Beginning of Semester To Do List
Online Math 1313

1. Sign up for a CASA account in CourseWare at http://www.casa.uh.edu

- CASA refers to both a website and a physical testing and tutoring center (its location is on the second floor of Garrison Gym).
- The website will have Test 1, all Practice Tests and all weekly Quizzes. It's where you will be able to view your grades. You will submit your homework on the CourseWare website. The textbook for the course will be available only through CourseWare.
- The CASA Testing Center is where you will go to take the 2nd, 3rd, and 4th tests. For these tests, you will first make a reservation by logging on to casa.uh.edu and schedule an exam on the Proctored Exams tab. You can get help at the CASA Tutoring Center.
- If you have not taken a math class that uses CASA before, you will need to set up your account. If you already set up a CASA account for another class or the placement exams, you do not have to create another account. Just log in after classes start, and you will have access to any CASA courses for which you are enrolled.
- If you have a problem registering with CASA, first make sure that you are enrolled (you can't get an account if you are not enrolled), then click on the "Email Tech Support" link on the CASA webpage. If nothing else works, go to 221A Garrison.
- Full Semester access to CourseWare requires that you purchase an Access Code at the register at the Bookstore and then log on to CourseWare and follow the prompts to enter your Code. We are temporarily giving access to the website to get the semester going. On February 2, 2015, any student who has not purchased/entered an access code will be locked out of CourseWare. Any such students will not be able to submit homework, take quizzes or practice tests, take Test 1, view grades, use the textbook, register for Tests, etc. In short, any student who has not purchased/entered an Access Code by 12:01 a.m. on Monday, February 2, 2015, will not be able to participate in the course until he/she purchases and enters a code. Any work missed due to your delay in purchasing and entering this code will be scored as zeros, and there is no possibility of making up missed work.

2. Read the "Departmental Policies for Math 13xx Face to Face Classes".

Find them on your teacher's website under Math 13xx Course Policies. You are responsible for knowing these policies. Read them carefully, and make sure you understand all of them. You possibly will take a quiz over them.

3. Take the Course Policies Quiz on CourseWare.

You must score 100% on this quiz before you can access Test 1 or the weekly quizzes. The answers to the Course Policies Quiz are all in the "Departmental Policies for 13xx." You cannot take any further online quizzes or practice tests until you get a perfect score on the course policies quiz. You must take a course policies quiz in every Math 13xx course in which you are enrolled.

4. Take Practice Test 1 on CourseWare.

This will count for bonus points, will help you get ready for Test 1 and will indicate what material is covered on Test 1. All material on Test 1 is pre-requisite material - material you are expected to have learned in a class you took before this one. This material will not be covered in class. Get help on anything you've forgotten. (You can seek help at the CASA Tutoring Center, 222 Garrison Gym.)

Beginning of Semester To Do List
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5. Take Test 1 on CourseWare.

Test 1 will be available very early in the semester, probably on the first or second class day. Your teacher will give you the exact start date. Log on to CourseWare, click on "Online Assignments," and you should see a link to the test. You may take the test two times. We allow two attempts at this test to allow for any technical difficulties. For example, if you get kicked offline while taking the test, you have used up one of your two attempts. There is no third attempt!! Test 1 counts as 8% of your semester average, so you must take it. It covers material that you are expected to already know (College Algebra). It is based on Practice Test 1, so you should take Practice Test 1 first to get acquainted both with the material covered on the test and with how CourseWare works. If you score below 70% on Test 1, there is a good chance you are in the wrong class and are at risk of failing the course. If you score below 70% on Test 1, you should consider dropping Math 1313 and taking or auditing Math 1310 to build you basic skills up to the requisite level.

6. Test your system for Blackboard Collaborate off the class homepage.

Since this is an online class there are certain special requirements:

- You must have access to a computer and a fast internet connection. Broadband, Cable and DSL connections are the best for this. You will need to install Adobe Acrobat Reader 8.1 or higher which is available for free from http://www.adobe.com.
- Java must be up to date on your computer. Before the start of the semester, make sure you can log on successfully to the online classroom. If you have any difficulties, see Blackboard Collaborate Help.

