Scatter Plots and Correlation

Describe a scatter plot by direction, form, and strength. The correlation coefficient r is from -1 to 1: the sign is the direction, the size is the strength.

Name _____ Date _____

Words we use

say the math word, then the plain English

WORD	PLAIN ENGLISH	WHAT YOU DO
Scatter plot	A graph of many cases, one dot each: input on the x-axis, output on the y-axis.	Describe its direction, form, and strength.
Association	A pattern between two quantities.	Look at the cloud of points as a whole.
Positive, negative association	Up together; or one up while the other goes down.	Read left to right: rising or falling.
Correlation	How strongly two quantities are related in a straight-line way.	Tight around a line is strong.
Correlation coefficient, r	A number from –1 to 1 measuring the direction and strength of a linear relationship.	Sign is direction; size is strength. Technology finds it.
Graphing window	The part of the grid you can see: roughly the domain and range of the data.	Read the axes before reading the pattern.

Part A Direction, form, strength

SCATTER PLOT	DIRECTION	FORM	STRENGTH
Hours studied and test score: rises, close to a line			
Car age and value: falls, a loose cloud			
Shoe size and math grade: no trend			
Hours since taking medicine and amount left: falls along a curve, tight			

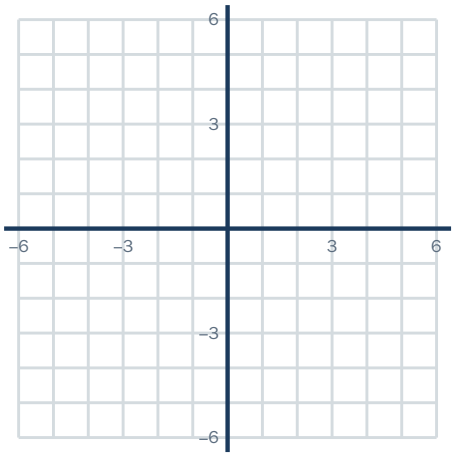
Part B Read r

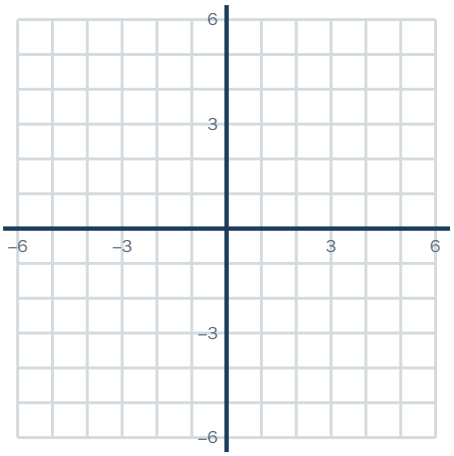
R	DIRECTION	STRENGTH
0.97		
–0.92		
0.15		
–0.5		

1

Part C Plot and estimate

Plot the points (1, 2), (2, 3), (3, 3), (4, 5), (5, 6) on the left grid and (1, 6), (2, 4), (3, 5), (4, 2), (5, 3) on the right grid.





1. For each plot, give the direction and strength, and choose the closest r: –0.8, –0.2, 0.3, 0.96.

2. Check with the site's scatter plot builder or a graphing calculator. What r did it give?

Part D Think about r

1. Which is stronger: r = –0.85 or r = 0.60? Why?

2. A student reports r = 1.4. What is wrong?

3. A scatter plot's x-axis runs from 60 to 95 degrees and its y-axis from 200 to 800 sno-cones. What does the window tell you?

Part E Exit ticket

1. What does r = 0.97 tell you? Three things.

2. What does r measure, and what does it not tell you?

Answer key

Part A. Positive, linear, strong. Negative, roughly linear, weak. None, no form, none. Negative, curved, strong.

Part B. Positive, very strong. Negative, strong. Positive, very weak. Negative, moderate. Positive, perfect.

Part C. Left: positive and strong, closest to 0.96 (the tool gives 0.962). Right: negative and fairly strong, closest to –0.8 (the tool gives –0.8).

Part D. 1. –0.85: strength is the size; the sign is direction. 2. r is always between –1 and 1. 3. The data covers about 60 to 95 degrees (domain) and about 200 to 800 sno-cones (range).

Part E. 1. Positive, very strong, and a line fits well. 2. The direction and strength of a straight-line relationship. It does not tell you the data is truly linear, and it does not show cause.