

# MIDDLESEX COMMUNITY COLLEGE

BEDFORD · MASSACHUSETTS · LOWELL

## Strategies for Success COURSE GUIDE

### Algebra 1



achievement ★ persistence ★ retention ★ engagement

## **Title III Strengthening Institutions Project**

### **Strategies for Success: Increasing Achievement, Persistence, Retention and Engagement**

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The Strategies for Success Title III initiative is a major, five-year project (2009-2013) funded by a two million dollar grant from the U.S. Department of Education. This initiative is intended to transform Middlesex Community College by improving the academic achievement, persistence, retention, and engagement of its students.

The project focuses on reformed curricula and comprehensive advising. *Reformed Curriculum* involves the design of developmental and college Gateway courses and learning communities embedded with Core Student Success Skills related to critical thinking, communication, collaboration, organization, and self-assessment. Overall, 45 courses will be impacted over the five years of the project. *Comprehensive Advising* involves the design of integrated advising services to include identification of academic and career goals, creation of realistic educational plans, and continuous tracking and intervention with an emphasis on the Core Student Success Skills. Comprehensive Advising Services will be specifically tailored to each program of study. Cross-division curriculum and advising design teams composed of faculty and staff are designing, piloting, and assessing the curriculum and advising initiatives.

The Title III grant provides resources to support faculty professional development related to designing and piloting new curriculum and advising students. The grant also supports the purchase of advising software programs and the hiring of a Pedagogical Instructional Designer, Learning Engagement Specialist, Advising Coordinator, and two academic advisors. The resources provided by the grant offer an exciting opportunity for the college community to work together to develop the strong programs and services that will increase student success.

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# *Algebra 1*

## *Resource Guide for Infusing College Student Success Skills*

Algebra 1 is a 3 credit elementary algebra course. It introduces students to basic algebraic concepts that are necessary for successful completion of college-level math courses.

This course has been designed to incorporate the following Core Student Success Skills (CSSS) as a result of a Title III grant: Critical Thinking, Collaboration, Communication, Organization, and Self Assessment. Development of these skills accounts for twenty-five percent of this course. The concept is to lead students to apply these skills as they learn the course content. The expectation is that by practicing these skills in this course, they will develop into more successful college students over all.

This resource guide is designed to provide resources to develop the CSSS which instructors can adapt for their own classes. The resources can be used and modified as the individual instructors see fit. There are two major parts to the resource guide, the Guided Readings and group activities.

The Guided Readings are meant for the students to complete *before* the particular section is covered in class. The Guided Readings include questions to be answered by the students as they read the section. By actively reading the sections before they are covered in class, it is hoped that the students will be more engaged in their learning. Also, the readings will identify which concepts the students find difficult and will allow them to focus their questions during the subsequent class or classes covering the material.

The group activities are projects that correspond to the 4 chapters covered in the course. The projects can be done during class or as take-home assignments. Instructors can pick and choose which projects they would like to use and modify the projects if they desire.

# Guided Readings

## Lesson Plan

**Title:** Pre-Lecture Guided Readings

### Learning Objectives:

1. Students will be able read and understand the textbook.
2. Students will be able to explain math definitions and concepts in their own words.
3. Students will be able to understand and explain the steps in the examples given in their textbook.
4. Students will be able to identify the concepts that they don't fully understand, make a note of them, and ask the appropriate questions during class.
5. Students will be able to produce their own study plan and study materials.

**Core Student Success Skills:** Critical Thinking, Communication, Collaboration, Organization, and Self-Assessment

**Materials:** Textbook, Guided Readings, notebook and pencil.

**Context within the Course:** This activity extends across the entire course.

### Procedure:

1. Students will read the section in the textbook *before* the section is covered in class.
2. Students will answer the questions on the guided reading for that particular section.
3. The students will formulate any questions they have after reading the section to ask during class.
4. Students will make study materials for each section.

**Note for Instructor:** The guided readings should be checked regularly to encourage the students to stay up to date with their readings.

## **Pre-Lecture Guided Readings: Instructions for Students**

There are guided readings for each section. The guided readings consist of questions about the material covered in the section. Many questions are straight-forward; some require critical thinking, but all the questions are designed to encourage you to actively read the textbook for understanding not to just skim the material. These guided readings are a significant portion of your grade. Doing the guided readings faithfully can significantly improve your grade; likewise, not doing them or only occasionally doing them can significantly hurt your grade. They are not difficult to do but require discipline and organization on your part. Set aside time every day to complete the assigned guided readings and any other assignments.

- Read over the guided reading for a particular section *before* you begin reading the section in the textbook.
- Read the section in the textbook answering the questions in the guided reading as you read.
- As you read the examples, try to follow along step by step to make sure you understand what they did to solve the problem.
- If you reach a part that is confusing, mark it with a pencil so you can come back to it.
- After the first reading, go back to the parts that confused you and read them again more carefully to see if you can figure them out. If you still don't understand that part, write up a question to ask during class or to ask one of your classmates.
- As you read, make a list of terms, definitions, concepts and procedures that you think are important. Use these to create study materials.
- The assigned guided reading will be collected at the very beginning of class.

## **Section 1.1**

### **Multiple Choice**

1. Write 48 as a product of prime factors. (p. 3)
  - a.  $2 \cdot 3 \cdot 8$
  - b.  $2 \cdot 2 \cdot 2 \cdot 6$
  - c.  $2 \cdot 2 \cdot 3 \cdot 4$
  - d.  $2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$

### **Fill in the Blank**

2. To multiply two fractions, multiply their \_\_\_\_\_ and then multiply their \_\_\_\_\_. (p.4)
3. To divide by a fraction, multiply by its \_\_\_\_\_. (p. 5)
4. Before you can add or subtract two fractions, they must have \_\_\_\_\_ denominator. (p. 6-8)
5. LCD is an abbreviation for \_\_\_\_\_ \_\_\_\_\_  
\_\_\_\_\_. (p. 7)

### **True or False:**

6.  $1/2 + 1/3 = 2/5$  (p. 6,7) \_\_\_\_\_
7. If a fraction is in lowest terms the numerator and denominator have no factors in common (p. 3,4) \_\_\_\_\_
8. When you multiply two fractions you do not need a common denominator (p. 4, 5) \_\_\_\_\_

Questions for class

Important concepts from this section

## **Section 1.2**

### **Fill in the blanks.**

1. An \_\_\_\_\_ is a number that indicates how many times a factor is repeated. (p. 15)
2. Parentheses ( ), brackets [ ], or fraction bars are examples of \_\_\_\_\_. (p. 16)

### **Explain**

3. In your own words explain how squaring a number is different from doubling a number? (p. 16)
4. In your own words, explain what is meant by order of operations. (p.16-18)

### **True or False**

5. In the expression,  $10 - 4 + 6$ , the addition should be done first. \_\_\_\_\_ (p. 16)
6. The statement  $9 > 5$  is equivalent to  $5 < 9$ . \_\_\_\_\_ (p. 20)

Questions for class	Important concepts from this section

### Section 1.3

#### Matching:

- |                       |       |   |
|-----------------------|-------|---|
| 1. Equation (p.27)    | _____ | a. A collection of objects  |
| 2. Element (p. 27)    | _____ | b. A symbol used to represent any unknown number  |
| 3. Variable (p. 25)   | _____ | c. Objects that belong to a set   |
| 4. Expression (p. 25) | _____ | d. A statement that two algebraic expressions are equal   |
| 5. Set (p. 27)        | _____ | e. A sequence of numbers, variables, operation symbols and/or grouping symbols formed according to the rules of algebra |

#### True or False

- |   |       |
|---|-------|
| 6. $3x + 2y$ is an equation. (p. 27, 28)  | _____ |
| 7. 7 is a solution of $2(b+5) - 3b = 3$ . (p. 27)   | _____ |
| 8. In the phrase, <i>the product of fifteen and a number</i> , the word product means multiplication. (p. 26) | _____ |

#### Explain

9. What value of  $x$  would make the expression  $2x - 5$  equal to 7? Explain your reasoning. (p. 27)

Questions for class	Important concepts from this section

## **Section 1.4**

### **Multiple Choice:**

1. An integer between 1.4 and 3.5 would be (p. 34-35)
  - a. 2.5
  - b. 4.0
  - c. 1.2
  - d. 3.0
  
2. A number that is less than -3.2 is (p. 34-35)
  - a. -3.4
  - b. -1.3
  - c. 0
  - d. -3.1
  
3. The set of whole numbers is different from the set of natural numbers because it contains (p. 31)
  - a. The negative numbers
  - b. All number decimal numbers
  - c. zero
  - d. Fractions
  
4. An example of an irrational number is (p. 33)
  - a. 1.6666 repeating
  - b.  $\pi$
  - c. 2.5
  - d. 1.0

### **Matching (p. 36-37):**

- |                   |                      |
|-------------------|----------------------|
| 5. $ -8 $ _____   | a. 8                 |
| 6. $- 8 $ _____   | b. -8                |
| 7. $ 10-2 $ _____ | c. 12                |
| 8. $- -8 $ _____  | d. none of the above |

**Matching**

9. additive inverse (p. 36) \_\_\_\_\_

10. integer (p. 31) \_\_\_\_\_

11. rational number (p. 32) \_\_\_\_\_

12. irrational number (p. 33) \_\_\_\_\_

a. The number the same distance from zero on the number line, but on the opposite side of 0.

b. Any real number that is not a rational number.

c. {...-2, -1, 0, 1, 2 ...}

d. Any number that can be written as a ratio, that is a quotient or fraction, of two integers.