7. Locate the online text at on the CASA website.

There is not a required bound text for this course. The text is online. The homework problems are located in the online text. The text also contains some worked examples and some basic explanations of the material we will cover.

8. Locate the class Discussion Board.

Class announcements will mainly be done through the class Discussion Board. This is located on your Courseware account right above link to the online book.

9. Buy your Access Code.

You must purchase and enter an Access Code for CourseWare to have full semester access to the Website. See the last paragraph of item 1 on this list for full information. Make sure you enter it right after you buy it, so that you don't misplace the Code! There are no refunds for lost Codes or for Codes purchased by students who drop the class. If you are taking two (or more) Math 13xx classes, you will need one Code for each Math 13xx class.
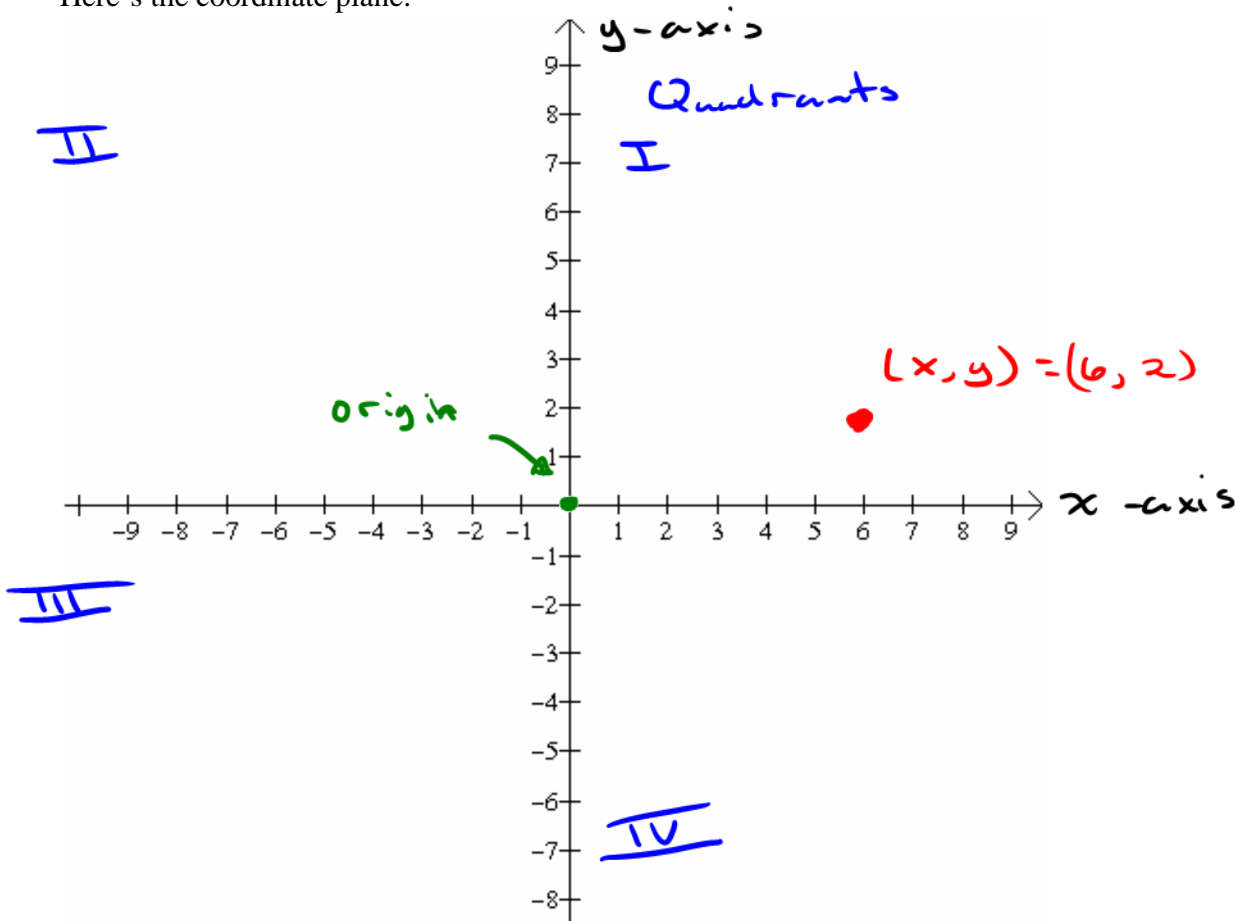
Math 1313
Section 1.2: Graphs of Linear Equations

In this section, we'll review plotting points, slope of a line and different forms of an equation of a line.

