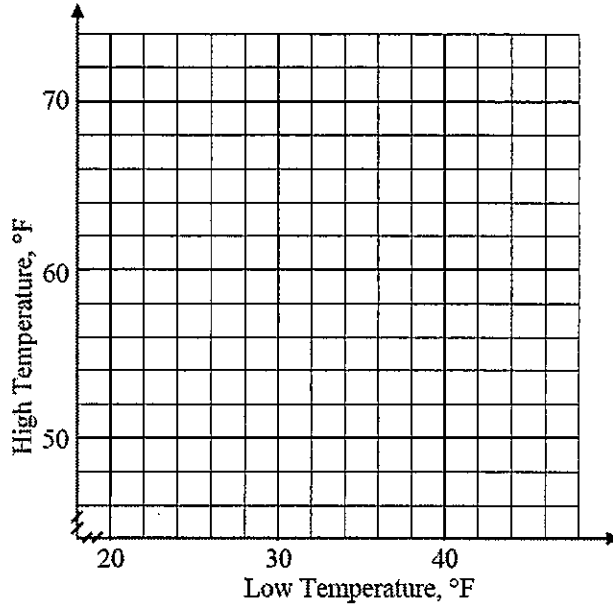


## Linear Regression (Review)

**Do Now:** A survey was taken of 10 low and high temperatures, in Fahrenheit, in the month of April to try to establish a relationship between a day's low temperature and high temperatures.

Low Temperature, $x$	26	28	30	32	34	35	37	38	41	45
High Temperature, $y$	49	50	57	54	60	58	64	66	63	72

Plot the following data and determine the type of correlation



### Steps for Graphing Bivariate Data and Finding Lines of Best Fit

\*(Turn Diagnostic on by going to the CATALOG 2<sup>ND</sup> 0)

\*\*We only need to do this after the memory is Reset

1. Choose STAT – 1:Edit
2. Input data into **L1**( $x$ -values) and **L2**( $y$ -values)
3. QUIT
4. Choose STATPLOT(2<sup>ND</sup> y =)
5. Select Plot 1
6. To graph scatter plot 9: ZOOMSTAT
7. Choose STAT – scroll over to CALC - Choose 4: LinReg ( $ax + b$ )
8. LinReg( $ax + b$ ) ENTER

L1	L2	L3	Z
14	49	---	---
27	50	---	---
48	57	---	---
80	54	---	---
110	60	---	---
153	58	---	---
261	64	---	---

L2(1)=14

```

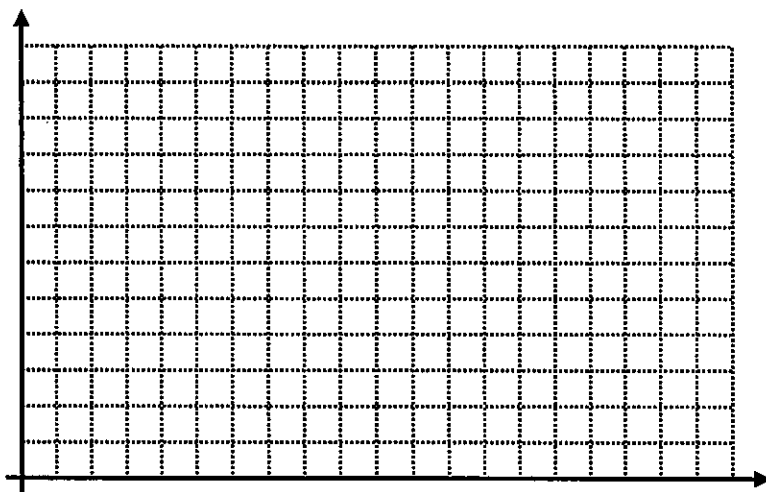
STAT Plot2 Plot3
OFF
Type: [ ] [ ] [ ]
[ ] [ ] [ ]
Xlist: L1
Ylist: L2
Mark: [ ] *
    
```

```

EDIT [ ] [ ] TESTS
1: 1-Var Stats
2: 2-Var Stats
3: Med-Med
4: LinReg(ax+b)
5: QuadReg
6: CubicReg
7: QuartReg
    
```

**Example 1:**

Temperature, degrees	Number of people at the beach
30	5
40	21
50	45
60	65
70	77
80	102
90	129

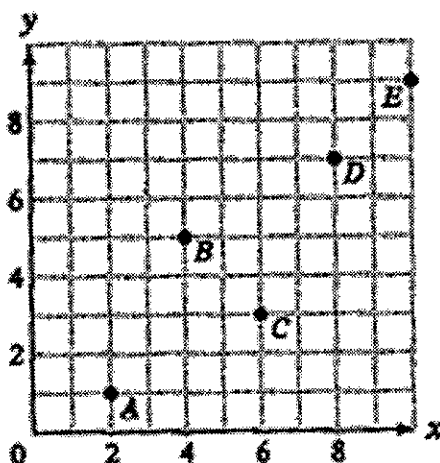


- Construct a scatter plot of this bivariate data set and draw a line of best fit.
- Write the equation for the line of best fit.
- Use your line of best fit to estimate the number of people at the beach when temperature is 97 degrees

**Example 2:** Calculate the equation for the line of best fit for the following data in  $y = mx + b$  form. Round  $m$  and  $b$  to the nearest tenth.