Questions for class

Important concepts from this section

## Section 1.5

### Fill in the Blanks

1. To add two numbers with the same sign you add the \_\_\_\_\_ of the numbers. The sum has the same sign as the numbers. (p. 42)
2. If I am adding a positive number and a negative number, and the negative number has the larger absolute value, the sum will be a \_\_\_\_\_ number. (p. 42) (positive/negative)
3. The sum of a number and its opposite is always \_\_\_\_\_ (p. 43)

### Explain

4. In your own words, explain how to subtract two real numbers. (p. 43-44)

### Multiple Choice

Circle the correct numerical expression for each Phrase (p. 46-47)

5. The difference between  $-5$  and  $-2$   
a)  $-5 - (-2)$                       b)  $-2 - (-5)$
6. 7 subtracted from  $-3$   
a)  $7 - (-3)$                       b)  $-3 - 7$
7. 12 less than 8  
a)  $12 - 8$                       b)  $8 - 12$

Questions for class

Important concepts from this section

## Section 1.6

### True or False

1. For any real number,  $x \cdot 0 = x$  (p. 53) \_\_\_\_\_
2. The product of two numbers having different signs is negative.  
(p. 55) \_\_\_\_\_
3. The quotient of two numbers having the same signs is positive. (p. 57)  
\_\_\_\_\_
4.  $\frac{0}{y}$ , where  $y \neq 0$ , is undefined. (p. 57) \_\_\_\_\_

### Evaluate

Evaluate the expression, given that  $x = -1$  and  $y = -2$ . (p. 59)

5.  $2x^2 - 3y^2$

Questions for class	Important concepts from this section

## **Section 1.7**

### **Fill in the blank.**

1. The Commutative Property of Addition states that  $-3+5 =$  \_\_\_\_\_.  
(p. 67)
2. The Associative Property of Multiplication states that  $(2 \cdot -3) \cdot 5 =$  \_\_\_\_\_.  
(p. 67)
3. -5 is the \_\_\_\_\_ of 5. (p. 70)
4. The multiplicative inverse of  $\frac{2}{3}$  is \_\_\_\_\_. (p. 70)

### **True or False**

5. The sum of a number and its opposite is 0. (p. 70)  
\_\_\_\_\_
6. The identity element for addition is 1. (p. 69)  
\_\_\_\_\_
7. Using the distributive property, we can rewrite  $-2m+8$  as  $-2m-8$ . (p. 73)  
\_\_\_\_\_

Questions for class

Important concepts from this section

## Section 1.8

Match up each phrase on the left with an example of it on the right.

- |                                  |       |                                     |
|----------------------------------|-------|-------------------------------------|
| 1. Term (p. 77)                  | _____ | a. $4(5+3) = 4 \cdot 5 + 4 \cdot 3$ |
| 2. like terms (p. 78)            | _____ | b. $4x+1$                           |
| 3. expression (previous section) | _____ | c. $5x, 10x$                        |
| 4. distributive property (p. 77) | _____ | d. $4x$                             |

### True or False

- |   |       |
|---|-------|
| 5. The numerical coefficient of $-7a^2$ is 2. (p. 77)     | _____ |
| 6. $5x^2$ and $-2x^2$ are like terms. (p. 78)             | _____ |
| 7. $2(4x - 1)$ simplifies to $8x - 2$ (p.78-80)           | _____ |
| 8. $12 + 8x - 30 + 6x$ simplifies to $14x - 42$ (p.78-80) | _____ |
| 9. Only like terms can be added or subtracted. (p. 78)    | _____ |

Questions for class

Important concepts from this section

## **Section 2.1**

### **Fill in the blank**

1. A linear equation in one variable is an equation that can be written in the form \_\_\_\_\_ . (p. 96)

Explain the parts of the form.

- a. A, B, and C are \_\_\_\_\_
- b. x is the \_\_\_\_\_
2. Determine whether the given equations are linear or nonlinear. If the equation is nonlinear explain why it's not linear. (p. 96)

a.  $2x+5=7$  \_\_\_\_\_

b.  $3x^2+2=9$  \_\_\_\_\_

c.  $\frac{1}{2}x+7=4$  \_\_\_\_\_

d.  $\frac{2}{x}+3=0$  \_\_\_\_\_

e.  $5x=9$  \_\_\_\_\_

### **Explain**

1. In your own words, explain the Addition Property of Equations. (p.97)
2. Solve using the Addition Property of Equality. Explain each step. (p. 97-100)
- $$x+13=-15$$

- a. How can you check the solution?

Questions for class

Important concepts from this section

## Section 2.2

### Explain

1. In your own words, explain the Multiplication Property of Equality. (p. 102)

### Multiple Choice

2. To solve the equation  $\frac{3}{5}x = 9$ , multiply both sides of the equation by...  
(p. 102-105)

a)  $\frac{3}{5}$       b)  $-\frac{3}{5}$       c)  $\frac{5}{3}$       d)  $-\frac{5}{3}$

3. To solve the equation  $-3x = 7 \dots$

- a) Add 3 to both sides.
- b) Divide both sides by  $-3$ .
- c) Multiply both sides by 3.
- d) Divide both sides by  $\frac{1}{3}$

On page 103, there is an important note highlighted in a yellow window. Copy the note here:

## Explain

4. Explain each step in the following example.

$$2y - 7y = 45$$

---

$$-5y = 45$$

---

$$y = -9$$

---

Questions for class

Important concepts from this section

## **Section 2.3**

### **Explain**

1. Explain the four step process for solving a linear equations. (p. 108)

2. Explain each step in the following example. (p. 110)

$$8a - 3 + 2a = 3a + 1$$

---

$$8a - 3 - 2a = 3a + 1$$

---

$$6a - 3 = 3a + 1$$

---

$$3a - 3 = 1$$

---

$$3a = 4$$

---

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

---

**Define the following special types of equations. (p. 113)**

3. Identity:

4. Contradiction:

Questions for class

Important concepts from this section

## Section 2.8

1. What is a linear inequality? Describe in your own words and give an example of one. (p. 164)

2. Fill in with the appropriate inequality symbols.  $<, \leq, >, \geq$  (p. 163-164)

When graphing linear inequalities...

... when do you use a parentheses? \_\_\_\_\_

... when do you use a square bracket? \_\_\_\_\_

3. Put  $x \geq 2$  and  $-2 \leq x < 4$  in interval notation. (p. 163-172)

a) \_\_\_\_\_

b)  $-2 \leq x < 4$  \_\_\_\_\_

4. Look below and see how the linear inequalities are solved. Write what was done from one step to the other. (p. 168-169)

a.  $5x - x + 2 < 7x - 5$  \_\_\_\_\_

$4x + 2 < 7x - 5$  \_\_\_\_\_

$2 < 3x - 5$  \_\_\_\_\_

$7 < 3x$  \_\_\_\_\_

$\frac{7}{3} < x$  \_\_\_\_\_

Or  $x > \frac{7}{3}$  \_\_\_\_\_

b.  $-6x - 15 \geq -3$

$-6x \geq 12$

$x \leq -2$

---

---

---

(why did the inequality sign change in the last step?)

5. Fill in the missing steps. (p. 171)

$$2 \leq 3x - 1 \leq 8$$

$$\underline{\hspace{2cm}} \leq 3x \leq \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} \leq x \leq \underline{\hspace{2cm}}$$

Questions for class

Important concepts from this section

## Section 2.4

### Explain

1. Copy the six step process for solving applied problems. (p. 118)

### Fill in the missing steps in for this applied problem. (p. 119)

2. *In the 2006 Winter Olympics in Torino, Italy, the United States won 6 more medals than Norway. The two countries won a total of 44 medals. How many medals did each country win?*

Step 1 Read the problem.

Step 2 Assign a variable

Let \_\_\_\_\_ = number of medals Norway won

Then \_\_\_\_\_ = the number of medals that the US won

Step 3 Write an equation.

$$\text{_____} + \text{_____} = 44$$

Step 4 Solve.

Step 5 State the answer.

The US won \_\_\_\_\_ medals and Norway won \_\_\_\_\_ medals.

