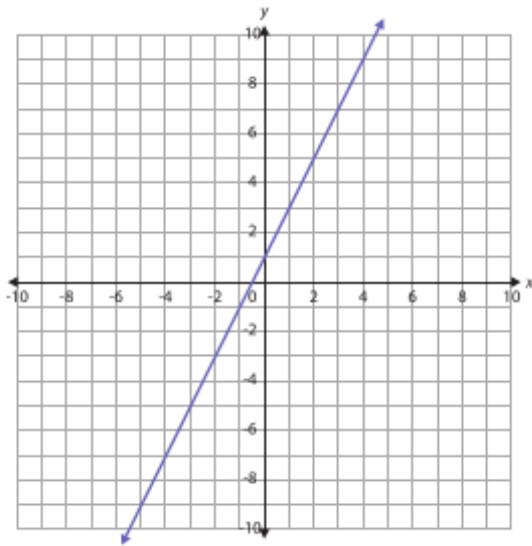# Linear vs. Nonlinear: Graphs and Equations

If a function has a constant rate of change, it is a **linear function**. The graph of a linear function will be a straight line. Linear equations can be written in the form $y = mx + b$.

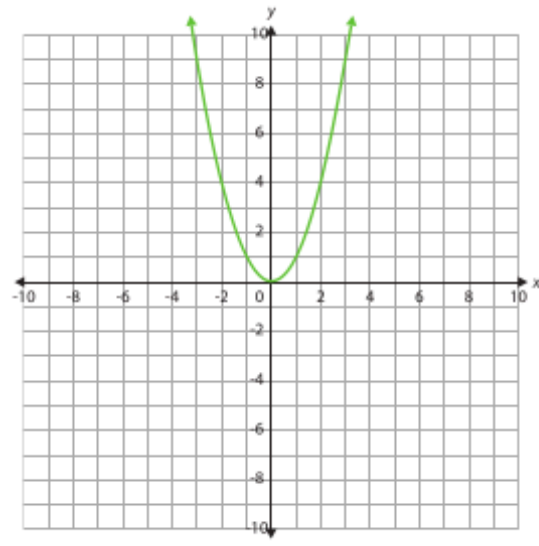Here is a graph of a linear function and its equation:
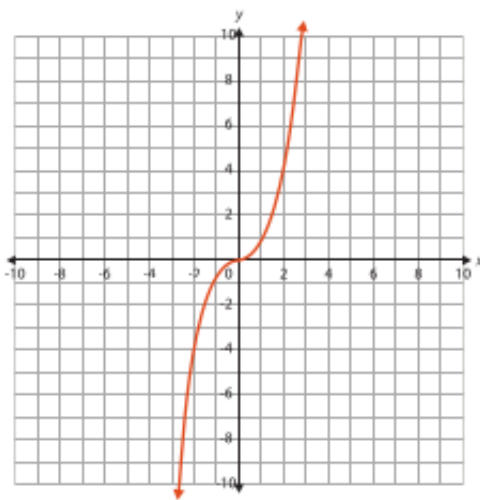
$$y = 2x + 1$$

If a function does **not** have a constant rate of change, it is a **nonlinear function**. The graph of a nonlinear function will not be a straight line. Nonlinear equations cannot be written in the form $y = mx + b$.

Here is a graph of a nonlinear function and its equation:
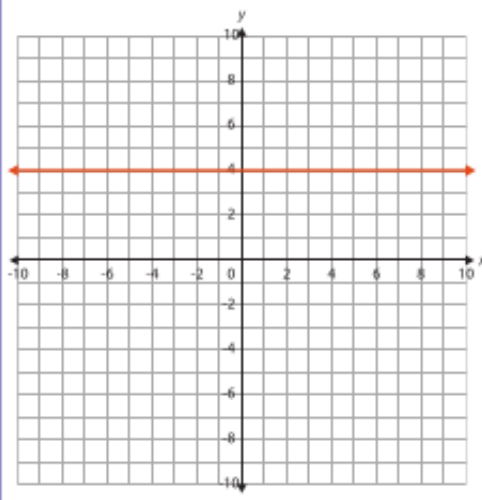
$$y = x^2$$

