Name: _____   Section: _____

Lines

- Slope $= \dfrac{\text{change in y}}{\text{change in x}} = \dfrac{y_2 - y_1}{x_2 - x_1}$

- Slope Intercept Form: $f(x) = mx + b$
  where m is the slope and b is the y-intercept.

- Point Slope form: $f(x) = m(x - x_1) + y_1$
  where m is the slope and (x_1, y_1) is a point on the line.

Quadratic functions

- Have the form $f(x) = ax^2 + bx + c$

- The curve opens up if $a > 0$, and the curve opens down if $a < 0$.

- The vertex is located at (h, k) where $h = -\dfrac{b}{2a}$ and $k = c - \dfrac{b^2}{4a}$

- The quadratic formula: $f(x) = 0$ if and only if $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Mathematical Modeling

Goal: Capture patterns in precise, mathematical lanugage.

Types of Models:

- *Analytical:* Turn a simple/simplified description of the pattern into a mathematical formula.

  This includes word problems where you must translate words into a formula.

- *Regression/Statistical:* You try to find a formula that fits some measured data well.

  This is the source for most equations that seem to come out of nowhere.

The Process of Modeling