Step 6 Check

**Define the following terms.**

3. Complementary angles:

4. Supplementary angles:

5. Right angles:

Questions for class

Important concepts from this section

## Section 2.5

1. As you read this section list any geometric formulas that you think might be important. (p. 131-137)

**Fill in the missing steps in for this applied problem.** (p. 133)

2. *Cathleen Horne's backyard is in the shape of a rectangle. The length is 5 m less than twice the width, and the perimeter is 80 m. Find the dimensions of the yard.*

Step 1 Read the problem.

Step 2 Assign a variable

Let \_\_\_\_\_ = width of the lot

Then \_\_\_\_\_ = the length of the lot

Step 3 Write an equation.

$$\text{Perimeter} = 2 \cdot \text{length} + 2 \cdot \text{width}$$

↓                      ↓                      ↓

$$80 = 2( \text{_____} ) + 2( \text{_____} )$$

Step 4 Solve.

Step 5 State the answer.

The width of the lot is \_\_\_\_\_ m and the length is \_\_\_\_\_ m.

Step 6 Check

Explain each step in the following problem.

3. Solve the  $F = \frac{9}{5}C + 32$  for  $C$ . (p. 136)

$$F = \frac{9}{5}C + 32$$

\_\_\_\_\_

$$F - 32 = \frac{9}{5}C + 32 - 32$$

\_\_\_\_\_

$$F - 32 = \frac{9}{5}C$$

\_\_\_\_\_

$$\frac{5}{9}(F - 32) = \frac{5}{9}\left(\frac{9}{5}C\right)$$

\_\_\_\_\_

$$C = \frac{5}{9}(F - 32)$$

\_\_\_\_\_

Questions for class

Important concepts from this section

### Section 3.1

#### Fill in the blank.

1. A bar graph is used to show \_\_\_\_\_. (p. 190)
2. A \_\_\_\_\_ graph is used to show changes or trends in data over time. (p. 191)

#### True or False

3. In an ordered pair the x variable is always given first. (p. 192) \_\_\_\_\_

#### Multiple Choice.

4. Circle any solutions to  $2x - 3y = 7$ . (p. 193)
  - a. (5,1)
  - b. (3,5)
  - c. (1,5)
  - d. (0,2)

#### Matching. (p. 195)

- |                   |       |   |
|-------------------|-------|---|
| 5. Origin         | _____ | a. Determined by the x and y axes                   |
| 6. Quadrant       | _____ | b. Credited with inventing the coordinate system    |
| 7. Rene Descartes | _____ | c. One of the four regions of the coordinate system |
| 8. Plane          | _____ | d. Point at where the x and y axes meet             |

Questions for class

Important concepts from this section



**Fill in the Blank** (p. 209)

5) The graph of  $y = 9$  is a \_\_\_\_\_ line.

6) The graph of  $x = -3$  is a \_\_\_\_\_ line.

**True/False**

7) The graph of  $3x + 2y = 9$  has  $y$  – intercept  $(0, 3)$ . (p. 207) \_\_\_\_\_

8) The point  $(2, 5)$  on the line  $2x - 11y = 3$ . (Answer without graphing!) (p. 204)  
\_\_\_\_\_

**Multiple choice** (p. 205-206)

9) The  $x$  – coordinate of a point on the line  $3x - 2y = 5$  with  $y$  – coordinate  $-1$  is:

- a) -4      b) -1      c)  $7/3$       d) 1

Questions for class	Important concepts from this section

### Section 3.3

#### **Explain**

1. In your own words how would you define or describe the slope of a line?

#### **Fill in the blank**

2. The \_\_\_\_\_ is the vertical change that determines the slope of a line. (p. 217)
3. The \_\_\_\_\_ is the horizontal change that determines the slope of a line. (p. 217)
4. Traditionally, the letter \_\_\_\_\_ is used to represent the slope of a line. (p. 219)

#### **True or False**

5. It doesn't matter which two points on a line are used to determine the slope. \_\_\_\_\_

6. The point closest to the origin needs to be used as  $(x_1, y_1)$  \_\_\_\_\_

#### **Matching**

(p. 221-223)

- |                         |  |
|-------------------------|--|
| 7. Vertical lines       | a. slope=0                                 |
| 8. Parallel lines       | a. undefined slopes                        |
| 9. Horizontal lines     | b. lines that have equal slopes            |
| 10. Perpendicular lines | c. lines whose slopes have a product of -1 |

Questions for class	Important concepts from this section

### Section 3.4

#### Matching (p.230 – 236)

Match each type of linear equation with its form.

1. Point-slope form \_\_\_\_\_
2. Horizontal line \_\_\_\_\_
3. Standard form \_\_\_\_\_
4. Vertical line \_\_\_\_\_
5. Slope-intercept form \_\_\_\_\_

- a.  $y = k$
- b.  $Ax + By = C$
- c.  $x = k$
- d.  $y = mx + b$
- a.  $y - y_1 = m(x - x_1)$

**Put the equation in slope-intercept form and then identify the slope and the y-intercept of the graph of the equation.** (p. 231)

6.  $2x - 3y = 3$

$m = \text{slope} = \underline{\hspace{2cm}}$

$y\text{-intercept} = \underline{\hspace{2cm}}$

## Explain

7. Follow example 5 on page 233 and then write up the steps that are needed to find the equation of a line given a point and the slope.

Questions for class

Important concepts from this section

## Section 3.5

### Explain

1. We graphed linear equations that looked like  $y = 2x - 3$  or  $3x + 2y = 6$ . Now we will be graphing linear inequalities in two variables. What symbols will now replace the  $=$  ?

### True or false.

2. The point  $(-3, 0)$  is a solution of  $y \geq \frac{1}{2}x - 3$ . \_\_\_\_\_
3. The point  $(1, 1)$  is a solution of  $x - y < 0$ . \_\_\_\_\_
4. The point  $(0, 3)$  is a solution of  $y < 4$ . \_\_\_\_\_

### Fill in the Blank

5. Replace the words with the inequality symbol that represents them.

- a. more than \_\_\_\_\_
- b. less than \_\_\_\_\_
- c. at most \_\_\_\_\_
- d. at least \_\_\_\_\_

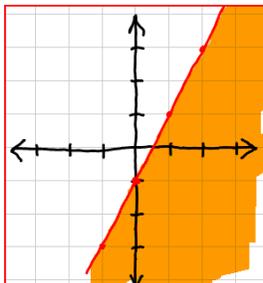
6. Explain when you would use a dotted or dashed line and when you would use a solid line to graph a linear inequality in two variables.

## Matching

Match each inequality with the correct graph.

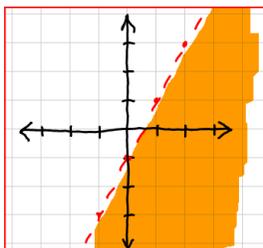
7.  $y < 2x - 1$  \_\_\_\_\_

a.



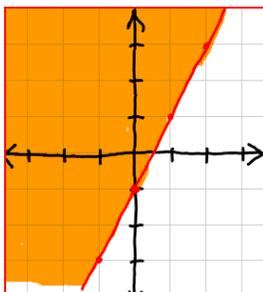
8.  $y \leq 2x - 1$  \_\_\_\_\_

b.



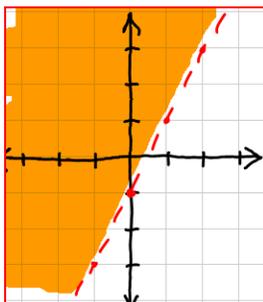
9.  $y > 2x - 1$  \_\_\_\_\_

c.



10.  $y \geq 2x - 1$  \_\_\_\_\_

d.



Questions for class

Important concepts from this section

## **Section 4.1**

### **Explain.**

- 1) In your own words, explain how to determine if an ordered pair is a solution to a system of equations. (p. 274-275)

### **Fill in**

- 2) Fill in the steps for solving a system of equations by graphing. (p. 274-275)

Step 1:

Step 2:

Step 3:

### **Fill in the blanks**

For a system of linear equations... (p. 277)

- 3) ...if the graphs of the equations intersect at exactly one point, then there is only \_\_\_\_\_ solution and the system is \_\_\_\_\_ and the equations are \_\_\_\_\_.
- 4) ...if the graphs of the equations are parallel, then there is \_\_\_\_\_ solution and the system is \_\_\_\_\_ and the equations are \_\_\_\_\_.
- 5) ...if the graphs are the same line, then there is an \_\_\_\_\_ number of solutions and the system is \_\_\_\_\_ and the equations are \_\_\_\_\_.

