Algebra 2 2.5

Use scatter plots and prediction equations

Use lines of regression* to model data

bivariate data

scatter plot

dot plot

correlation (positive, negative, none)

line of fit

prediction equation

regression equation

correlation coefficient

graphing calculators (on computer) & scatter plots

p. 94

by hand

technology

Graphing calculator (on computer)

2 Lines of Regression Another method for writing a line of fit is to use a line of regression. A **regression line** is determined through complex calculations to ensure that the distance of all data points to the line of fit are at a minimum. Most graphing calculators and spreadsheets can perform these calculations easily.

The **correlation coefficient** r, $-1 \leq r \leq 1$, is a measure that shows how well data are modeled by a linear equation.

- When r is close to -1, the data have a negative correlation.
- When $r = 0$, the data have no correlation.
- When r is close to 1, the data have a positive correlation.

The only way to get a number for correlation!

Basic calculator operation:
Turn on & check settings
Contrast adjustments
Mode key
y= clear
Statplots
Clear screen
Lists

graphing calculators
note: keystrokes are given
on p. 94

yrs since 1980

Real-World Example 2 Regression Line

The table shows the life expectancy for people born in the United States.

	0	3	10	15	20	26
Year of Birth	1980	1983	1990	1995	2000	2006
Life Expectancy (yr)	73.7	74.6	75.4	75.8	76.8	77.7

Source: U.S. CDC

L_1 x
L_2 y

$y = 0.14x + 73.89$

Use a graphing calculator to make a scatter plot of the data. Find an equation for and graph a line of regression. Then use the equation to predict the life expectancy of a person born in 2025.

$LE = 0.14(Yr) + 73.89$

$y = ax + b$

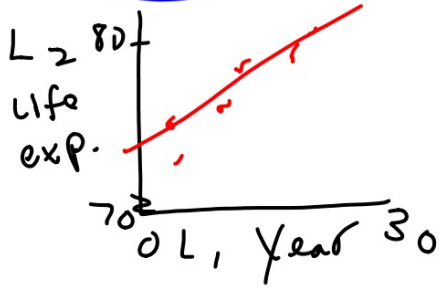
$a = 0.14$

$b = 73.89$

~~$r^2 = 0.98$~~

$r = 0.99$

$= 0.14(45) + 73.89$



GuidedPractice

2. MUSIC The table at the right shows the percent of sales that were made in music stores in the United States for the period 1999–2008. Use a graphing calculator to make a scatter plot of the data. Find and graph a line of regression. Then use the function to predict the percent of sales made in a music store in 2018.

Music Store Sales	
Year	Sales (percent)
1999	44.5
2000	42.4
2001	42.5
2002	36.8
2003	33.2
2004	32.5
2005	39.4
2006	35.4
2007	31.1
2008	30.0

Source: Recording Industry Association of America

L1 L2

9 10 11 12 13 14 15 16 17 18

Since 1990

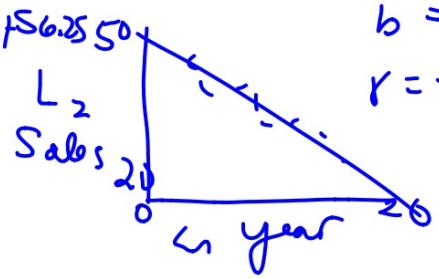
$y = ax + b$

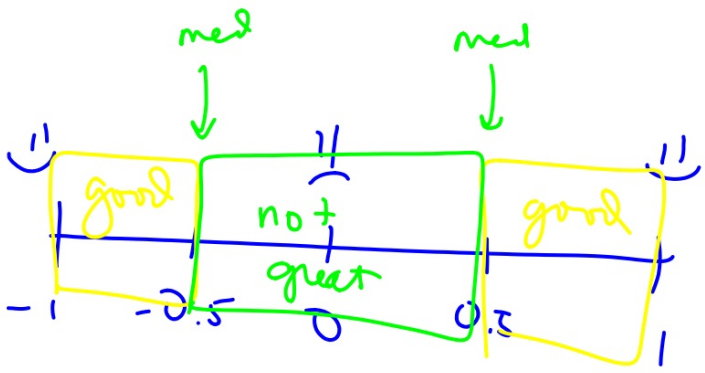
$a = -1.44$

$b = 56.25$

$r = -0.84$

$y = 1.44(28) + 56.25$




med
med
good
not
great
good
-1
-0.5
0
0.2
1

Cricket data
Regression equation: