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5.7 Scatter Plots and Line of Best Fit

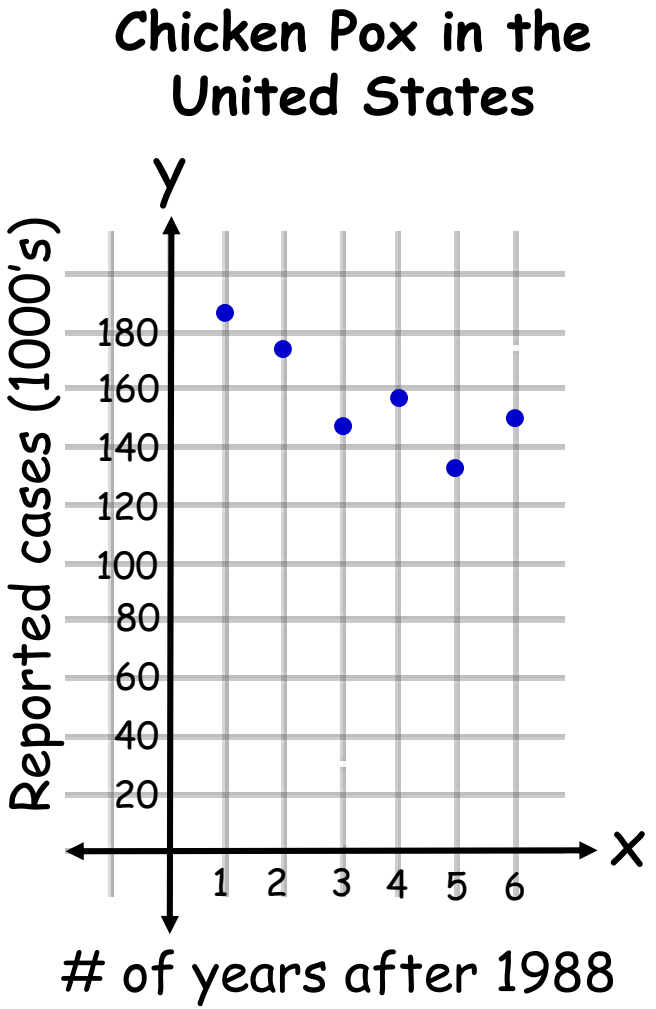
Objectives:

Create a scatter plot and draw an informal inference about any correlation between the variables

Use a graphics calculator to find an equation for the least-squares line and use it to make predictions or estimates

Scatter Plot

Chicken Pox in the U.S.	
Year	Reported Cases (in thousands)
1989	185.4
1990	173.1
1991	147.1
1992	158.4
1993	134.7
1994	151.2



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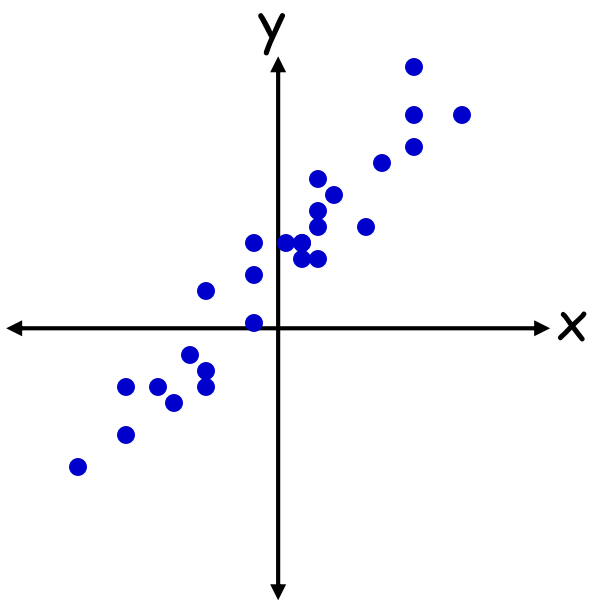
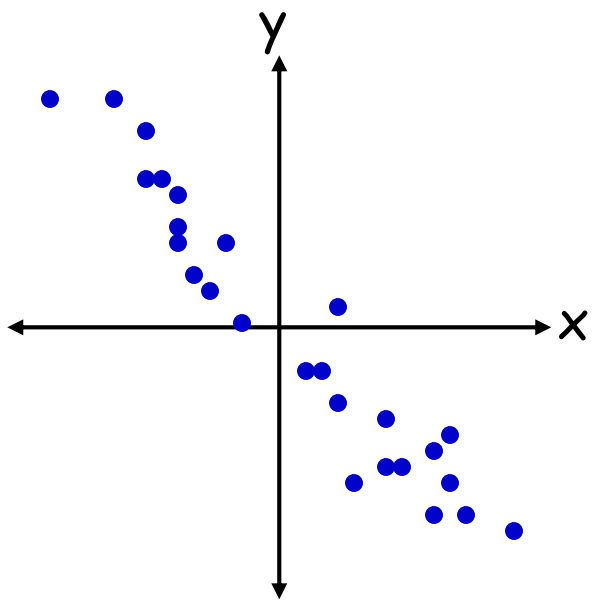
Correlation

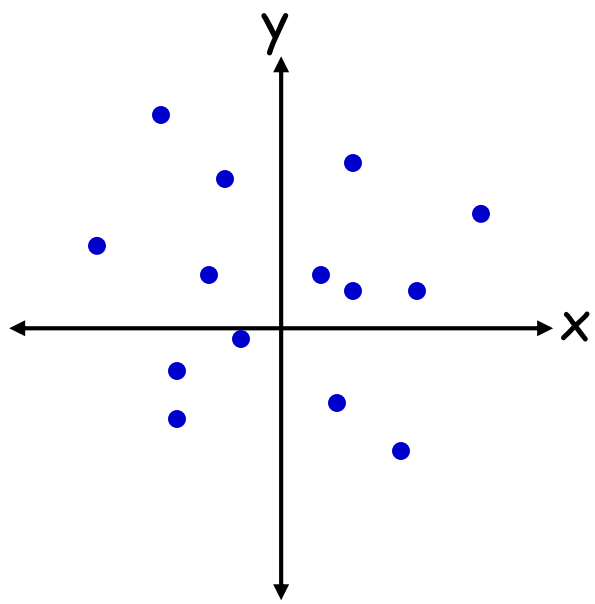
positive correlation



negative correlation



no reliable correlation



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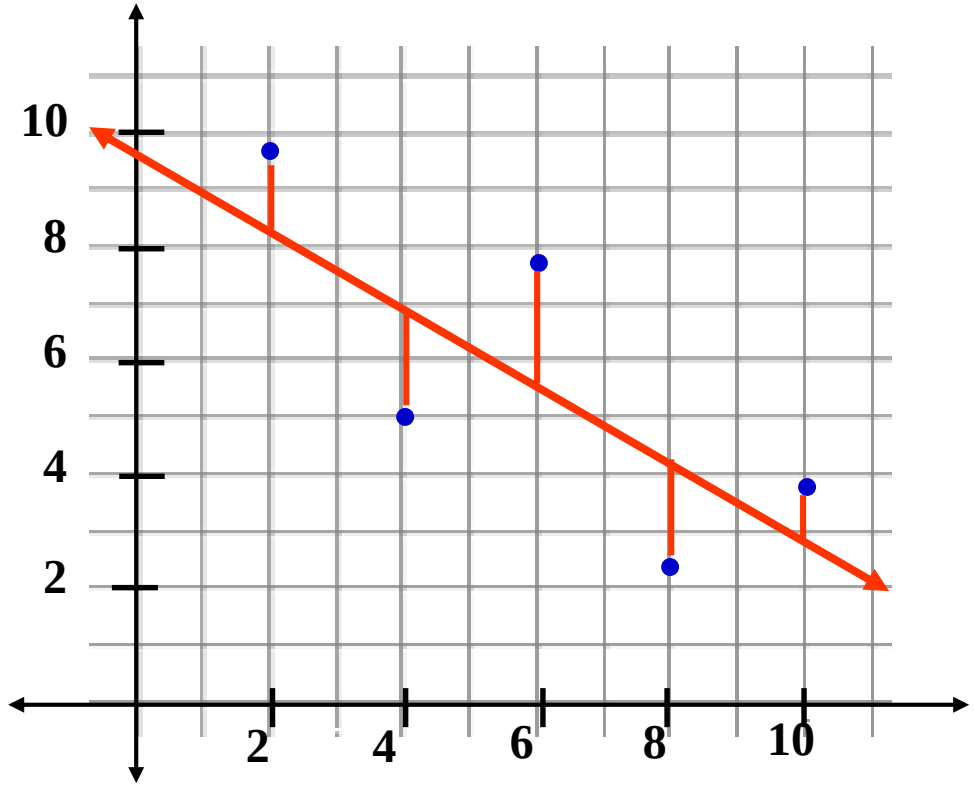
Least-Squares Line

Also called

(line that best fits the data)



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Example 1

Create a scatter plot for the data shown below. Describe the correlation. Then find and graph an equation for the least-squares line.

x	0	2	3	6	7	9	12
y	14	19	22	26	26	32	38

The line of best fit, also referred to as the least squares line, should go down the middle of all the points such that the distance from the line to the points are minimal. Try to place it so that it seems equidistant from each of the points.

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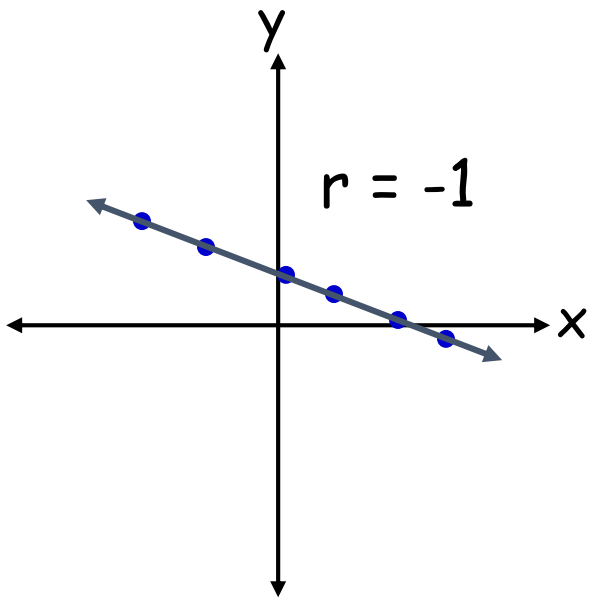
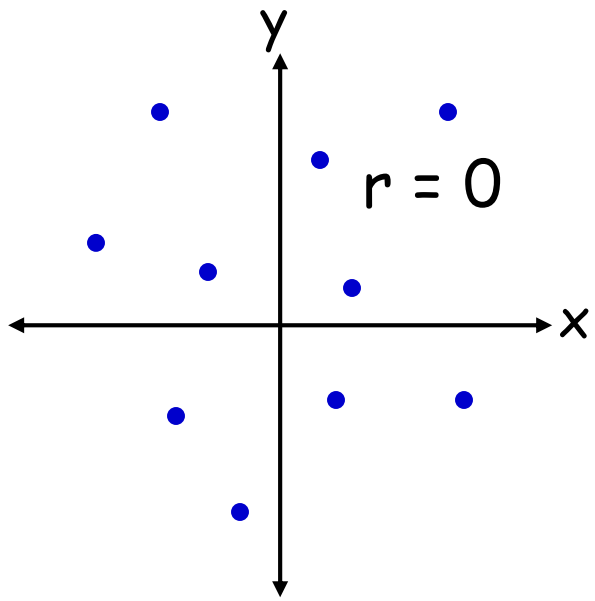
Correlation and Prediction

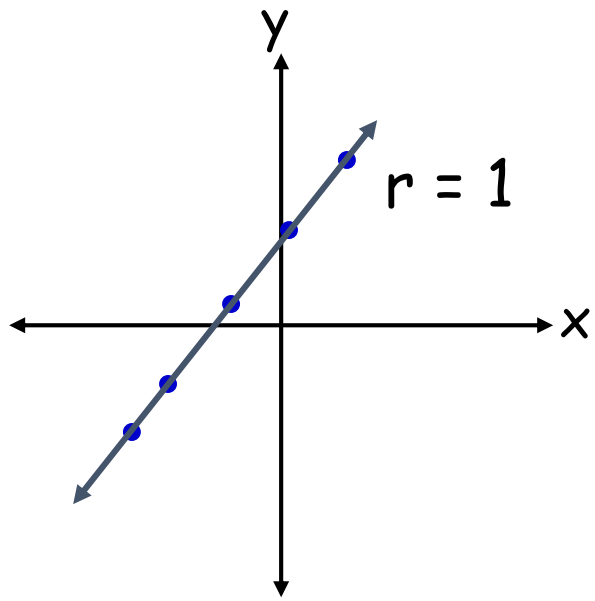
perfect negative correlation



no reliable correlation



perfect positive correlation



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Example 2

Create a scatter plot for the data shown below. Describe the correlation. Then find and graph an equation for the least-squares line.

x	1	2	3	4	5	6	7	8	9	10
y	10	9	8	10	6	3	2	3	4	2

Take any two points that are on or closest to your line of best fit and find the slope

$M = \frac{y_2 - y_1}{x_2 - x_1}$

correlation: negative

least-squares line:

$y \approx -0.96x + 11$

Y intercept