Took exam 1

3. Equations and their Graphs

3.1 Use the Rectangular Coordinate System
3.1 Exercise Set, page 312 (294): 1, 5, 7, 11, 15, 19, 25
3.2 Graph Linear Equations in Two Variables
3.2 Exercise Set, page 346 (328): 1, 3, 21, 25, 27, 33

3.1

Memorize

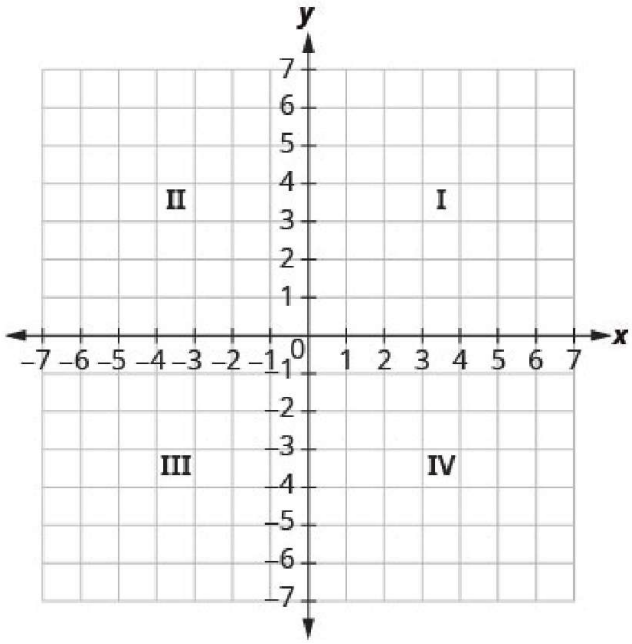
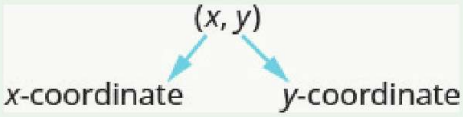


Figure .1

Memorize

Ordered pair

An ordered pair, (x, y), gives the coordinates of a point in a rectangular coordinate system.



The first number is the x-coordinate.

The second number is the y-coordinate.

Memorize

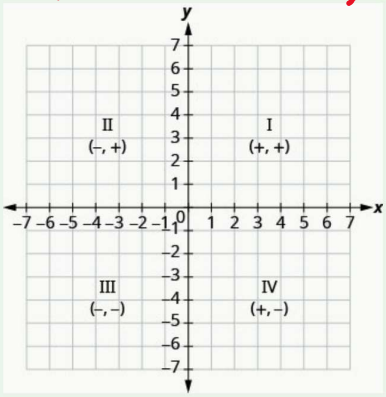
The origin

The point $(0, 0)$ is called the origin. It is the point where the *x*-axis and *y*-axis intersect.

Quadrants

We can summarize sign patterns of the quadrants in this way.

Quadrant I	Quadrant II	Quadrant III	Quadrant IV
(x, y)	(x, y)	(x, y)	(x, y)
$(+, +)$	$(, +)$	$(,)$	$(+,)$
	$(-, +)$	$(-, -)$	$(+, -)$



Memorize

Linear equation

An equation of the form $Ax + By = C$, where A and B are not both zero, is called a linear equation **in two variables**.

A, B, C are constants
x, y are variables

Memorize

Standard Form of Linear Equation

A linear equation is in standard form when it is written $Ax + By = C$.

Memorize

Solution of a Linear Equation in Two Variables

An ordered pair (x, y) is a **solution** of the linear equation $Ax + By = C$, if the equation is a true statement when the *x*– and *y*-values of the ordered pair are substituted into the equation.

Two points are sufficient to graph a line.
To check for accuracy, it is a good idea to plot 3 points.

3.2
Memorize

Graph of a linear equation

The graph of a linear equation $Ax + By = C$ is a line.

- Every point on the line is a solution of the equation.
- Every solution of this equation is a point on this line.

More precisely, the ordered pair of coordinates of every point on the line is a solution of the equation.

Memorize

HOW TO: Graph a linear equation by plotting points.

The steps to take when graphing a linear equation by plotting points are summarized below.

1. Find three points whose coordinates are solutions to the equation. Organize them in a table.
2. Plot the points in a rectangular coordinate system. Check that the points line up. If they do not, carefully check your work.
3. Draw the line through the three points. Extend the line to fill the grid and put arrows on both ends of the line.

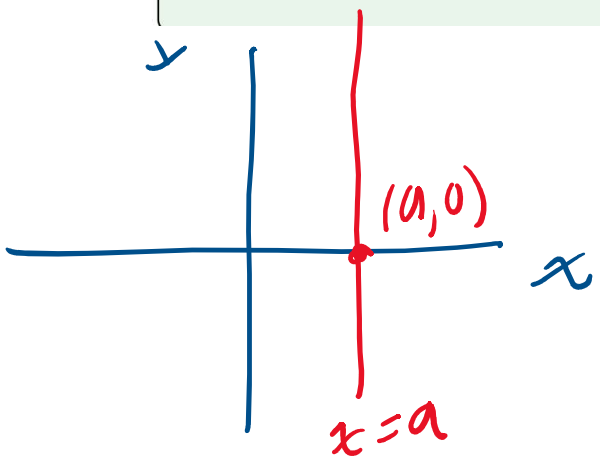
Memorize

Vertical line

A vertical line is the graph of an equation of the form $x = a$.