**Graphing Points and Regions**

Here's the coordinate plane:

As we see the plane consists of two perpendicular lines, the **x-axis** and the **y-axis**. These two lines separate them into four regions, or **quadrants.** The pair, (x, y), is called an **ordered pair**. It corresponds to a single unique point in the coordinate plane. The first number is called the *x* **coordinate**, and the second number is called the *y* **coordinate**. The ordered pair $(0, 0)$ is referred to as the **origin**. The *x* **coordinate** tells us the horizontal distance a point is from the origin. The *y* **coordinate** tells us the vertical distance a point is from the origin. You'll move right or up for positive coordinates and left or down for negative coordinates.

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Example 1: Plot the following points.

A. (-2,6)

B. (3,-4)

C. (5,3)

D. (-7,-3)

A. (-2,6)
B. (3,-4)
C. (5,3)
D. (-7,-3)

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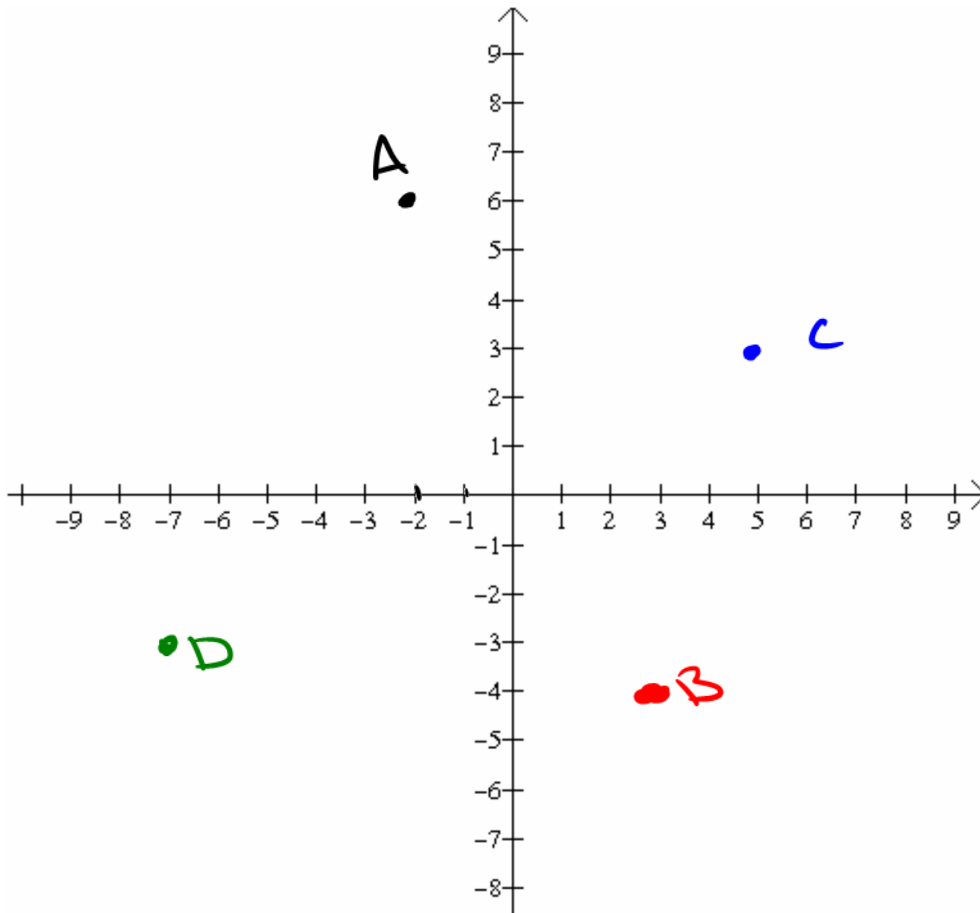
Slope of a Line

