LINEAR EQUATIONS

Standard Form

$Ax + By = C$ A, B, C are integers

Slope-Intercept Form

$y = mx + b$ Slope is m and y-intercept $(0,\ b)$

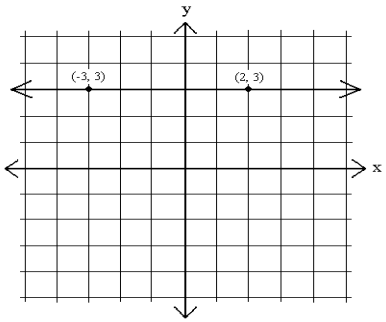
Point-Slope Form

$y - y_1 = m(x - x_1)$ Slope is m. Line passes through $(x_1,\ y_1)$

Horizontal Line

$y = b$

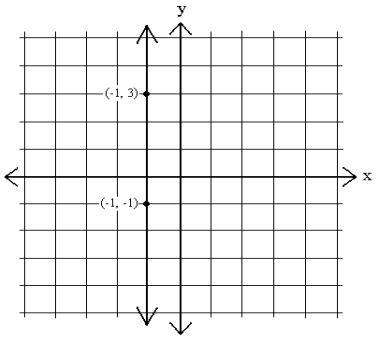
Slope is zero and y-intercept $(0,\ b)$



Vertical Line

$x = a$

Slope is undefined and x-intercept $(a,\ 0)$



Images: sparknotes.com, easycalculations.com, and onemathematicalcat.org

COORDINATE GEOMETRY

Let (x_1, y_1) and (x_2, y_2) be two order pairs

Slope

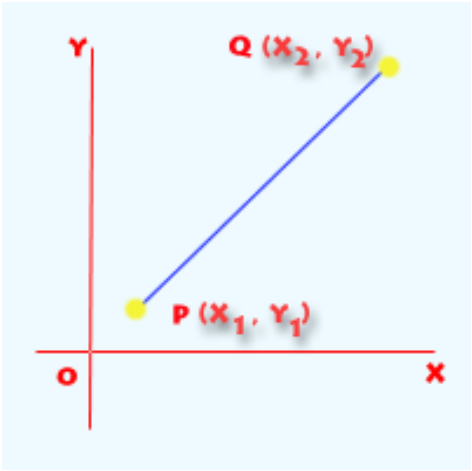
$$m = \frac{y_2 - y_1}{x_2 - x_1} \qquad x_2 \neq x_1$$

Midpoint

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

Distance

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

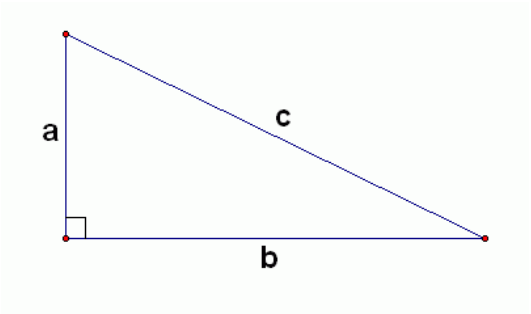


Distance Travel

$d = r\,t$ distance = rate × time

Pythagorean Theorem

$$a^2 + b^2 = c^2$$



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QUADRATIC EQUATIONS

Standard Form		Vertex Form
$f(x) = ax^2 + bx + c$		$f(x) = a(x-h)^2 + k$
$\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$	**vertex**	(h, k)
$x = \frac{-b}{2a}$	**axis of symmetry**	$x = h$

Find the y-intercept by evaluating $f(0)$

$(0,\ f(0))$	**y-intercept**	$(0,\ f(0))$

If **a is positive** the graph **opens up**

If **a is negative** the graph **opens down**

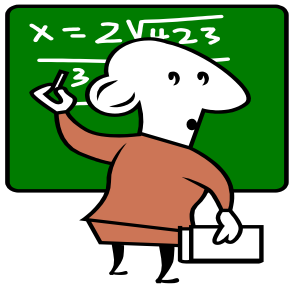
x-intercepts/zeroes/roots/solutions

Find the x-intercepts by factoring or using the quadratic formula

$$ax^2 + bx + c = 0$$

Quadratic Formula

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



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SPECIAL FACTORING

Difference of Squares

$$x^2 - y^2 = (x+y)(x-y)$$

Perfect Square Trinomials

$$x^2 + 2xy + y^2 = (x+y)^2$$

$$x^2 - 2xy + y^2 = (x-y)^2$$

Difference of Cubes

$$x^3 - y^3 = (x-y)(x^2 + xy + y^2)$$

Sum of Cubes

$$x^3 + y^3 = (x+y)(x^2 - xy + y^2)$$

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