Vertical line

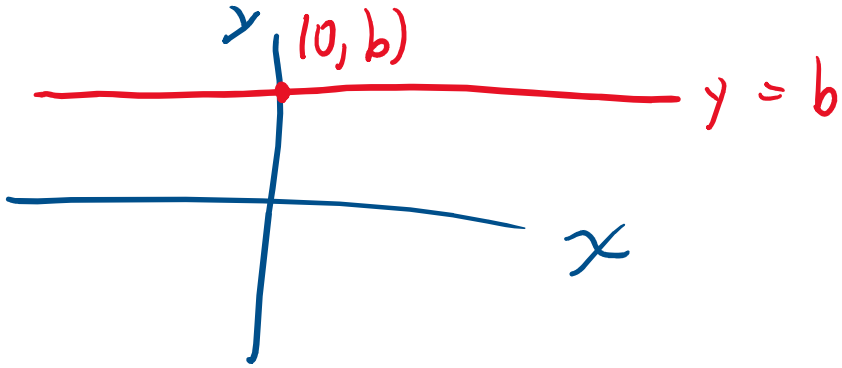
A vertical line is the graph of an equation of the form $x = a$.
The line passes through the *x*-axis at $(a, 0)$.



Memorize

Horizontal line

A horizontal line is the graph of an equation of the form $y = b$.
The line passes through the *y*-axis at $(0, b)$.



Let $2x + 8y = 10$

Find 3 solutions to the equation

Plot the points.

Plot the points.

Draw the graph of the line

x	y
0	5/4
1	1
2	3/4

$x + 4y = 5$

$0 + 4y = 5$

$\boxed{y = \frac{5}{4}}$

$1 + 4y = 5$

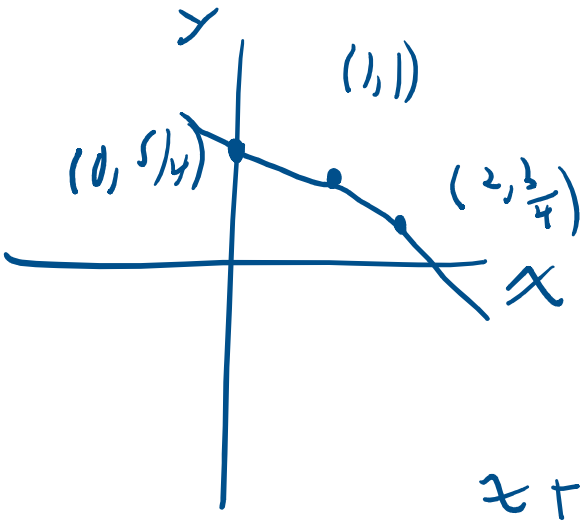
$4y = 4$

$\boxed{y = 1}$

$2 + 4y = 5$

$4y = 3$

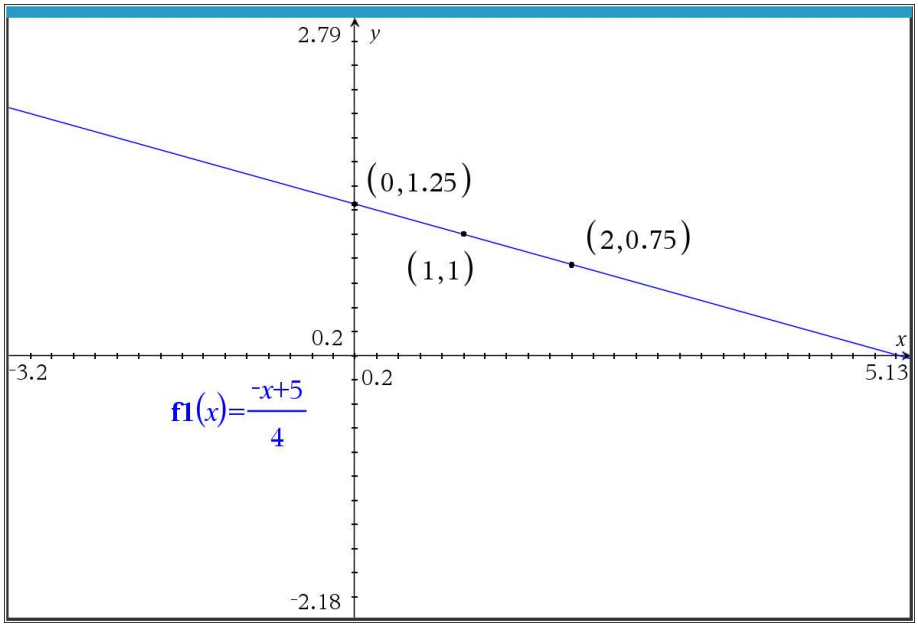
$\boxed{y = \frac{3}{4}}$



$x + 4x = 5$

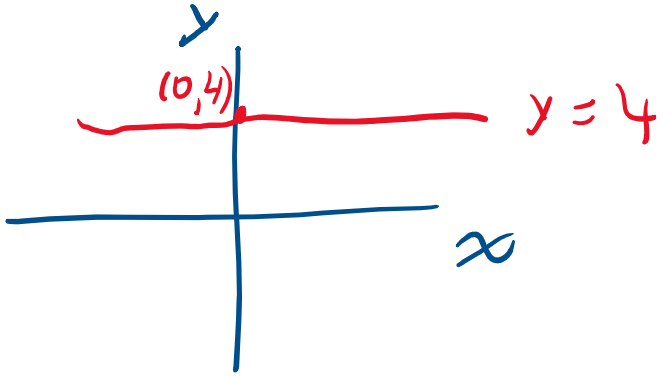
$4y = -x + 5$

$y = \frac{-x + 5}{4}$



The graph verifies our algebra.

Graph the line y=4



Graph the line $x = -3$