Questions for class

Important concepts from this section

## Section 4.2

### True/False

- 1) The substitution method can only be applied when both equations are in the form  $y = mx + b$ . (p. 284-286) \_\_\_\_\_
- 2) If you obtain " $2 = 0$ " after solving a system, it means that the solution is  $x = 2$ . (p. 286) \_\_\_\_\_
- 3) To apply the substitution method, we must first solve one equation for the  $y$  – variable. (p. 284-286) \_\_\_\_\_

### Multiple Choice

- 4) Given the system of equations  $\begin{cases} 3x + 2y = 27 \\ x = y + 4 \end{cases}$ , the solution set is:

a)  $\{(9,0)\}$       b)  $\{(4,0)\}$       c)  $\{(7,3)\}$       d)  $\{(3,7)\}$

- 5) If you obtain " $5 = 5$ " after solving a system, it means that the solution set is:

a)  $\{(5,5)\}$       b)  $\{(0,0)\}$       c)  $x = 5$       d) infinite # of solutions

### Matching

- 6) System of dependent equations. \_\_\_\_\_ 1. solution set  $\emptyset$
- 7) System of two different vertical lines. \_\_\_\_\_ 2. infinite number of solutions
- 8) \_\_\_\_\_
- 9) System of two perpendicular lines. \_\_\_\_\_ 3. one point of intersection

### Fill in the blank

10) If the system has fractions as coefficients, we can simplify our work by

\_\_\_\_\_ each side of the equation by a common denominator. (p. 288)

### Explain

11) Explain how the solution to a system of two linear equations in two variables obtained by graphing is related to the solution to the system obtained by the substitution method.

Questions for class

Important concepts from this section

## Section 4.3

### Explain

1. Explain the steps for solving a system of equations using the elimination method.  
(p. 291-295)

### True or False.

2. To eliminate the y-terms in the system  $\begin{cases} 2x+12y=7 \\ 3x+4y=1 \end{cases}$  we should multiply the bottom equation by 3 and then add the equations. \_\_\_\_\_

3. The ordered pair  $4, -5$  cannot be a solution of a system that contains the equation  $5x-4y=0$ . \_\_\_\_\_

Questions for class

Important concepts from this section

## Section 4.4

### Fill in.

1. The following steps can be used to solve an application problem using a \_\_\_\_\_

Step 1. Read

Step 2. Assign variables

Step 3. Write **two** equations

Step 4. Solve

Step 5. State the answer

Step 6. Check

### True or false.

2. Only the Elimination method can be used to solve application problems using a system of linear equations. \_\_\_\_\_

### Fill in

3. There are two unknown quantities in the following application problem? What are they? Assign variables to represent each of them.

*Hector has decided to set up a workout schedule to get in shape. He would like to vary his training between aerobic workouts and strength training. He would like to work out a total of 8 hours per week and he would like the number of hours of aerobic workouts to be twice as much as the number of hours he spends on strength training. How many hours should he spend on each?*

Unknowns Quantities: \_\_\_\_\_ and \_\_\_\_\_

Variables: Let \_\_\_\_\_ = \_\_\_\_\_

Let \_\_\_\_\_ = \_\_\_\_\_

Questions for class

Important concepts from this section

# GROUP ACTIVITIES

## Activity

**Title:** Your Time Inventory

### Learning Objectives:

1. The student will create an inventory of his or her weekly activities and the time (in hours) spent on each activity.
2. The student will calculate the percent of time out of the total hours in a week he or she spends in each activity.
3. The student will round to the nearest whole number percent.
4. The student will share his or her insights with the class regarding his or her personal chart as well as classmates' charts.

**Core Student Success Skills:** Critical Thinking, Communication, Collaboration, Organization, and Self-Assessment

### Materials:

Student Packet, Worksheet for activity list, Calculator, Pencil.

### Context within the Course:

This activity is designed to be used at the start of the course. It can also be used as a one-on-one counseling activity during office hours.

### Procedure:

1. Students will brainstorm to create a list of all activities in which they engage. Each individual will then select the subset of activities that best reflects his or her personal inventory and list these on his or her worksheet in column 1, "Your Activities."

*Note: The instructor may want to emphasize that the students should calculate their weekly "study time" based on a formula of 2, 2 ½ or 3 hours of study for every 1 hour spent in class. For example, a typical college class of 3 credit hours requires at least 6 hours of independent study time.*

2. The student will complete column 2 of the worksheet, "Hours per Week."
3. The student will calculate the percent of time spent in each activity by applying the formula:

$$\% = \frac{\text{hours spent in this activity}}{168 \text{ hours}} \times 100\% .$$

The student will list these values in column 3, "Percent per Week."

4. The student will verify that column 2 sums to 168 and column 3 sums to 100%.
5. The student will answer the final questions of the worksheet:

Do you have enough time to do everything on your list?

When you need more time to study, what activity or activities do you sacrifice?

**Student Packet**  
**Your Time Inventory**

Directions:

Step 1. Brainstorm with your partner or group to come up with a list all of your weekly activities. List YOUR activities in Column 1 of your worksheet.

Step 2. Estimate how many hours each week you spend engaged in each activity. List this data in Column 2 of your worksheet. This column should add up to 168 hours. Why?

Step 3. Calculate the percent of time you spend engaged in each activity. List this data in Column 3 of your worksheet. This column should add up to 100. Why?



## Activity

**Title:** Math Quest: Group Map Activity

### Learning Objectives:

1. Students will be able measure distances on a map using a ruler or tape measure.
2. Students will be able to convert inches on a map to miles.
3. Students will be able to add mixed numbers.
4. Students will be able to convert mixed numbers to decimal numbers.
5. Students will be able to use the Internet to determine distances.
6. Students will be able to multiply decimal numbers.
7. Students will be able to use the  $D = R \cdot T$  formula

**Core Student Success Skills:** Critical Thinking, Communication, Collaboration, Organization, and Self-Assessment

**Materials:** Instruction and Work sheets (attached on the next pages), rulers and/or tape measures, a map of the USA, Internet access, a calculator, as determined by the Instructor.

**Context within the Course:** This activity fits at the end of a chapter that reviews arithmetic skills in Algebra I.

### Procedure:

1. Students will work in groups of 2 or 3 on this project to complete the worksheets.
2. Each group will need a ruler or a measuring tape and a map of the USA in order to measure distances between cities; this part of the project may have to be completed outside of the classroom.  
  
(Printable PDF rulers are available here: [http://www.vendian.org/mncharity/dir3/paper\\_rulers/](http://www.vendian.org/mncharity/dir3/paper_rulers/))
3. Each of the distances calculated in step 2 need to be recorded as mixed numbers, not decimals.
4. Students will also need access to the Internet; this part of the project may have to be done outside the classroom.
5. It is left to the individual instructor to determine the extent of calculator use for this project.

**Next Steps:** This project should serve as a means of strengthening arithmetic skills and some very basic algebraic skills that will be used throughout the Algebra I course.

### **Part I: Using a Ruler**

On the paper copy of the ruler provided, work with your partner to determine the fraction of an inch that is represented by each of the lines on the ruler between 0 and 1. Record the results below.

These same values are true between any of the inch segments on the ruler.

Describe which line on the ruler would represent each of the following:

a)  $2\frac{7}{8}$

b)  $4\frac{1}{2}$

c)  $1\frac{3}{4}$

d)  $11\frac{1}{8}$

e)  $9\frac{5}{8}$

Keep this information in mind as you work the next part of this module.

## **Part II: Take a Tour**

I. Choose one of the following Tours:

# TOURS

### **Tour #1 – Music Tour**



If you take this tour, you will travel to the following:

1. The Rock and Roll Hall of Fame in Cleveland, OH
2. The House of Blues in Chicago, IL
3. Graceland in Memphis, TN
4. Country Music Hall of Fame in Branson, MO



### **Tour #2 – Hard Rock Café Tour**

If you take this tour, you will travel to the following cities:

1. New York, NY
2. New Orleans, LA
3. Los Angeles, CA
4. Washington, D.C.

### **Tour #3 - Sports Hall of Fame Tour**



This tour will take you to:

1. The Basketball Hall of Fame in Springfield, MA
2. The Baseball Hall of Fame in Cooperstown, NY
3. Football Hall of Fame in Canton, OH
4. Hockey Hall of Fame in Toronto, Canada



### **Tour #4 – Amusement Parks Tour**

This tour will take you to:

1. Disney World in Orlando, FL
2. Disneyland in Anaheim, CA
3. Hershey Park in Hershey, PA
4. Busch Gardens, Williamsburg, VA

II. Choose one of the tours.

Name of Tour: \_\_\_\_\_

Cities you will be traveling to:

City #1 \_\_\_\_\_; City #2 \_\_\_\_\_

City #3 \_\_\_\_\_ City #4 \_\_\_\_\_

- Determine the route you would like to take that would include all of the cities. (Your tour will start and end in Boston)

**My route is:**

Boston to \_\_\_\_\_ to \_\_\_\_\_

to \_\_\_\_\_ to \_\_\_\_\_ back to Boston

Measure the distance on the map in inches, **expressed as mixed numbers**, from Boston to:

- a) the first city you will visit; record this information in the second the table on the following page;
- b) then measure the distance between the first city and the second city; record this information in the table;
- c) continue to do this for the remaining cities and then back to Boston from the last city

Route #1	# of inches on the map	# of miles
From Boston to _____		
From _____  to _____		
From _____  to _____		
From _____  to _____		
From _____  Back to Boston		
<b>TOTAL</b>		

Next convert the number of inches to miles using the fact that on the map of the United States one inch represents \_\_\_\_\_ miles.