If (x_1, y_1) and (x_2, y_2) are any two distinct points on a non vertical line L, then the slope m of L is given by

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

Up to the right (positive)

Down to the right (negative)

$m = 0$ (Horizontal) $y = \#$
$y = -3$

$n = $ undefined (Vertical) $x = \#$
$x = 4.2$
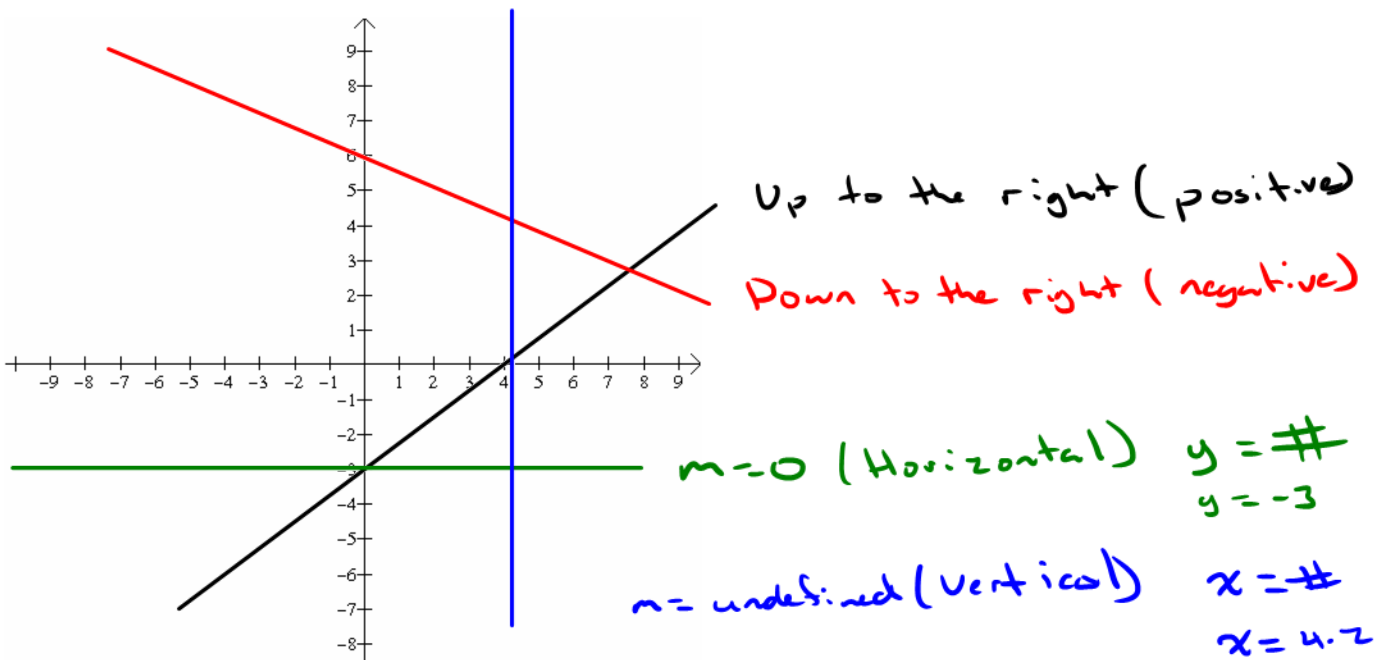
When the $m = 0$, you have a **horizontal line**.
When the $m = $ undefined, you have a **vertical line**.

