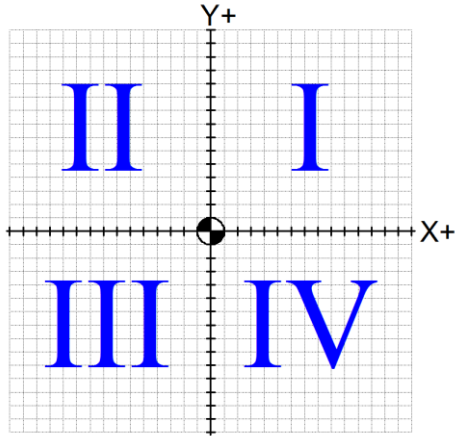


Chapter 0

Coordinate Grid and Quadrants



Linear Equations with Two Variables

Solve the equation for y

$$Y = 2x + 12$$

$$X = 3$$

You need to substitute a 3 in for x and then combine like terms to solve.

$$Y = 2(3) + 12$$

$$Y = 6 + 12$$

$$Y = 18$$

Linear Equations: Drawing graphs

Graph $y = 2x + 2$

1. Make a table. You can choose random numbers for x and then solve for y (smaller numbers will make it easier to graph!). Use at least 3 numbers for an accurate line.

X	Y
0	2
1	4
2	6

2. Plot your points on a graph and “connect the dots”.

Finding Slope from a graph:

Slope is represented by the letter m

$$m = \frac{\text{vertical change}}{\text{Horizontal change}} \quad \text{or} \quad \frac{\text{Rise}}{\text{Run}} \quad (\text{Rise "over" run})$$

Finding Slope from two points:

Find the slope from the points (1, 5) (3, 9)

$$(1, 5) = (x_1, y_1)$$

$$(3, 9) = (x_2, y_2)$$

Formula for slope is:

$$m = \frac{(y_2 - y_1)}{(x_2 - x_1)}$$

$$m = \frac{(9 - 5)}{(3 - 1)} \quad \text{simplify to get} \quad m = \frac{4}{2} \quad \text{simplify again to get} \quad m = 2$$

Writing Equations from Graphs:

$$y = mx + b \quad (\text{also called slope intercept form})$$

b = y intercept
m = slope

Drawing Graphs from Equations:

1. Plot point where the line crosses the y intercept (x will be zero and your point will be on the y intercept)
2. Use the slope of the line to find additional points
3. Draw a line through the points

Determining the direction of slope:

Example $y = 3x + 2$ has a positive slope (3) On a graph it will have an upward trend as you look from left to right along the graph

Example $y = -3x + 2$ has a negative slope (-3) On a graph it will have a downward trend as you look from left to right along the graph

Horizontal and Vertical Lines:

Horizontal Lines have a slope of zero (since there is not a vertical change)

$$y = 0x + b$$

Vertical Lines have a slope that is undefined (since there is not a horizontal change)

$$x = \text{where the line crosses the x intercept}$$

Solving an equation for one variable:

$$A = \frac{B}{3C}$$

Solve in terms of “b”

To solve for a variable you need to isolate it (get it all by itself on one side of the = sign)

You need to “undo” whatever is being done to the variable. In this example “b” is being divided by 3c. so in order to “undo” it, you must do the opposite. You will multiply

BOTH sides by 3c. That will leave you with $3CA = B$

**Don’t forget that whatever you do to one side of an equation, you must do to the other side!

Standard form of an equation:

$$Ax + By = C$$

Slope intercept form of an equation:

$$y = mx + b$$

Intercepts:

Y intercept: where the line crosses the y axis (so x will = 0)

X intercept: where the line crosses the x axis (so y will = 0)

To find the y intercept, let $x = 0$ and solve for y (0, y)

To find the x intercept, let $y = 0$ and solve for x (x, 0)

Parallel Linear Equations:

Parallel lines will have the same slope (slopes of the lines will be equal)

Perpendicular Linear Equations:

Perpendicular lines

- Intersect once
- Makes four right angles at the point where they intersect
- The slopes are negative reciprocals of each other

Verifying solutions to linear equations:

Substitute the x and y values into the original equation and verify the equation remains true

Writing Linear Equations: Slope and Point:

$$y = mx + b$$

Use slope intercept form and insert values for m (slope) and b (y intercept)

Use slope intercept form and insert values for m (slope) and the coordinates (x, y). You must solve for b if it is not given. Once you have slope and the y intercept, insert the values in the equation using slope intercept form.

Writing Linear Equations: Two Points:

$$y = mx + b$$

First solve for slope. Then use slope intercept form and substitute slope for m and use one set of the points to solve for b. Once you have slope and the y intercept, insert the values in the equation using slope intercept form.

Writing Linear Equations: Point and Parallel Lines:

$$y = mx + b$$

Remember that parallel lines will have the same slope

Use slope intercept form and insert values for m (slope) and b (y intercept)

Use slope intercept form and insert values for m (slope) and the coordinates (x, y). You must solve for b if it is not given. Once you have slope and the y intercept, insert the values in the equation using slope intercept form.

Writing Linear Equations: Point and Perpendicular Lines:

$$y = mx + b$$

Remember that the slopes of perpendicular lines are negative reciprocals of each other.

Follow the same steps for parallel lines except remember to change your slope so that they are negative reciprocals of each other.