

1.) Which expression is equivalent to $(4x - 6)^2$?

A. $16x^2 + 36$

B. $16x^2 - 48x + 36$

C. $8x^2 - 36$

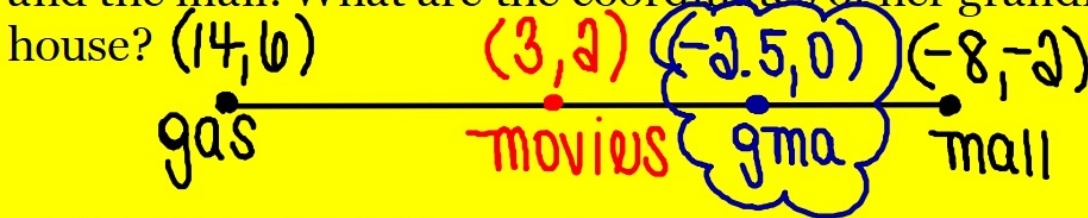
D. $8x^2 + 48x - 36$

$(4x - 6)(4x - 6)$

$4x$	$16x^2$	$-24x$
-6	$-24x$	36

2.) Briana created a coordinate grid of her city. The gas station is located at $(14, 6)$ and the mall is located at $(-8, -2)$. **Halfway** between the gas station and the mall is the movie theater.

Briana's grandmother lives halfway between the movie theater and the mall. What are the coordinates of her grandma's house?



mdpt. $\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}$

Enter the data into your graphing calculator.

Hours Spent Studying (x)	Test Score
2	85
3	81
4	88
5	91
6	98

```
LinReg
y=ax+b
a=3.6
b=74.2
r2=.784503632
r=.8857220963
```

