|----|----|----|----|----|----|----|
| Hours Slept | 8 | 7 | 7 | 8 | 6 | 5 | 7 | 4 | 9 | 7 |
| Test Score | 83 | 86 | 74 | 88 | 76 | 63 | 90 | 60 | 89 | 91 |



use the smallest + largest x-values when determining the equation

b) Determine the equation for the line of best fit. Round your values to the nearest hundredth.

$(4, 60)$ $(9, 89)$
 x_1, y_1 x_2, y_2
 $m = \frac{y_2 - y_1}{x_2 - x_1}$
 $m = \frac{89 - 60}{9 - 4}$ $m = \frac{29}{5}$ $m = 5.8$

$y = mx + b$ $(4, 60)$ $m = 5.8$
 $60 = 5.8(4) + b$
 $60 = 23.2 + b$
 $-23.2 \quad -23.2$
 $b = 36.8$

$y = mx + b$
 $m = 5.8$
 $b = 36.8$
 $y = 5.8x + 36.8$
 Start here

c) Draw your line of best fit

d) Is there a ^{Correlation/association} relationship between the number of hours slept and the test score?

Yes! It has a positive relationship. As the # of hrs they sleep increases, their test score also increases.

e) What would the student's test score be if they slept for 11 hours?

~ 95

f) Did you interpolate or extrapolate in part e?

extrapolating b/c it is outside the plotted values

Lesson 37: Interpreting Linear Models

You can use an equation to describe the trend line on a scatter plot. The equation can be used to find relationships between the two data sets (variables) that are being graphed. The slope of the equation describes the rate of change between the two variables. The y-intercept of the equation describes the value of the dependent variable (y) when the value of the independent variable (x) is 0.

Example

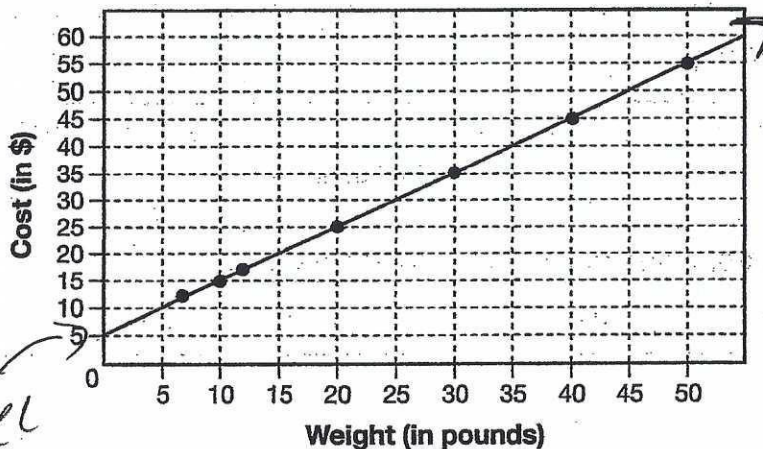
Lucia ships eight packages from a delivery company. The weight of her eight packages and the cost to ship them are listed in the following table.

Weight of Package Versus Cost of Shipment

| | | | | | | | | |
|--------------------|----|----|----|----|----|----|----|----|
| Weight (in pounds) | 10 | 20 | 30 | 23 | 50 | 12 | 7 | 40 |
| Cost (in \$) | 15 | 25 | 35 | 28 | 55 | 17 | 12 | 45 |

Lucia creates a scatter plot of her data. She then draws a trend line through the data points. Create and interpret the equation for Lucia's trend line.

Weight of Package Versus Cost of Shipment



Slope: $\frac{\Delta y}{\Delta x} = \frac{\$1}{1 \text{ lbs}} = \frac{1\$}{1\text{lb}}$

The y-intercept of the trend line is 5. The trend line goes up 1 unit for every 1 unit it moves to the right. Therefore, the slope is 1. Lucia's trend line can be modeled by the equation $y = x + 5$, where y is the cost to ship a package that weighs x pounds.