Example 2: Find the slope between the points.
a. $(4, -8)$ and $(-3, 6)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - (-8)}{-3 - 4} = \frac{14}{-7}$$

$$= \boxed{-2}$$

b. $(1, 4)$ and $(-3, 4)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 4}{-3 - 1} = \frac{0}{-4} = 0$$

Horizontal line

$$y = 4$$

c. $(-1, -7)$ and $(-1, 12)$

$$M = \frac{y_2 - y_1}{x_2 - x_1} = \frac{12 - (-7)}{-1 - (-1)} = \frac{19}{0} = \text{undefined}$$

Vertical line

$$x = -1$$

Equations of Lines

Every Straight line in the *xy*-plane can be represented by an equation involving the variables *x* and *y*. The first from we will be looking at **Point -Slope Form**

An equation of the line that has the slope *m* and passes through the point (x_1, y_1) is given by

$$y - y_1 = m(x - x_1)$$

Slope Intercept Form

When an equation is left in the form of $y = mx + b$, where *m* is the slope and *b* is the is the *y*-intercept of the line.

General Equation of a Line is in the form $Ax + By + C = 0$

Example 3: Find the equation of the line that pass through (4,7) and (-4,-9)

$$M = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{-9 - 7}{-4 - 4}$$

$$= \frac{-16}{-8} = 2$$

$$y - y_1 = m(x - x_1)$$

$$y - 7 = 2(x - 4)$$

$$y - 7 = 2x - 8$$

$$\boxed{y = 2x - 1}$$

Example 4: Write the equation of a line that has slope -4/3 and passes through (6, -8/3)

$$M = -\frac{4}{3} \qquad pt: \left(6, -\frac{8}{3}\right)$$

$$y = mx + b$$

$$-\frac{8}{3} = -\frac{4}{3}(6) + b$$

$$-\frac{8}{3} = \frac{-24}{3} + b$$

$$\frac{16}{3} = b$$

$$\boxed{y = -\frac{4}{3}x + \frac{16}{3}}$$

Math 1313   Section 1.4

Section 1.4: Graphs of Linear Inequalities

Linear inequalities are in the form of:

Equal to = Solid

$$ax + by + c < 0 \qquad ax + by + c \leq 0$$
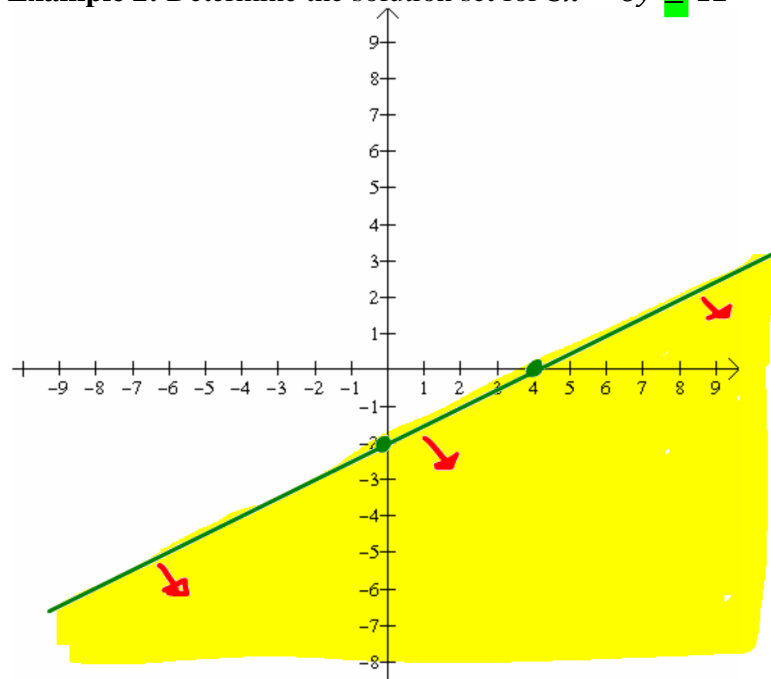$$ax + by + c > 0 \qquad ax + by + c \geq 0$$

Dashed lines

Procedures for graphing inequalities:
1. Draw the line of the inequality replacing < or > with "=", if its < or > the line you draw will be dashed not solid.
2. Pick a test point on either side of the line and plug it into the original inequality
3. If the point picked "works" then that's the side you shade in. If it is not true, shade the other side.

