

Graphing Data (p. 15 - 19)

I. Identifying Variables

1. When performing an experiment, only one variable should be changed at a time.

Circle One :

True

False

Ex. Pop Task Test

2. Define the term variable.

Variable - any factor that might affect the behavior of an experimental setup

3. Define the term independent variable.

Independent Variable - factor that is changed or manipulated during an experiment

4. Define the term dependent variable.

Dependent Variable - factor that depends on the independent variable

5. Identify the independent and dependent variables in an experiment where a ball rolls down inclined planes positioned at different angles, and speed is calculated.

Independent Variable = Slope of inclined planes

Dependent Variable = Speed of the ball

6. On a graph, which variable (independent or dependent) is located on the :

X-Axis (horizontal) : Independent Variable

Y-Axis (vertical) : Dependent Variable

7. Define the term line of best fit.

Line of Best Fit - line that best passes through or near graphed data
 (Used to describe data + predict where new data will appear on the graph.)

II. Linear Relationships

1. Define the term linear relationship.

Linear Relationship - relationship that exists between two variables whose graphed data points lie on a straight line

x = horizontal distance ; y = vertical distance

p. 15



Plotting Line Graphs

p. 16
 * Know This! *

p. 16



Usually counterclockwise angles!

Name _____

2. Write out the formula to determine the linear relationship between two variables; and identify what each variable in the formula represent.

Graph p. 16

$$y = mx + b$$

y = Dependent Variable
m = Slope
x = Independent Variable
b = Y-intercept
(where line intersects y-axis)

$$y = kx$$

(↑ Distance = ↑ Time)

3. Write out the formula to determine slope.

$$\text{Slope } m = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$$

4. Slope can never be negative value.

Circle One: True

False

If y gets smaller as x gets larger, then slope is negative (downward)

III. Nonlinear Relationships

1. List two types of nonlinear relationships.

1. Quadratic

2. Inverse

2. Define the term quadratic relationship.

$$y = kx^2$$

Quadratic Relationship - parabolic relationship that results when one variable depends on the square of another variable

3. Write out the formula to determine the quadratic relationship between two variables.

$$y = ax^2 + bx + c$$

Quadratic Formula
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

4. Define the term inverse relationship.

$$y = k/x$$

Inverse Relationship - hyperbolic relationship that exists when one variable depends on the inverse of the other variable

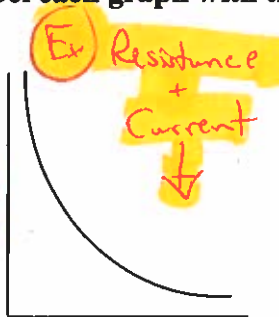
5. Write out the formula to determine an inverse relationship.

$$y = \frac{a}{x}$$

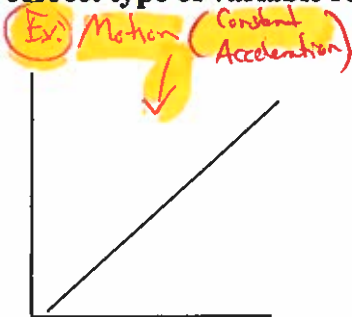
(↑ Resistance = ↓ Current)

6. Label each graph with the correct type of variable relationship.

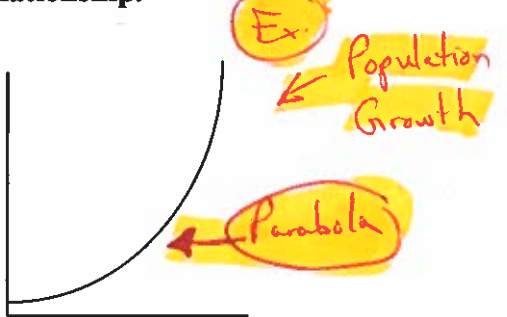
Hyperbola



Inverse
 $y = k/x$



Linear
 $y = kx$



Quadratic
 $y = kx^2$