Graphing Linear Relations and Functions

Relations and Functions
Relationship- A set of ordered pairs.
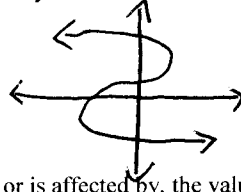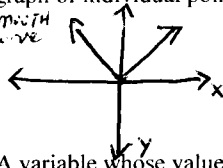**Domain-** The set of x-values of a relationship
Range- The set of y-values of a relationship
Function- When each element of the domain is paired with exactly one element of the range
Discrete Function- A graph of individual points
Continuous Function - Smooth curve

Function

Not a Function

Linear Equations
Dependent Variable- A variable whose value depends upon, or is affected by, the value of another variable
Independent Variable- A variable whose value does not depend upon, nor is affected by, the value of another variable
Linear Equation- An equation that can be written in standard form
Standard Form of a Linear Equation- $Ax+By=C$ where A, B, and C are real numbers and A and B are both not zero
Linear Function- Any function whose ordered pairs satisfy a linear equation. Can be defined as $f(x)=mx+b$ where m and b are real numbers
Constant Function- A function where is where m=0

Slope
Slope = $\frac{\text{Vertical Change}}{\text{Horizontal Change}} = m = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2-y_1}{x_2-x_1}$
Perpendicular lines- Where the lines meet at a 90 angle. Happens if the products of the slopes = -1

Writing Linear Equations
Slope-Intercept Form- $y=mx+b$ where m is the slope and b is the y-intercept
Point-Slope Form- $y-y_1=m(x-x_1)$ Where (x_1, y_1) are the coordinates of a point on the line and m is the slope of the line
Forms for a linear equation- $Ax+By=C$
$y=mx+b$
$y-y_1=m(x-x_1)$

Modeling Real-World Data Using Scatter Plots
Scatter Plot- Visually shows the nature of a relationship that is determined both by the shape and closeness of the data
Best-Fit Line- A line drawn on a scatter plot to approximate the linear relationship for a set of data points
Prediction Equation- The equation of the best-fit line suggested by the data points of a scatter plot. It may be used to estimate, or predict, one of the variables given the other

Special Functions
Direct Variation- A linear function where b=0 and m=0. Also know as y=kx
Identity Function- A linear function where m=1 and b=0
Step Functions- A function whose graph is a series of disjoint lines or steps
Greatest Integer Function- A type of step function described by $f(x)=[x]$ is the greatest integer not greater than x. Looks like steps
Absolute Value Function- A function described by $y=|x|$ or $f(x)=|x|$. It looks like a V.

Linear Inequalities
Graphing an Inequality-
(1) Graph the boundary
(2) Test a point in each region
(3) Shade the region whose ordered pair results in a true inequality