Example 1: Determine the solution set for 2x+4y >12

↱ Dashed

x-int	y-int
y=0	x=0
2x+0=12	0+4y=12
2x=12	4y=12
x=6	y=3
(6,0)	(0,3)

~~(0,3)~~

$2x + 4y > 12$

$4y > -2x + 12$

$y > -\frac{1}{2}x + 3$

↑ Shade
Above

Test (0,0)

2(0) + 4(0) > 12

0 > 12
False

Math 1313   Section 1.4
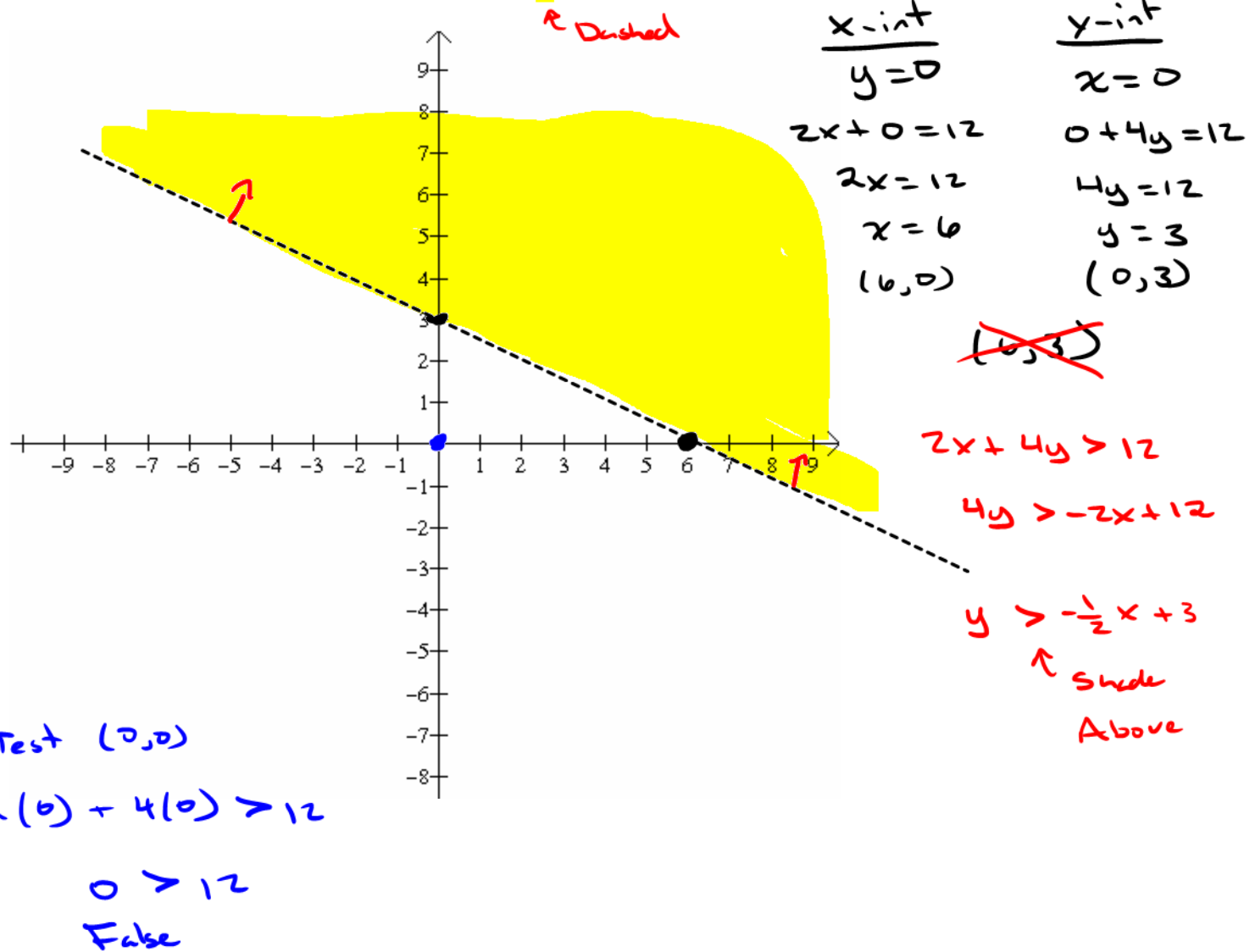
Example 2: Determine the solution set for $3x - 6y \geq 12$