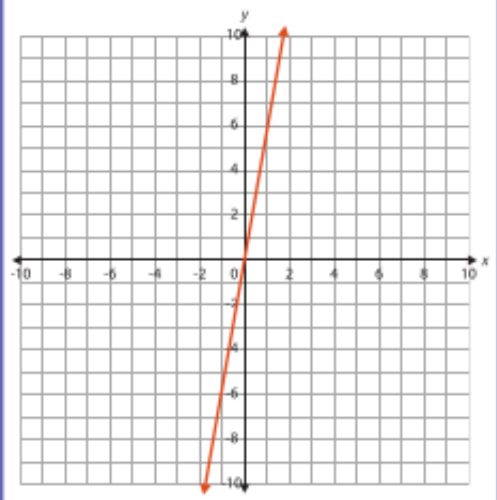Determine whether each graph shows a linear or nonlinear function. Circle the correct answer.
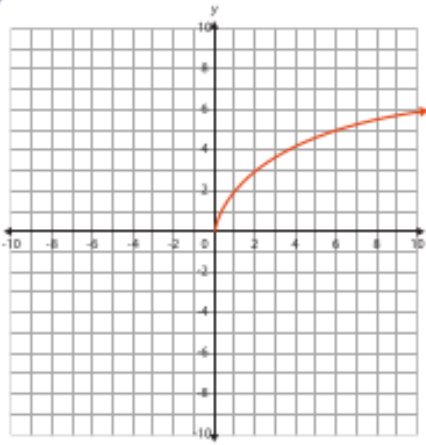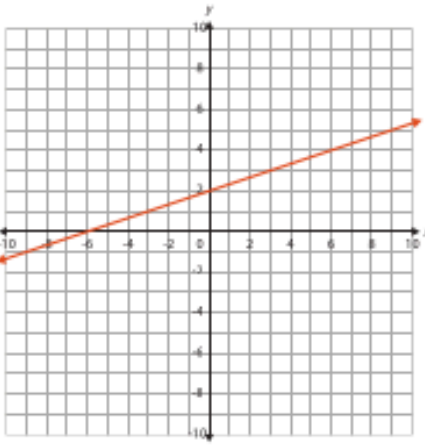
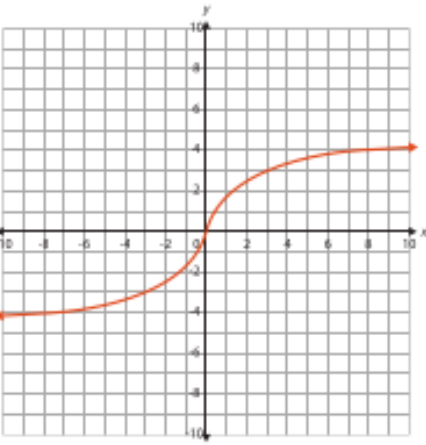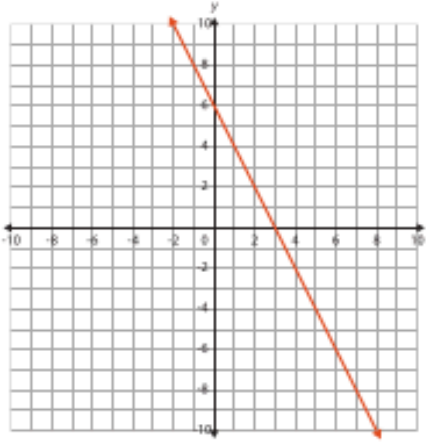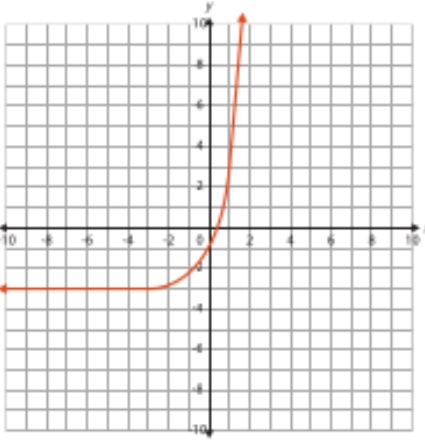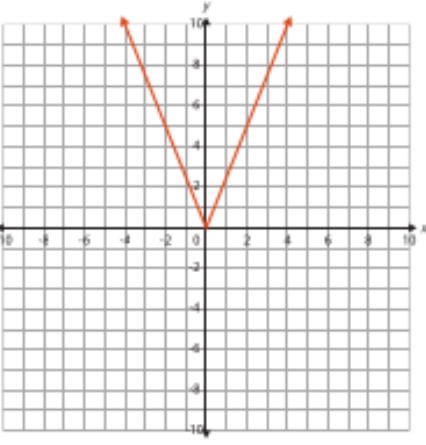Linear   Nonlinear

Linear   Nonlinear

Linear   Nonlinear

Linear vs. Nonlinear: Graphs and Equations

Keep going! Determine whether each graph shows a linear or nonlinear function. Circle the correct answer.

Linear Nonlinear	Linear Nonlinear	Linear Nonlinear
Linear Nonlinear	Linear Nonlinear	Linear Nonlinear

Determine whether each equation shows a linear or nonlinear function. Circle the correct answer.

$y = x + 9$ Linear Nonlinear	$y = 3x^2$ Linear Nonlinear	$y = -\dfrac{1}{2}x$ Linear Nonlinear
$y = 4x^2 + 7$ Linear Nonlinear	$4x + 2y = 10$ Linear Nonlinear	$y = 6x^3 - 5x$ Linear Nonlinear