$x$	$y$
10	250
20	310
30	450
40	560
50	820

**Example 3:** What is the equation for the line of best fit for the points on this scatter plot.

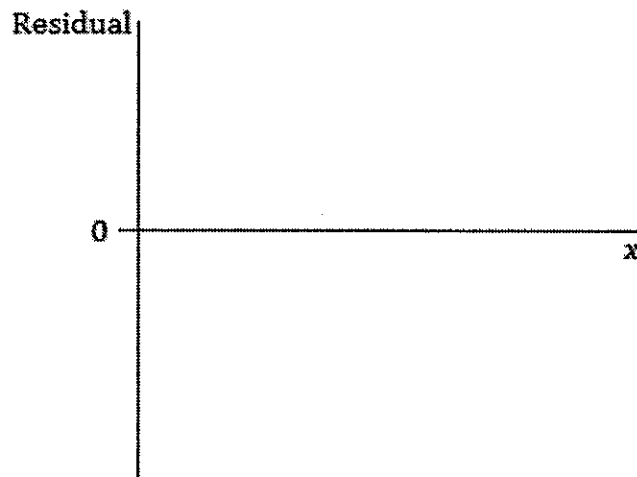


Residuals:

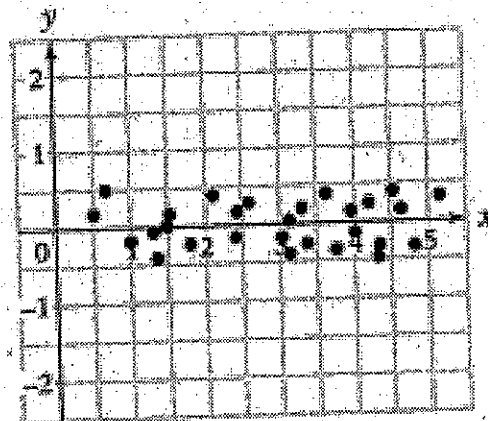
We do not want RESIDUALS to fall along a curve or make a distinct pattern. If so then the linear model is not appropriate to fit the data.

**Example 4:** Below is the data from a recent study comparing hours studied to test grades. Using the line of best fit  $y = 14.79x + 67.38$ , fill in the table below. Plot the residuals on the graph below.

Hours Studied, $x$	.5	1.0	1.0	2	2	2
Test Grade, $y$	75	80	84	95	100	96
Prediction						
Residual						

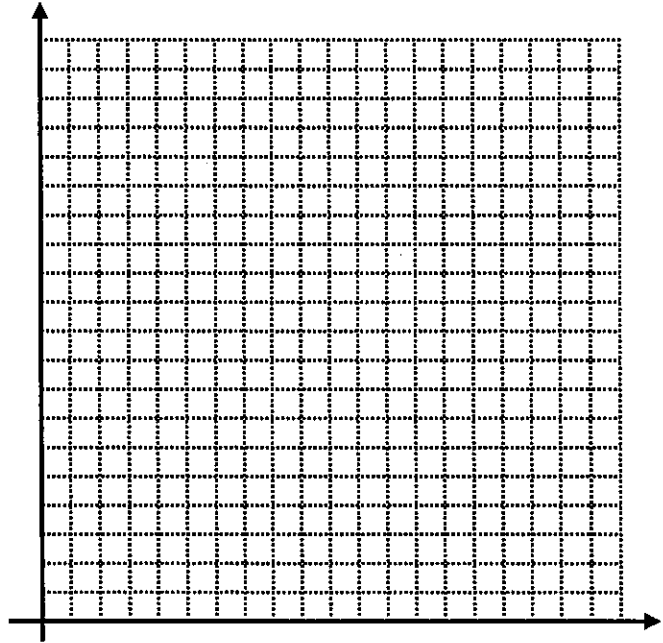


**Example 5:** Below is a residual plot for a scatter plot. What information can be determined about the original scatter plot from this residual plot?



**Example 6:** A car dealership keeps track of how many cars they sell at different prices. The data is displayed on the table below

Price (in thousands of dollars)	Cars sold
25	150
30	127
35	118
40	91
50	65



- Make a scatter plot of the data.
- Calculate the line of best fit.
- Use your equation of the line of best fit to predict how many cars they would sell at a cost of \$31,000.