

Key

LINEAR REGRESSION

What is it? Linear approach for modelling the relationship between dependent (y) and independent (x) variables

How does it work? When given a *table of values*, follow the steps below:

TO ENTER THE TABLE OF VALUES:

- Hit STAT, then ENTER
- Enter x-values into L₁ column
- Enter y-values into L₂ column

TO FIND THE LINE OF BEST FIT:

- Hit STAT
- Arrow over to CALC
- Select #4, LinReg (ax + b)
- Hit ENTER

Examples:

1. The information in the table below shows average temperature in Northern Latitudes:

Latitude (N°)	0	10	20	30	40	50	60	70	80
Temp (F°)	79.2	80.1	77.5	68.7	57.4	42.4	30.0	12.7	1.0

a. Find the line of best fit. $y = -1.061x + 92.309$

b. Estimate the average temperature for a city with a latitude of 25°

$$y = -1.061(25) + 92.309$$

$$y = 65.784^\circ \text{ F}$$

2. The information in the table shows the Olympic 500-meter Men's Gold Medal Speed Skating times since 1980.

a. Find the line of best fit. $y = -2.175x + 4735.867$

Year	Time (s)
1980	422
1984	432
1988	404
1992	420
1994	395
1998	382

b. Estimate the 500-meter time for the 2012 Olympics.

$$y = -2.175(2012) + 4735.867$$

$$y = 359.767 \text{ sec}$$

3. The information in the table shows sales for a certain retail department store (in billions of dollars)

Year	1980	1985	1990	1994	1995	1996	1997	1998
Sales	86	126	166	217	231	245	261	279

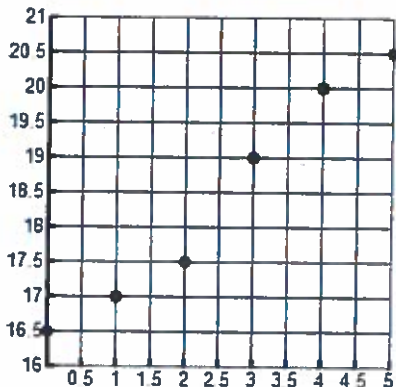
a. Find the line of best fit. $y = 10.602x - 20915.972$

b. Estimate the store sales for the year 2008.

$$y = 10.602(2008) - 20915.972$$

$$y = 372.844 \text{ or } \$372,844,000,000$$

4. The scatter below shows the number of dollars (in billions) spent on books and maps in the US from 1990 through 1995.



a. Find the line of best fit.

$$y = 0.871x + 16.238$$

b. Estimate the amount spent on books in 2005

$$y = 0.871(\overset{15}{2005}) + 16.238$$

~~$y = 162.543$~~ $y = 29.303$
or
 ~~$y = 17.545$~~ \$29,303,000,000

~~2005~~
2005 = 15

5. The table shows the average number of gallons of milk a family drinks per week.

Family Size	1	2	3	4	5	6
# of Gallons	1	1.5	2.2	3.8	4.7	5

a. Find the line of best fit.

$$y = 0.89x - 0.087$$

b. Find the milk consumption in one week of a 7-member family.

$$y = 0.89(7) - 0.087$$

$$y = 6.143 \text{ gallons}$$

6. The table shows the number of U.S. high schools with computer networks from 1994 to 1997.

Years	1994	1995	1996	1997
# of Schools	6576	8159	9166	9565

a. Find the line of best fit.

$$y = 997.4x - 1981945.2$$

b. Estimate the number of high schools with computer networks in 2002.

$$y = 997.4(2002) - 1981945.2$$

$$y = 14,849.6 \text{ schools}$$

7. The table shows the predicted annual cost to raise a child from birth until adulthood.

Year Born	1988	1991	1994	1997	2000
Annual Cost (\$)	10,700	11,700	12,600	15,000	16,700

a. Find the line of best fit.

$$y = 510x - 1003600$$

b. Estimate the cost of raising a child born in the year 2011.

$$y = 510(2011) - 1003600$$

$$y = \$22010$$