Express the miles as mixed numbers. Enter the number of miles in the third column of the chart.

Finally total both columns to find the total # of inches on the map and the total number of miles traveled.

## II. Comparisons

Repeat the above exercise 2 more times taking a different route each time to see which route would be the shortest in distance. Tables are provided below to record this information. (Change the routes by changing the order in which the cities are visited.)

### Route #2:

Route #1	# of inches on the map	# of miles
From Boston to _____		
From _____ to _____		
From _____ to _____		
From _____ to _____		
From _____ Back to Boston		
<b>TOTAL</b>		

**Route #3:**

<b>Route #1</b>	<b># of inches on the map</b>	<b># of miles</b>
<b>From Boston to</b> _____		
<b>From</b> _____ <b>to</b> _____		
<b>From</b> _____ <b>to</b> _____		
<b>From</b> _____ <b>to</b> _____		
<b>From</b> _____ <b>Back to Boston</b>		
<b>TOTAL</b>		

### III. Internet Distances

Go online to check the total distances for each of your routes above. You may leave these numbers in decimal form.

Route #1: \_\_\_\_\_miles

Route #2: \_\_\_\_\_miles

Route #3: \_\_\_\_\_miles

Convert the fractional Total Distances you found by measuring to decimal numbers. Compare these distances with the actual distances from the Internet. How do these compare? What accounts for the discrepancies, if any?

#### **IV. Taking the Trip**

Choose the route with the shortest distance to answer the following:

1. If the average cost per gallon of gasoline is \$2.65, how much would it cost for gas to do this trip?  
What information do you need in order to answer this question?

2. How many miles could you travel in one day?

What do you need to know in order to answer this question?

3. How many days would the trip take?

What do you need to know in order to answer this question?

**Activity**

**Title:** Mill Girls Group Project

**Learning Objectives:**

1. Students will be able to read non – textbook materials and identify math concepts in it.
2. Students will be able to perform basic calculations based on information from a source other than their textbook.
3. Students will apply mathematical concepts/knowledge to the understanding of local history.

**Core Student Success Skills:** Critical Thinking, Communication, Collaboration, Organization, and Self-Assessment

**Materials:** Modified text based on “The Mill Girls” brochure from Lowell National Historical Parks, questionnaire sheet.

**Context within the Course:** This activity fits at the end of the second chapter and provides an excellent review of all the concepts introduced.

**Procedure:**

1. Students should be put into groups of 3 or 4.
2. The students will read the text and will be encouraged to go on a tour of the National Park.
3. The group will complete the questionnaire.

**Next Steps:** Introduce texts from sources such as newspapers, magazines, books, etc. as often as possible to encourage critical thinking and the understanding of numerical information in everyday context.

# The Mill Girls

*Who were the “mill girls”? The term “mill girls” was used to describe the young*

*Yankee women, generally 15 – 30 years old, who worked in the large cotton factories.*

*Despite the hardship of mill work, women remained an important part of the textile workforce for many years. In the late 19th century, women held nearly two-thirds of all textile jobs in Lowell, with many immigrant women joining Yankee mill girls in the textile industry.*

## Choices and Changes

To find workers for their mills in early Lowell, the textile corporations recruited women from New England farms and villages. These “daughters of Yankee farmers” had few economic opportunities, and many were enticed by the prospect of monthly cash wages and room and board in a comfortable boardinghouse. Beginning in 1823, with the opening of Lowell’s first factory, large numbers of young women moved to the growing city.

## A New Way to Live and Work

For most young women, Lowell’s social and economic opportunities existed within the limits imposed by the powerful textile corporations. Most obvious was the control corporations had over the lives of their workers. The men who ran the corporations and managed the mills tried to regulate the moral conduct and social behavior of their workforce. Within the factory, overseers were responsible for maintaining work discipline and meeting production schedules. In the boardinghouses, the keepers enforced curfews and strict codes of conduct. Male and female workers were expected to observe the Sabbath, and temperance was strongly encouraged. The clanging factory bell summoned operatives to and from the mill, constantly reminding them that their days were structured around work. Most textile workers toiled approximately 14 hours a day and half a day on Saturdays; the mills were closed on Sundays. Typically, mill girls were employed for nine to ten months of the year, and many left the factories during part of the summer to visit back home.

## Life in a Boardinghouse

The majority of mill girls in Lowell lived in boardinghouses. These large, corporation-owned buildings were often run by a female keeper, or a husband and wife. A typical boardinghouse consisted of eight units, with an average of 30 women living in each unit. For most young women, life in the boardinghouse was dramatically different from life on the farm. Usually they shared a room with three other women, sleeping two to a bed. A fireplace in each room provided warmth in the colder seasons. The keeper prepared three meals a day, and the women dined together in a common room. Women formed many new friendships with other female boarders. The bonds created through daily socializing helped new workers adjust to the demands of factory life.

## Boardinghouse Life

The keepers were also responsible for purchasing or renting everything needed to furnish a house and feed its occupants. Room and board costs, which ranged from \$1.25 to \$1.50 per week during the 1830s and 1840s, were deducted from wages. For this amount, workers received three meals a day, limited laundry service, and a bed in a shared room.

Adapted from the Lowell National Historical Park  
National Park Service  
U.S. Department of the Interior

- 1) Let's use  $a$  to represent the age of the mill girls; what is the interval that describes the range of values of  $a$ ?
- 2) What percent of all textile jobs in Lowell were held by women? (Round to nearest whole number)

- 3) How many hours per week did they work?
- 4) What fraction of the day did they work on weekdays?
- 5) If  $w$  indicates the number of hours somebody works Monday through Friday,  $s$  indicates the number of hours somebody works on Saturday, and  $u$  indicates the number of hours somebody works on Sunday,
  - a) Write an expression that would allow you to figure out the total number of hours that person works per week.
  - b) Write an equation that states that the number of hours of work on weekdays (Monday through Friday) totals 45
- 6) Approximately how many women lived in each boardinghouse?
- 7) If thirty women lived in a house, and each room accommodated four women, what was the minimum number of rooms needed in the house?
- 8) What was the monthly room and board cost?
- 9) The yearly room and board costs at UML are \$7519. Calculate the monthly cost.

## **Activity**

**Title:** Slope is all around us!

### **Learning Objectives:**

1. Students will be able to determine the slope of an incline or decline
2. Students will be able to determine the slope of a line, given two points.