The slope of 1 means that the rate of change is \$1 for every additional pound. The y-intercept of 5 means that the delivery company charges a minimum of \$5 to ship any package, regardless of weight.

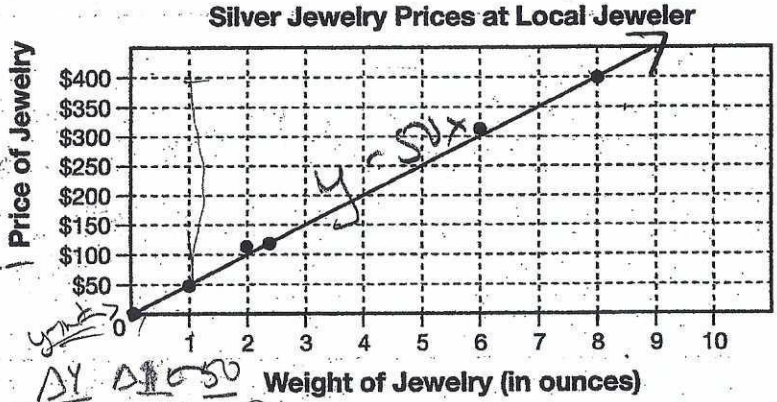
Practice

LOBF

Directions: For questions 1 and 2, interpret the slope and y-intercept of the trend line for the situation. Then write an equation for the trend line.

1. The following scatter plot shows the prices and weights of several pieces of her jewelry, as well as a trend line that shows their relationship.

$(1, 50)$ $(8, 400)$
 x_1, y_1 x_2, y_2
 $m = \frac{y_2 - y_1}{x_2 - x_1}$ or $m = \frac{\text{rise}}{\text{run}}$
 $m = \frac{400 - 50}{8 - 1} = \frac{350}{7} = 50$
 $m = \frac{50}{1}$



$y = mx + b$
 $m = 50$
 $b = 0$
 $y = 50x$

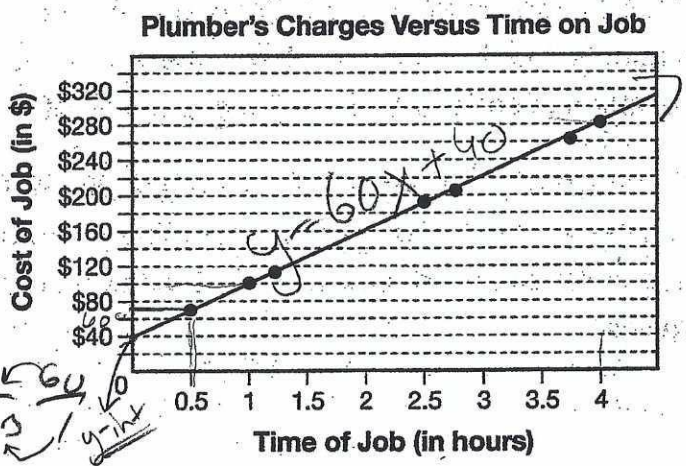
Interpret the slope: 50, it costs \$50 per 1 oz

Interpret the y-intercept: 0, There is no charge for 0 ounces (No fee)

Equation: $y = 50x$

2. The following scatter plot shows a plumber's charges (not including parts) and the time he spends at each job, as well as a trend line that shows their relationship.

$(0.5, 70)$ $(4, 280)$
 x_1, y_1 x_2, y_2
 $m = \frac{y_2 - y_1}{x_2 - x_1}$ or $m = \frac{\text{rise}}{\text{run}}$
 $m = \frac{280 - 70}{4 - 0.5} = \frac{210}{3.5} = 60$
 $m = 60$



$y = mx + b$
 $m = 60$
 $b = 40$
 $y = 60x + 40$

Interpret the slope: 60, it costs \$60 per 1 hour

Interpret the y-intercept: 40, his fee is \$40 for showing up

Equation: $y = 60x + 40$