Solid

x-int
y = 0

$3x - 0 = 12$
$3x = 12$
$x = 4$
$(4, 0)$

y-int
x = 0

$0 - 6y = 12$
$-6y = 12$
$y = -2$
$(0, -2)$

$3x - 6y \geq 12$
$-6y \geq -3x + 12$
$y \leq \frac{1}{2}x - 2$

Example 3: Determine the solution set for $3x + 2y < 4$ and $2x + 4y > -8$

Line 1

x-int
y = 0

$3x = 4$
$x = \frac{4}{3}$

y-int
x = 0

$2y = 4$
$y = 2$
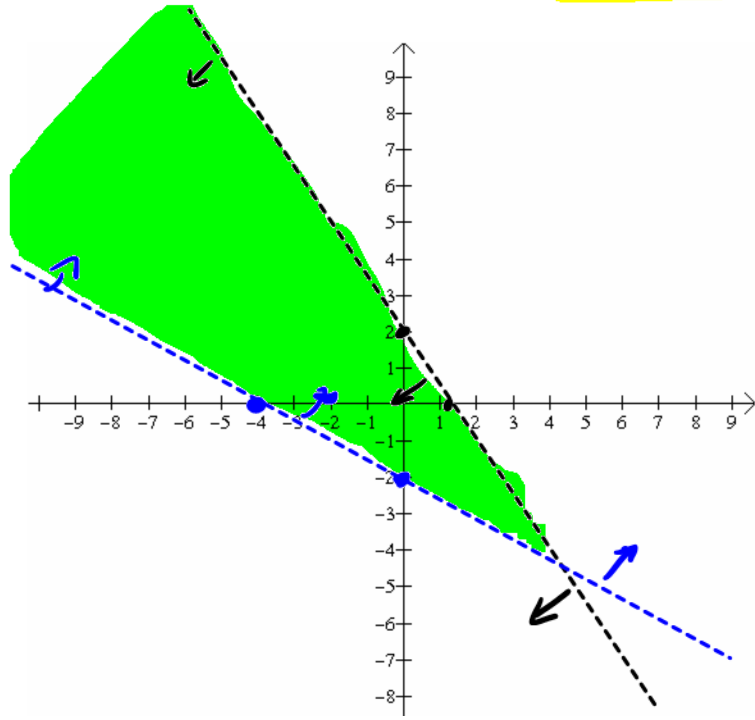
$3x + 2y < 4$
$2y < -3x + 4$
$y < -\frac{3}{2}x + 2$

Shade Below

Line 2

x-int
y = 0

$2x = -8$
$x = -4$

y-int
x = 0

$4y = -8$
$y = -2$

$2x + 4y > -8$
$4y > -2x - 8$
$y > -\frac{1}{2}x - 2$

Shade Above

Section 1.5: Linear Models

An **asset** is an item owned that has value.
Linear Depreciation refers to the amount of decrease in the book value of an asset.
The **purchase price**, also known as **original cost**, of an asset is the price paid for the asset when purchased.
The **scrap value** of an asset is the remaining value after it is no longer seen as useable.

Example 1: In 2010, the B&C Company installed a new machine in one of its factories at a cost of $150,000. The machine is depreciated linearly over 15 years with no scrap value. $ 0

a. Find the rate of depreciation for this machine.

$$M = \frac{Y_2 - Y_1}{X_2 - X_1}$$

$$= \frac{0 - 150000}{15 - 0} = \frac{Scrap - Initial}{time}$$

$t = 0 \; ; \; 150,000 \qquad (0, 150000) \qquad = \frac{-150000}{15}$

$t = 15 \; , \quad 0 \qquad\qquad (15, 0)$

$$= \$ -10,000 /yr$$

$$\boxed{10,000 /yr}$$

b. Find an expression for the machine's book value in the t-th year of use ($0 \le t \le 15$).