**Core Student Success Skills:** Critical Thinking, Communication, Collaboration, Organization, and Self-Assessment

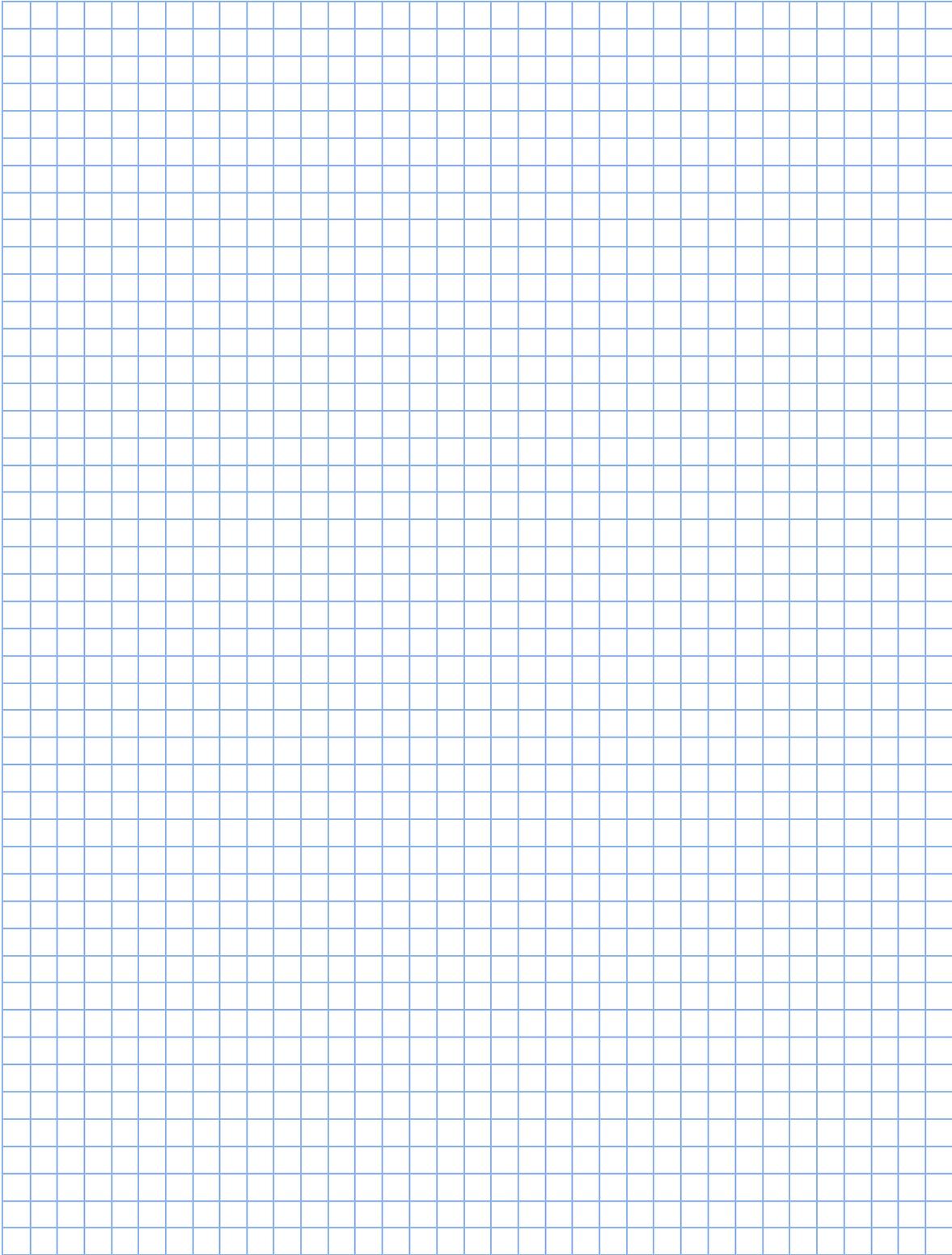
**Materials:** Textbook, worksheet (attached), one sheet of transparency graph paper, ruler

**Context within the Course:** This activity fits at the end of the chapter on lines and slope.

### **Procedure:**

1. Students will be asked to find something outside of the classroom that has a slope to it such as a hill, a handicap ramp, a roof etc.
2. They will be asked to take of photo of what they have found (most phones have a camera in them. Students can download the picture to a computer and print, or do it on the screen. If taking a picture is an issue, you can have students look up pictures on line as a last resort)
3. They will then overlay their transparency graph paper. They should place the origin at the beginning of the incline or decline.
4. They will then trace the slope with a ruler.
5. Once the line has been drawn, they will then find two points on the line.
6. Once the points have been determined, they will then calculate the slope
7. All work must be shown. Students will pass in all calculations
8. They will then answer the questions on the following worksheet.





**Activity**

**Title:** Creating Systems of Linear Equations

**Learning Objectives:**

1. Students will be able to create systems of linear equations fitting certain criteria,
2. Students will be able to solve systems of linear equations by the Substitution method and/or the Elimination method.
3. Students will be able to solve systems of linear equations by graphing.

**Core Student Success Skills:** Critical Thinking, Communication, Collaboration, Organization, and Self-Assessment

**Materials:** Worksheets (attached), rulers and pencils.

**Context within the Course:** This activity can be used once the students have been introduced to all types of systems of linear equations, consistent and inconsistent systems and systems with dependent equations, and how to solve them graphically and with the Substitution method and the Elimination method.

**Procedure:**

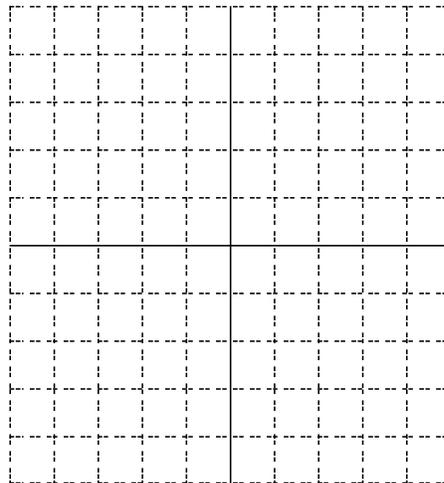
1. Students will work in groups of 2 or 3 on this project to complete the worksheets.
2. Project can be used in class or as a take home assignment.
3. Allow students 20 to 30 minutes to complete the worksheet.
4. If time allows, you can have groups present their solutions to the class.

For each problem below, write a system of linear equations that fits the description given. Demonstrate that the system you have created fits the given description.

For each problem,

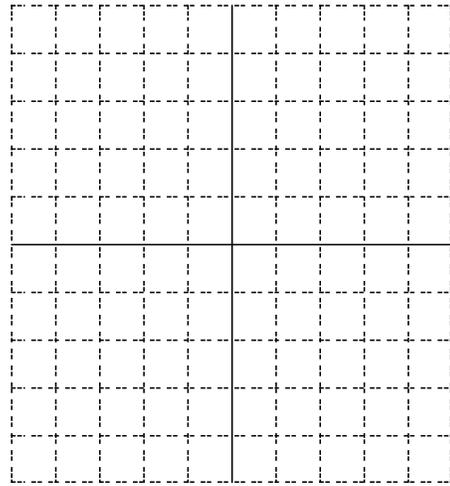
- a. Write a system of linear equations
- b. Solve the system of linear equations algebraically using either the Substitution method or the Elimination method.
- c. Solve the system graphically.

1. Find a system of linear equation that has  $(-2,4)$  as its solution.



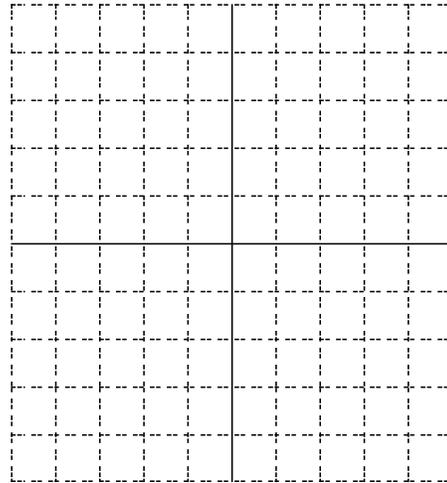
Explain how you came up with your system of equations.

2. Find a system of linear equations for which there is no solution



Explain how you came up with your system of equations.

3. Find a system of linear equations that is a system of dependent equations.



Explain how you came up with your system of equations.

# Appendices

## Appendix A

Fall 2009 Semester

Dear Algebra 1 Teachers,

Welcome to another semester teaching Algebra 1. This letter, the syllabus and other documents and materials are available in the **Algebra 1 Instructor Information** Blackboard site.

**Textbook:** We are using a custom edition of Beginning Algebra, 10<sup>th</sup> edition, by Lial/Hornsby/McGinnis, published by Addison Wesley 2007. We have split the book into two separate books, one for Algebra 1 and one for Algebra 2. The Annotated Instructors' Edition is not customized. It is the entire book.

*Instructor's Edition:* Beginning Algebra, 10<sup>th</sup> edition, by Lial/Hornsby/McGinnis, published by Addison Wesley 2007. ISBN: 0-321-44786-7

*Student's Edition:* Beginning Algebra, Volume 1 Custom Edition for Middlesex Community College, by Lial/Hornsby/McGinnis, published by Pearson Custom Publishing 2007. ISBN: 0-536-45550-3

**Placement:** Students are allowed to challenge their placement in Algebra 1. They may move to the next level math course, which is Algebra 2 if they take the MATH-CHALLENGE- EXAM for Algebra 1 and get a C or better. The Math Labs administer this process. Students interested must be sent ASAP to the Math Lab to make an appointment by the end of the first week of the semester.

**Important Change:** The prerequisite for the course has been changed! The new prerequisite is: *A grade of C or better in MAT 060 or placement by exam is required.*

**Calculator:** The use of a Calculator is allowed. Some proficiencies, such as combining signed numbers, you may wish to require to be performed without the use of a calculator until rules are mastered.

**MyMathLab:** MyMathLab is an online teaching and learning environment that is text specific. All the students will receive MyMathLab access codes with their books. There are online problem sets and instructional videos and animations that the students can use. You can also set up online homework assignments and quizzes. Gene O'Brien, the sales representative from Pearson, is willing to provide training if anyone is interested. Contact me if you would like to copy my course. If instructors do not want to set up a MyMathLab course, there will a generic MyMathLab Algebra 1 course set up so that your students can access MyMathLab if they would like to.

**Assignment List:** I erred on the side of more problems in the selected exercises rather than less. Feel free to trim the number of problems if you think the problems sets are too long. I require my students to do their homework in MyMathLab.

**Title III Activities:** Some instructors are piloting some changes made to the course by using activities designed through a Title III grant that MCC received. The materials developed are available in the instructor's Blackboard site. Feel free to use any of the activities in your class. If you have activities that you would like to share, please send them to me.