Line of Best Fit

y = _____

Plotting Data on Scatterplot

1.) Press 2nd Y=



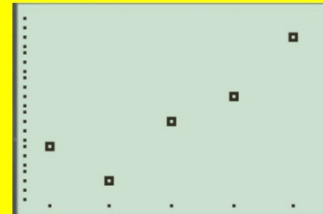
2.) Press Enter



3.) Press Enter to turn on Plot 1

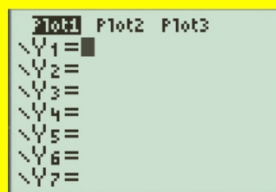


4.) Press Zoom 9:
ZoomStat

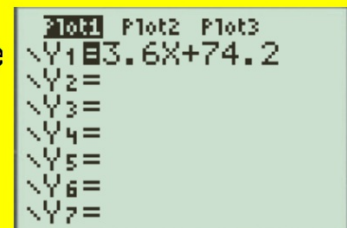


Displaying the Line of Best Fit

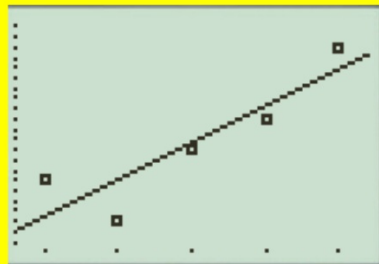
5.) Press $Y=$

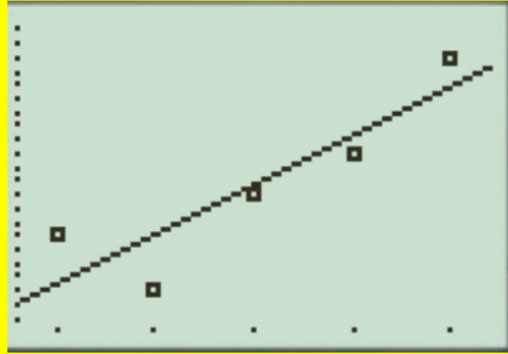


6.) Press VARS--> 5: Statistics--> EQ--> 1:RegEq--> Ente



7.) Press Graph

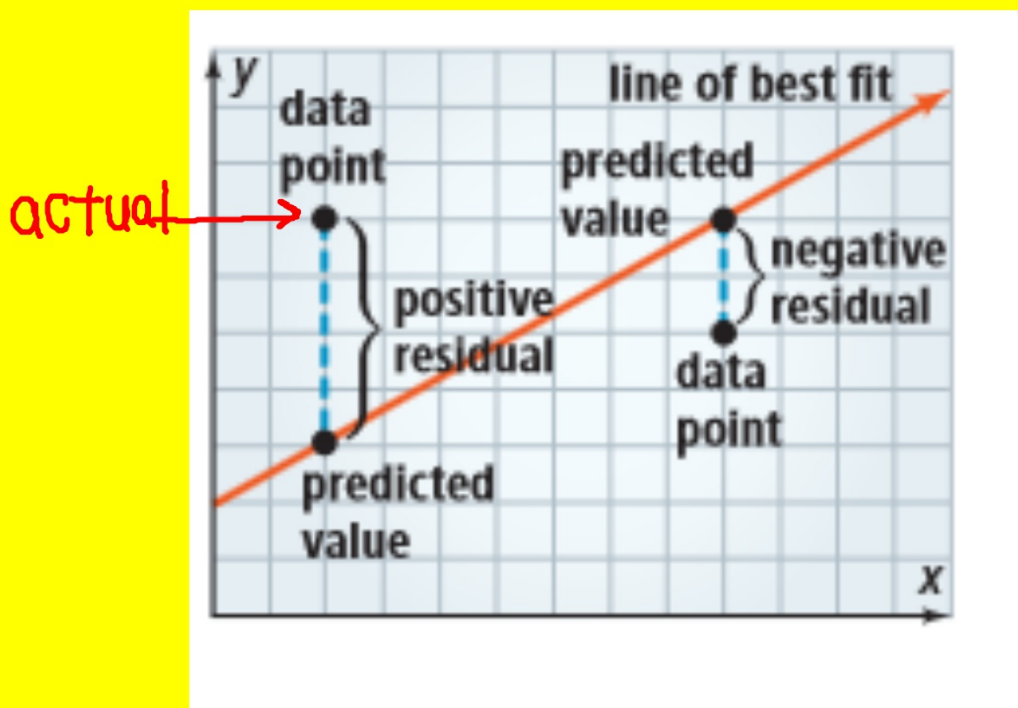




Do the actual values measure perfectly to the predicted values (line of best fit)?

NO! The distance between the line of best fit and the actual values is called a **residual**.

$$\text{Residual} = \text{actual value} - \text{predicted value}$$



Residual - Vertical distance from actual value to predicted value.

Residuals have numerical values!

STAT--> EDIT--> L3

L1	L2	$\frac{1}{3}$	3
2	85		
3	81		
4	88		
5	91		
6	98		
---	---		
L3 =			

2nd--> STAT--> 7: RESID

NAME	OPS	MATH
1		L1
2		L2
3		L3
4		L4
5		L5
6		L6
7		RESID

L1	L2	$\frac{1}{3}$	3
2	85		
3	81		
4	88		
5	91		
6	98		
---	---		
L3 = LRESID			

Press ENTER

L1	L2	L3	3
2	85	8.7	
3	81	-4	
4	88	-6	
5	91	-1.2	
6	98	2.2	
---	---	---	

The numbers in L3 represent the residuals for the (x_1, y_1) points in L1 and L2.

Positive Residuals v. Negative Residuals

Positive Residuals = the predicted is value **less than** the actual value.

For example, using the equation $3.6x + 74.2$ when $x = 2$
 $y = \frac{81.4}{3.6(2) + 74.2}$
 $\text{actual} - \text{predicted} = 85 - 81.4 = 3.6$
This was 3.6 units **less than** the value from the table.

Negative Residuals = the predicted value is **greater than** the actual value.

Residual Plots

A residual plot is a graph that shows the residuals on the vertical axis and the independent variable on the horizontal axis. If the points in a residual plot are randomly dispersed around the horizontal axis, a linear regression model is appropriate for the data; otherwise, a non-linear model is more appropriate.

