Graphical Methods-Summary

A graph is one of the most effective representations of the **relationship** between two variables. The independent variable (one controlled by the experimenter) is usually placed on the x-axis. The dependent variable (one that responds to changes in the independent variable) is usually placed on the y-axis. It is important for you to be able interpret a graphical relationship and express it in a written statement and by means of an algebraic expression.

As x increases, y remains the same. There is no relationship between the variables. "No relationship" As x increases, y increases proportionally. Y is directly proportional to x. "Linear function" As x increases, y increases proportionally. Y is directly proportional to x. "Linear function" As x increases, y decreases. Y is inversely proportional to x. "Inverse function" Y is proportional to the square of x. "Quadratic or Parabolic function." None $y = b$, or y is constant $y = mx + b$ Graph $y = mx + b$ $y = mx + b$ Finally is constant $y = mx + b$ The proportional to x. $y = mx + b$ The proportional to the square of x. "Quadratic or Parabolic function."	Graph shape	Written relationship	Modification required to linearize graph	Algebraic representation
As x increases, y increases proportionally. Y is directly proportional to x. "Linear function" As x increases, y decreases. Y is inversely proportional to x. "Inverse function" Y is proportional to the square of x. "Quadratic or Parabolic function." None $y = mx + b$ Graph $y \vee s \frac{1}{x}$, or $y = m(\frac{1}{x}) + b$ $y \vee s \stackrel{?}{x}$ Graph $y \vee s \stackrel{?}{x}$ Figure 1. Graph $y \vee s \stackrel{?}{x}$ Graph $y \vee s \stackrel{?}{x}$ Y is proportional to the square of x. "Quadratic or Parabolic function."	у	the same. There is no relationship between the variables.	None	_
proportionally. Y is directly proportional to x. "Linear function" As x increases, y decreases. Y is inversely proportional to x. "Inverse function" Y is proportional to the square of x. "Quadratic or Parabolic function." Graph y $v s \frac{1}{x}$, or $y = m(\frac{1}{x}) + b$ y $v s \dot{x}$ Y is proportional to the square of x. "Quadratic or Parabolic function."	х	"No relationsnip"		
As x increases, y decreases. Y is inversely proportional to x. "Inverse function" Y is proportional to the square of x. "Quadratic or Parabolic function." Graph y $v s \frac{1}{x}$, or $y = m(\frac{1}{x}) + b$ Y is proportional to the square of x. "Quadratic or Parabolic function."		proportionally. Y is directly proportional to x.	None	y = mx + b
Y is inversely proportional to x. "Inverse function" Y is proportional to the square of x. "Quadratic or Parabolic function." Y is proportional to the square of x. "Quadratic or Parabolic function." $y = mx^2 + b$	X			
square of x. "Quadratic or Parabolic function."		decreases. Y is inversely proportional to x.		$y = m\left(\frac{1}{x}\right) + b$
	У	square of x.	Graph y vs x ²	$y = mx^2 + b$
		function."		
The square of y is proportional to x. "Square root function" Graph $y^2 \text{ vs } x$ $y^2 = mx + b$	у	proportional to x.	Graph y ² vs x	$y^2 = mx + b$

When you state the relationship, tell how y depends on x (e.g., as x increases, y ...), and describe how the rate of change changes.

1