**Journal/ Portfolio:** Some instructors include 5 Journal/Portfolio assignments for their students. This allows a stress-free and time-free environment in which students complete an assessment, as well as training in personal responsibility with at home assignments. Use it or not as you see fit. Feel free to improve upon them and make them your own.

**Application Problems:** Application problems are found throughout the book but most of them are found in Sections 2.4, 2.5, 2.7 and 4.4. (We are not covering section 2.6 Ratios and Proportions)

**(Note:** I have eliminated the mixture problems from section 2.7 and I also eliminated the vertical and straight angle problems from section 2.5)

*Applications of Linear equations in 1 variable:*

Simple translations [2.4]

Supplementary and complementary angles [2.4]

Consecutive integer problems [2.4]

Formulas and geometric formulas [2.5]

Investment problems [2.7]

Coin problems [2.7]

Motion problems [2.7]

*Applications of Systems of linear equations:*

Simple translations [4.4]

Coin problems [4.4]

Mixture problems [4.4]

Motion problems [4.4]

**Final Exam and Review:** There is a departmental final-exam and final-exam-review packets distributed near the end of the semester.

Please feel welcome to contact me at any time with suggestions or concerns. We have a new textbook so feedback is especially appreciated. Have a great semester!

Sincerely,

Mike Williamson  
[williamsonm@middlesex.mass.edu](mailto:williamsonm@middlesex.mass.edu)

Lowell Cube #40  
978-656-312

## Appendix B Sample Syllabus

Middlesex Community College

Fall 2009

**MAT 070 Algebra 1 3 credits**

**MAT 070-51 MWF at 8:30 – 9:20 LF – 203**

**MAT 070-52 MWF at 9:30 – 10:20 LF – 203**

**Instructor: Mike Williamson**

Phone: 978-656-3128

E-mail: [williamsonm@middlesex.mass.edu](mailto:williamsonm@middlesex.mass.edu)

Office location: Lowell City Building -cube #40 on 5<sup>th</sup> floor

Office hours: Monday, Wednesday 1:00 – 2:00

Tuesday, Thursday 10:30 – 11:30

(Other times by appointment.)

**Placement:** You may test out of this course and move to the next consecutive math course if you feel strongly that you have been misplaced.

To do this, go to the MATH TUTORING CENTER on the 4<sup>th</sup> floor of Lowell City Campus early in the first week of classes to make an appointment to take the Challenge Test.

**This procedure must be completed by the Friday of the first week of classes.**

**Prerequisites:** A Grade of C or better in [MAT 060](#) (formerly MA 1101) or placement by exam is required. A Grade of B or better in [MAT 060](#) (formerly MA 1101) is strongly recommended.

**Course Description:** **The first course of Elementary Algebra. Topics include operations with signed numbers; linear equations; linear inequalities; point plotting and graphs of straight lines; and systems of linear equations.**

*Credits earned in this course will not apply to MCC degree programs.*

*This course was redesigned as part of the Title III grant, Strategies for Success: Increasing Achievement, Persistence, Retention and Engagement. The course materials will focus on key skills of **critical thinking, communication, collaboration, organization and self-assessment**. As students in the pilot version of this course you will have an opportunity to think more explicitly about these skills, to apply them to course concepts and then to demonstrate how you have improved your communication, critical thinking, collaboration, organization and self-assessment skills by the end of the semester.*

**Course Goals:** It is the goal of this course to increase student's comfort and confidence with mathematics, to strengthen orderly ways of thinking and to develop an algebraic way of working with mathematics. This will lay a solid mathematical basis for other courses to build upon.

**Materials:** **Textbook:** [Beginning Algebra](#), custom edition for MCC, based on 10<sup>th</sup> edition, by Lial/Hornsby/McGinnis, Addison Wesley 2007

**Supplies:** a folder in which to keep handouts, tests, etc  
 a notebook for class notes and a notebook for homework  
 a scientific calculator (TI-30a is a good one)  
**(graphing calculators and cell phones are not allowed)**

**Teaching Procedure:** Class will begin promptly and start with a discussion of assigned exercises. Presentation of new material is part lecture, part examples and part group work. Strong student participation is expected. Each student is responsible to take good notes, ask questions, work collaboratively and be attentive. Please bring your textbook, notebooks and calculator to each class. During each class you will have a chance to try problems and/or work on some group activity.

**Course Objectives:** Upon successful completion of [MAT 070](#), Algebra 1, a student should be able to:

<b>1) Simplify Real Numbers and Algebraic Expressions</b>	<ul style="list-style-type: none"> <li>▪ Perform operations with signed numbers</li> <li>▪ Use the Order of Operation to simplify algebraic expressions</li> <li>▪ Evaluate an algebraic expression for given variables</li> <li>▪ Multiply and divide variables with exponents</li> <li>▪ Use Scientific notation</li> </ul>
<b>2) Solve Equations of one-variable and applications</b>	<ul style="list-style-type: none"> <li>▪ Solve equations for a given variable</li> <li>▪ Use equations to solve applications problems involving percents, geometry and uniform motion</li> </ul>
<b>3) Solve Inequalities of one-variable and applications</b>	<ul style="list-style-type: none"> <li>▪ Graph simple inequalities on a number line</li> <li>▪ Solve inequalities</li> <li>▪ Solve application problems involving linear inequalities</li> </ul>
<b>4) Solve Equations of two-variables</b>	<ul style="list-style-type: none"> <li>▪ Recognize and use a Rectangular Cartesian Plane</li> <li>▪ Graph an equation in <math>y=mx+b</math> form and <math>ax+by=c</math> form</li> <li>▪ Compute and interpret slope and intercepts</li> <li>▪ Produce the equation of a line from given data</li> <li>▪ Graph linear inequalities of two variables</li> </ul>
<b>5) Solve Systems of Equations of two-variables and applications</b>	<ul style="list-style-type: none"> <li>▪ Solve a system of two equations in two variables using the Graphing, Substitution and Addition methods</li> <li>▪ Solve application problems in two variables such as mixture and break-even analysis</li> </ul>
<b>6) Demonstrate comfort and confidence with math</b>	<ul style="list-style-type: none"> <li>▪ Communicate math concepts using accurate vocabulary</li> <li>▪ Organize work to show a clear development of ideas</li> <li>▪ Participate in class activities free from undo anxiety</li> </ul>

**Classroom  
Atmosphere  
and  
Conduct:**

Our classroom is a learning community. As part of this community each of us should be respectful of every other person. A simple summary of some standards of behavior for the benefit of all are as follows:

- ⇒ On-time attendance of every class.
- ⇒ No whispering or talking while someone else is speaking.
- ⇒ Avoid creating distractions such as sharpening pencils, using trash receptacles, walking about, using cell phones, etc. while class is in session.
- ⇒ Always treat yourself and others with respect and dignity.

Misconduct of a habitual or extreme nature will be handled as specified under [Student Conduct: Rules and Regulations](#), in your **STUDENT HANDBOOK 2007-2008**. Submitting work that has been copied from someone else is considered plagiarism. Cheating and plagiarism are serious offences. See [Offenses of an Academic Nature](#) in your **STUDENT HANDBOOK 2007-2008**.

**CELL PHONES ARE NOT ALLOWED DURING CLASS!**

**TURN OFF CELL PHONES DURING CLASS**

**Cheating and  
Plagiarism**

As stated in the Middlesex Community College Student Handbook: Cheating is a serious offense, whether it consists of taking credit for work done by another person, or doing work for which another person will receive credit. Taking or using the ideas or writings of another without clearly and fully crediting the source is plagiarism, a violation of the student code. **Any assignment in which there is evidence of cheating or plagiarism will receive a failing grade of zero.**

**Helps for  
Success:**

**Academic Support:** Free **tutoring** is available in the Math Tutoring Center on the 4<sup>th</sup> floor of LC. Videotapes and computer tutorials are also available there. The daily hours are approximately 8am to 4pm. I strongly recommend that you make use of this support.

**Personal/Career Counseling:** Counselors are available on the 3<sup>rd</sup> floor LC to explore your concerns in many areas. The service is free and valuable.

**Financial Aid:** The Financial Aid office is available on the 3<sup>rd</sup> floor LC if you have concerns in this area. Please stop in to explore your options.

**Disability Services:** Students are encouraged to share information regarding documented disabilities, physical, learning or psychological, with the Disability Support Services office on the 3<sup>rd</sup> floor LC, x3258, in order to provide accommodations for your success.

**Pearson Tutor Center:** The Pearson Tutor Center is a free service available for student's with a valid MyMathLab code. Student's can contact the tutors by phone or email. They are open Sunday through Thursday, 5:00 pm to midnight. Their number is 1-800-877-3016.

