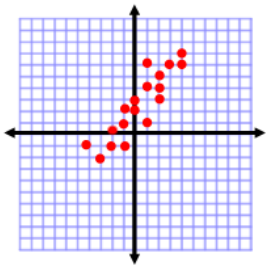
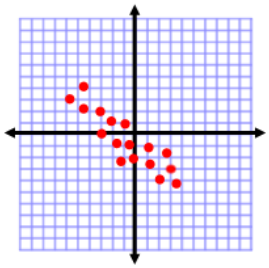
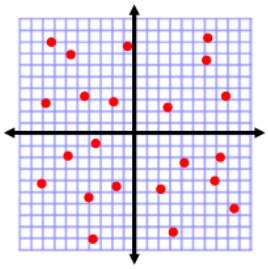
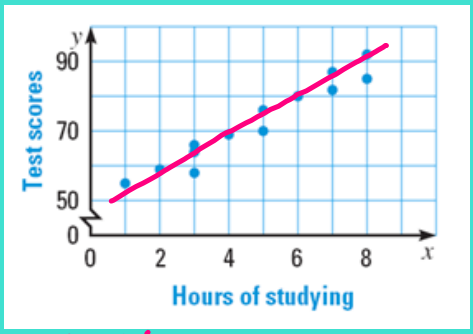
REMEMBER: Scatter Plots

Positive Correlation	Negative Correlation	No Correlation
		
x increases y increases	x increases y decreases	no relationship is apparent

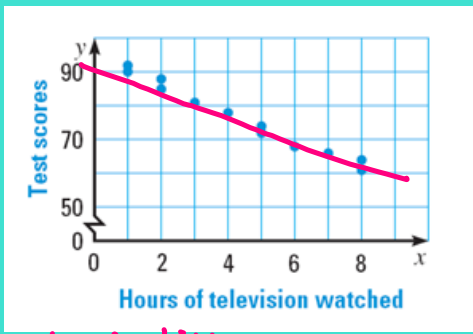
REAL LIFE EXAMPLES



positive corr.

Conclusion?

As the # of hours of studying increases, the test scores also increase.



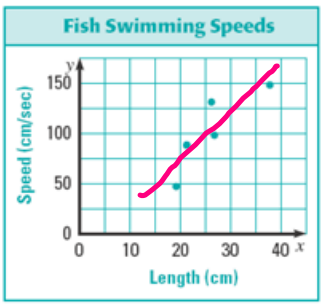
negative corr.

Conclusion?

As the # of hours of tv watched increases, the test scores decrease.

The table shows the lengths (in centimeters) and swimming speeds (in centimeters per second) of six fish.

Fish	Pike	Red gurnard	Black bass	Gurnard	Norway haddock
Length (cm)	37.8	19.2	21.3	26.2	26.8
Speed (cm/sec)	148	47	88	131	98



Conclusion?

As the length of fish increases, so does the swimming speed.

The table shows the number of active red-cockaded woodpecker clusters in a part of the De Soto National Forest in Mississippi. Write an equation that models the number of active clusters as a function of the number of years since 1990.

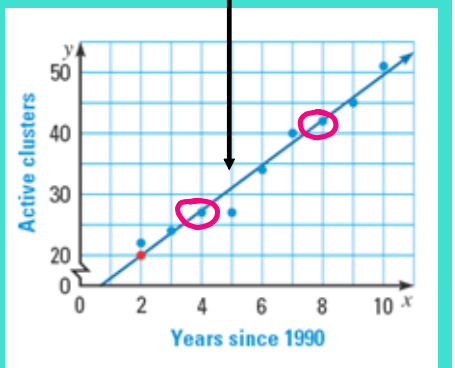
Year	1992	1993	1994	1995	1996	1997	1998	1999	2000
Active clusters	22	24	27	27	34	40	42	45	51

$(x_1, y_1) = (4, 27)$ $(x_2, y_2) = (8, 42)$

$$m = \frac{42-27}{8-4} = \frac{15}{4}$$

$$y - y_1 = m(x - x_1)$$
$$y - 27 = \frac{15}{4}(x - 4)$$
$$y - 27 = \frac{15}{4}x - 15$$
$$+27 \qquad +27$$
$$y = \frac{15}{4}x + 12$$
$$\boxed{m(x) = \frac{15}{4}x + 12}$$

line of best fit



a line that most closely follows a trend in data

LINE OF BEST FIT

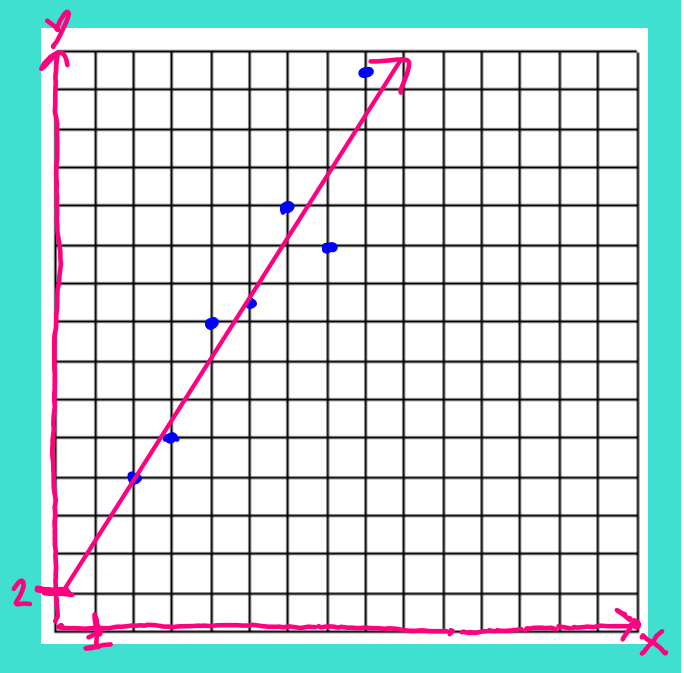
When mathematical models are used in the real world, we often don't have data that fall on perfect lines.

Most of the time we want to find the line of best fit.

Exercise #1: A biologist is studying the relationship between a tree's diameter and its height. She records the following data for 7 different trees.

Diameter (inches)	2	3	4	5	6	7	8
Height (feet)	8	10	16	17	22	20	29

(a) On the grid provided, create a scatterplot of the data. Use the diameter as the independent variable and the height as the dependent variable.



(b) Draw a line of best fit through your data.

(c) Write two ordered pairs that lie on your line.

$(2,8)$ $(5,17)$
$x_1\ y_1$ $x_2\ y_2$

$m = \frac{17-8}{5-2} = \frac{9}{3} = 3$

(d) Determine the equation of your linear function using the two ordered pairs from part (c).

(2, 8) $m = 3$

$y - y_1 = m(x - x_1)$

$y - 8 = 3(x - 2)$

$y - 8 = 3x - 6$

$+8 \quad +8$

$y = 3x + 2$

$h(x) = 3x + 2$

(e) Using your linear function from part (d), estimate, to the nearest foot, the height of a tree given that its diameter is 14 inches. $x = 14$

$h(14) = 3(14) + 2$

$h(14) = 42 + 2$

$h(14) = 44$ ft