

2. If given a table of data:

a. Perform a LINEAR REGRESSION using your calculator:

Desmos

HOW TO PERFORM A LINEAR REGRESSION

Enter Your Data List

- > STAT
- > 1: EDIT
- > Type x values in L1
- > Type y values in L2

EDIT CALC TESTS

1: Edit

2: SortA(

3: SortD(

4: ClrList

5: SetUpEditor

L1	L2	L3	1

L1() =

Calculate the Linear Regression

- > STAT
- > CALC
- > 4: LinReg(ax + b) ... "a" is actually m (slope)
- > substitute the "a" and "b" values into $y = ax + b$ to get your equation

EDIT CALC TESTS

1: 1-Var Stats

2: 2-Var Stats

3: Med-Med

4: LinReg(ax+b)

5: QuadReg

6: CubicReg

7: QuartReg

LinReg

$y = ax + b$

$a = 1.637931034$

$b = 1.103448276$

$r^2 = .9634888438$

$r = .9815746756$

Examples

	L_1	L_2
x	y	
5	1	
10	2.5	
15	4	
20	6	
25	7	
30	8.5	
35	11	
40	12.5	

Age of car (x)	Value of car (v)
0	12,500
1	9,200
2	7,850
4	6,100
8	3,425

Which equation most closely defines the line of best fit for the data?

Which equation defines the line of best fit for the data in the table?

- F $y = \frac{1}{3}x - 10$ H $y = \frac{2}{3}x - 1$
- G** $y = \frac{1}{3}x - 1$ J $y = \frac{2}{3}x - 10$

- A $v = x + 12,500$
- B $v = 11,000x - 12,500$
- C $v = -1000x + 8,000$
- D** $v = -1000x + 11,000$

Your Turn - Find the line of best fit

1. The table below gives the number of hours spent studying for a science exam (x) and the final exam grade (y).

x	2	5	1	0	4	2	3
y	77	92	70	63	90	75	84

a: 6.0887 b: 63.9274 Line of best fit: $y = 6.09x + 63.93$

2. The table below shows the lengths and corresponding ideal weights of sand sharks.

x (in.)	60	62	64	66	68	70	72
y (lbs.)	105	114	124	131	139	149	158

a: 4.36 b: -156.14 Line of best fit: $y = 4.36x - 156.14$ 33

Making Predictions

Once we have found our line of best fit, we can use that line to make predictions.

Using Your Turn #1 (hours spent studying vs. final exam grade):

a) Line of best fit: $y = 6.09x + 63.93$

b) Predict the final exam grade for a student who studies:

i. 2.5 hours
(x) $y = 6.09(2.5) + 63.93$

The final exam score would be a 79.

ii. 6 hours
(x) $y = 6.09(6) + 63.93$

The final exam score would be a 100.

c) If a student earned a 98 on the exam, how many hours did he/she study?
(y)

$$\begin{array}{r} 98 = 6.09x + 63.93 \\ - 63.93 \\ \hline 34.07 = 6.09x \end{array}$$

$$\frac{34.07}{6.09} = \frac{6.09x}{6.09} \quad x = 5.6$$

He/she would
Study about
5.6 hours.

Let's try another:

Using Your Turn #2 (sand sharks):

a) Line of best fit: $y = 4.36x - 156.14$

b) Predict the weight of a sand shark with a length of:

i. 80 inches
(x) $y = 4.36(80) - 156.14$

The sand shark would weigh about 193 lbs.

ii. 105 inches
(x) $y = 4.36(105) - 156.14$

The sand shark would weigh about 302 lbs.

c) If a sand shark weighs 250 pounds, what is its length?
(y)

$$y = 4.36x - 156.14$$

$$\begin{array}{r} 250 = 4.36x - 156.14 \\ + 156.14 \quad \quad + 156.14 \\ \hline 406.14 = 4.36x \end{array}$$

$$\frac{406.14}{4.36} = \frac{4.36x}{4.36}$$

$$93.15 = x$$

The ~~sand~~ sand shark's
length would be
about 93 inches.