

More Practice!

1.

The data table below shows the median diameter of grains of sand and the slope of the beach for 9 naturally occurring ocean beaches.

Median Diameter of Grains of Sand, in Millimeters (x)	0.17	0.19	0.22	0.235	0.235	0.3	0.35	0.42	0.85
Slope of Beach, in Degrees (y)	0.63	0.7	0.82	0.88	1.15	1.5	4.4	7.3	11.3

Write the linear regression equation for this set of data, rounding all values to the *nearest thousandth*. Using this equation, predict the slope of a beach, to the *nearest tenth of a degree*, on a beach with grains of sand having a median diameter of 0.65 mm.

2.

Omar has a piece of rope. He ties a knot in the rope and measures the new length of the rope. He then repeats this process several times. Some of the data collected are listed in the table below.

Number of Knots	4	5	6	7	8
Length of Rope (cm)	64	58	49	39	31

State, to the *nearest tenth*, the linear regression equation that approximates the length, y , of the rope after tying x knots. Explain what the y-intercept means in the context of the problem. Explain what the slope means in the context of the problem.

$y = -8.5x + 99.2$

↑
 rate at which the rope length decreases

↑
 starting rope length

NORMAL FLOAT AUTO REAL RADIAN MP

LinReg

$y = ax + b$

$a = -8.5$

$b = 99.2$

$r^2 = .9940836544$

$r = -.9970374388$

Name _____
Date _____

Period ____
Residual Plots

Do Now:

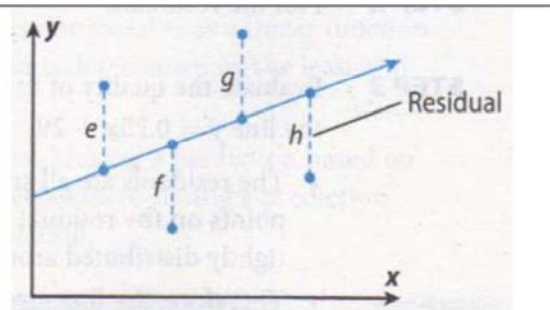
Find the following pieces of information for this data set: 13, 6, 24, 18, 33, 5, 13, 48, 9.

Mean: 18.8 Median: 13 Q1: 7.5 Q3: 28.5 IQR: 21

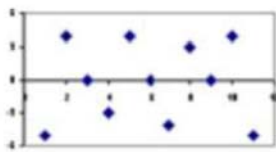
Standard Deviation: 13.3 Range: 43 ROUND TO THE NEAREST TENTH
 $48 - 5 = 43$

Creating a Residual Plot:

Some lines will fit a data set better than others. One way to evaluate how well a line fits a data set is to use **residuals**. A **residual** is the vertical distance between a data point and a line of best fit. After calculating residuals, you can draw a residual plot, which is a graph of points whose x-coordinates are the values of the independent variable and whose y coordinates are the corresponding residuals.

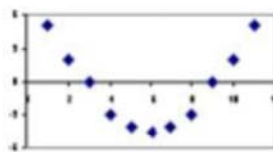


How do we assess the fit of a line with residual plots?

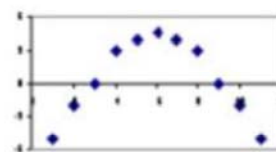


Random pattern

Good linear fit



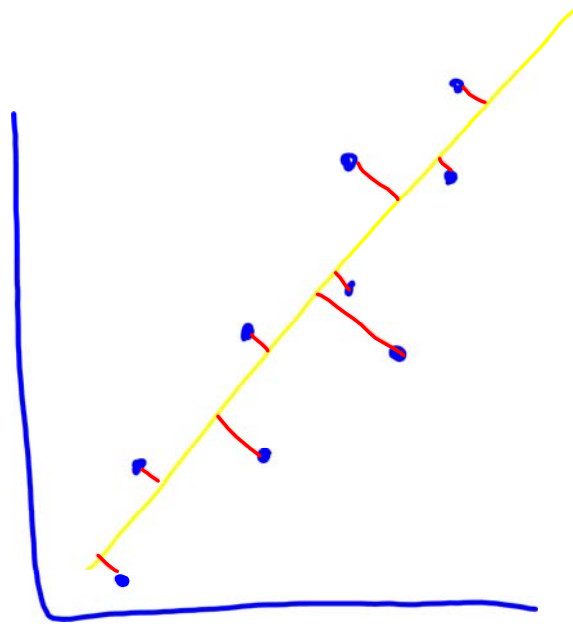
Non-random: U-shaped



Non-random: Inverted U

Poor linear fit

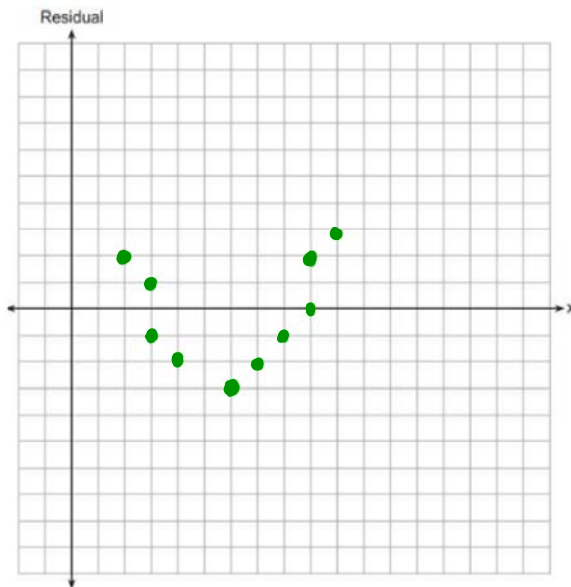
We will conduct practice on the next page!



The table below represents the residuals for a line of best fit.

x	2	3	3	4	6	7	8	9	9	10
Residual	2	1	-1	-2	-3	-2	-1	2	0	3

Plot these residuals on the set of axes below.



Using the plot, assess the fit of the line for these residuals and justify your answer.

Not a good linear fit, because there is a pattern.

After performing analyses on a set of data, Jackie examined the scatter plot of the residual values for each analysis. Which scatter plot indicates the best linear fit for the data?