$y = mx + b$

$V(t) = mt + b$

$= mt + Initial$

$$\boxed{V(t) = -10,000t + 150,000}$$

Example 2: A company's car has an original value of $85, 000 and will be depreciated linearly over 6 years with scrap value of $10,000.

a. Find the expression giving the book value of the car at the end of year t ($0 \le t \le 6$).

$M = \frac{Scrap - Initial}{Time}$

$V(t) = mt + Initial$

$= \frac{10,000 - 85000}{6}$

$$\boxed{V(t) = -12,500t + 85000}$$

$= -12,500$

b. Find the car's book value in at the end of the third year.

$V(3) = ?$

$V(3) = -12500(3) + 85,000$

$= -37,500 + 85000$

$= \boxed{47,500}$

1

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Linear Cost, Revenue and Profit Functions:

If x is the number of units of a product manufactured or sold at a firm then,

The **cost function**, C(x), is the total cost of manufacturing x units of the product.

Fixed costs are the costs that remain regardless of the company's activity.

 Examples: building fees (rent or mortgage), executive salaries

Variable costs are costs that vary with the production or sales.

 Examples; wages of production staff, raw materials

The **revenue function**, R(x), is the total revenue realized from the sale of x units of the product.

The **profit function**, P(x), is the total profit realized from the manufacturing and sale of the x units of product.

Formulas: Suppose a firm has fixed cost of F dollars, production cost of c dollars per unit and selling price of s dollars per unit then

C(x) =

R(x) =

P(x) =

Where x is the number of units of the commodity produced and sold.

Example 3: A manufacturer has a monthly fixed cost of $150,000 and a production cost of $18 for each unit produced. The product sells for $24 per unit.

a. What is the cost function?

b. What is the revenue function?

c. What is the profit function?

d. Compute the profit (loss) corresponding to production levels of 22,000 and 28,000.

e. How many units must the company produce and sell if they wish to make a profit of $40,000?

Example 4: Auto Time, a manufacturer of 24-hour variable timers, has a fixed monthly cost of $56000 and a production cost of $10 per unit manufactured. The timers sell for $17 each.

a. What is the cost function?

b. What is the revenue function?

c. What is the profit function?

d. Compute the profit (loss) corresponding to the production and sale of 4,000, 8,000 and 10,000 timers.

Break-Even Point

The **break-even level of operation-** is when the company neither makes a profit nor sustains a loss.
Note: The break-even level of operation is represented by the point of intersection of two lines.
The break-even level of production means the profit is zero.

Consider the following graph.

The point (x_o, y_o) is referred to as the break-even point.
x_o = break even quantity
y_o = break even revenue

If $x < x_o$ then $R(x) < C(x)$, therefore $P(x) = R(x) - C(x) < 0$ so you will have a loss.
If $x > x_o$ then $R(x) > C(x)$, therefore $P(x) = R(x) - C(x) > 0$ so you will have a profit.

Example 5: Find the break-even quantity and break-even revenue if $C(x) = 110x + 40,000$ and $R(x) = 150x$.

Example 6: The XYZ Company has a fixed cost of 20,000, a production cost of $12 for each unit produced and a selling price of $20 for each unit produced.

a. Find the break-even point for the firm.

b. If the company produces and sells 2000 units, would they obtain a profit or loss?

c. If the company produces and sells 3000 units, would they obtain a profit or loss?

Math 1313   Section 1.5

Example 7: Given the following profit function $P(x) = 6x - 12,000$.

a. How many units should be produced in order to realize a profit of $9,000?

b. What is the profit or loss if 1,000 units are produced?

Example 8: A bicycle manufacturer experiences fixed monthly costs of $124,992 and variable costs of $52 per standard model bicycle produced. The bicycles sell for $100 each. How many bicycles must he produce and sell each month to break even? What is his total revenue at the point where he breaks even?