**Getting Help:**

If you start struggling, make sure that you get help as soon as possible. Come to my office hours or stop by the Math Tutoring Center. Take advantage of the resources available to you and get some help somewhere

**MyMathLab:**

MyMathLab is an online resource that has homework problems, guided solutions, videos, animations and other resources to help you learn the material. Each of you should have a MyMathLab code that came with the book. You are **required** to register for the MyMathLab course. When you register for the course you will be asked for the course ID.

**This is our course ID: [williamson00529](#)**

You will be given a short MyMathLab homework assignment after every class based on the topics we covered in that day's class. You are expected to do that homework assignment before the next class. The next class will begin with questions from the homework. **These homework assignments will determine 10% of your grade.**

**Homework:**

Homework is an **extremely** important part of this class. You **must** do your homework if you want to do well in this class. You should do the homework for the sections covered in class **before** the next class. This course builds upon the preceding concept. Falling behind can quickly develop into a threat of failure. Mathematics requires practice for success. The homework is your responsibility. You should do as many problems as you can, especially in the topics that you are struggling. Even when you do the homework online, you will still need to keep a homework notebook. Math is meant to be worked out on paper and pencil.

**Class Cancellations:** Inclement weather can cause the college to cancel classes for the day or delay opening. Local radio and TV stations will announce this information. You can also call the general college number 978-656-3200, to find out if there is a cancellation.

**Attendance:** You are expected to attend every class and you are expected to be engaged in the class, taking notes, doing problems, asking questions. **If you are physically present but not doing any work, you will be marked as absent.**

You are allowed 3 unexcused absences. After that, 1 point will be deducted from your final course grade:

3 or fewer absences	no points deducted
4 absences	1 point deducted
5 absences	2 points deducted
6 absences	3 points deducted
7 absences	4 points deducted
8 or more absences	5 points deducted

**Grading Criteria:** **Tests** (100 points each) and **quizzes** (20 points each) will be graded for use of algebraic skills, accuracy, and the thought process shown in the step-by-step development of your work. I will take your best 5 quizzes. If we have more than 5 quizzes, then the lowest quiz grade will be dropped.

If you are given portfolio assignments (20 points each) they will be graded for accuracy, demonstration of concept and presentation.

## Grading Criteria

### **Group Projects**

**10%**

The Group Projects are an opportunity to collaborate with your fellow students. Group Projects will be graded for participation, content and presentation. Final projects should look professional and reflect the amount effort that you put into them.

### **MyMathLab Homework**

**10%**

Homework is probably the most important thing that you can do to learn Algebra. Working the problems will help you understand the concepts and help you identify what concepts you don't understand. MyMathLab provides help in solving the problems. It works out similar problems and has animations and videos for some of the problems to help you understand the type of problem. You can redo a problem until you get it correct.

### **Guided Readings**

**10%**

The guided readings should be completed before the section is covered in class. It is a way for you to prepare for the class. As you read, write down any questions that you would like cleared up in class. Guided readings will be collected at the beginning of class. No late submissions are allowed. (You are allowed to miss 3 of the Guided readings.)

### **Weighted Average of Tests, Quizzes and Portfolio**

**50%**

Tests and quizzes are the biggest part of your grade.

There will be 5 or 6 quizzes. No make-ups are allowed on quizzes, but your lowest quiz grade will be dropped.

There will be four tests. If you miss a test, you are allowed **one, and only one**, make-up test per semester. You must contact me within 24 hours of the scheduled test to schedule a make-up. *If you don't contact me within 24 hours you will get a grade of zero for the missed test.*

### **Final Exam**

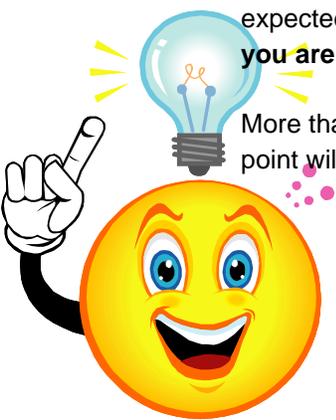
**20%**

The final exam is cumulative.

### **Attendance**

Attendance will be recorded each class. Students are expected to be present and participating in all classes. You are expected to attend every class and you are expected to be engaged in the class, taking notes, doing problems, asking questions. **If you are physically present but not doing any work, you will be marked as absent.**

More than 3 absences is considered excessive. For every absence beyond three, 1 point will be deducted from your final course grade.



**Tentative Topic and Test Schedule  
(and additional problems from textbook)**

Textbook: *Beginning Algebra*, 10th Edition, Lial/Hornsby/McGinnis, Addison Wesley, 2007  
eoo means 'every other odd' numbered problem, for example # 1,5,9,13,17....

Section	Topic	Required HW	Selected Additional Exercises
	<b>Time Inventory</b>		
1.1* pp. 1-10	Fractions Examples: 1 to 9 <b>*Student's responsibility to review</b>	MyMathLab	p. 11 #1-6, 23, 29, 33-49 eoo, 55-71 eoo, 73, 79, 87
1.2 pp. 15-19, 21	Exponents and Order of Operations Examples: 1 to 4 and 7	MyMathLab	p. 21 #1,2, 5-65 odd, 83, 85, 93, 94
1.3 pp. 25-28	Variables, Expressions, and Equations Examples: 1 to 6	MyMathLab	p. 29 #1-6, 7-11 odd, 13-65 eoo, 69-81 odd
	<b>Group Project</b>		<b>Math Quest: Group Map Activity</b>
1.4 pp.31-38	Real Numbers and the Number Line Examples: 1 to 5	MyMathLab	p. 38 #1-7 odd, 9-18, 19, 27, 29-34, 35-75 odd
1.5 pp. 41-48	Adding and Subtracting Using Real Numbers Examples: 1 to 10	MyMathLab	p. 49 #1-6, 7, 13, 19, 25, 29, 33, 39, 41-53 odd, 57, 59, 63, 65, 71, 75, 79, 83, 87, 89, 97, 99, 101, 103, 105, 111, 125
1.6 pp. 53-62	Multiplying and Dividing Real Numbers Examples: 1 to 8	MyMathLab	p. 62 #1-10, 11-73 eoo, 77, 83, 87, 89, 95, 97, 115
p. 66	Summary Exercises on Operations w/ Real Numbers (Important!)	MyMathLab	p. 66 #1-41 odd
5.3 pp. 345-348	Scientific Notation Examples 1-5	MyMathLab	p. 350 #1-31 odd, 33, 37, 43, 47, 71, 73

**Test #1**

1.7 pp. 67-73	Properties of Real Numbers Examples: 1 to 10	MyMathLab	p. 74 #1-9 odd, 11-33 eoo, 35-41 odd, 43, 47, 51, 53, 55-79 odd
1.8 pp. 77-80	Simplifying Expressions Examples: 1 to 4	MyMathLab	p.80 #1-4, 5-31 odd, 33-81 eoo
2.1 pp. 96-100	Addition Property of Equality Examples: 1 to 6	MyMathLab	p. 100 #1-4, 5, 11, 17, 23, 29, 31, 35, 41, 47, 53, 61, 65, 69, 71
2.2 pp. 102-106	Multiplication Property of Equality Examples: 1 to 6	MyMathLab	p. 106 #1-6, 7-21 odd, 23, 29, 35, 37, 41, 45, 51, 53, 55, 59, 65, 69, 71, 73, 75
2.3 pp. 108-114	More on Solving Linear Equations Examples: 1 to 9	MyMathLab	p. 115 #1-4, 5, 9, 13, 17, 21, 23, 25, 27, 29, 31, 35, 37, 39, 41, 47, 49, 51, 55, 59
p. 117	Summary Exercises on Solving Linear Equations	MyMathLab	p. 117 #1-29 odd
2.8 pp. 163-172	Solving Linear Inequalities Examples: 1 to 8	MyMathLab	p. 172 #1-19 odd, 21, 23, 27, 31-39 odd, 45, 49, 53, 55, 57, 59, 61, 65, 67, 81

## Test #2

Appendix B p. 669	Percent Equations Example 5	MyMathLab	p. 670 Set up as <i>equations</i> , then solve. #39-53 odd
2.4 pp. 118-125	Applications of Linear Equations Examples: 1 to 8	MyMathLab	p. 125 #1-4, 5, 9, 11, 13, 17, 19, 23, 25, 27, 33, 35-40, 41, 43, 49, 51, 55
	<b>Group Project</b>		<b>Mill Girls</b>
2.5 pp. 131-135	Formulas and Applications from Geometry Examples: 1 to 4	MyMathLab	p. 137 #1-12, 13, 15, 17, 21, 23, 39-47 odd, 51
2.5 (cont'd) pp. 135-137	Solving for a Specified Variable Examples: 6 to 9	MyMathLab	p. 141 #63, 67, 71, 77, 79, 81, 85
2.7 pp. 150-154	Further Applications of Linear Equations (Investment, "Coin" problems) Examples: 1, 3, 4	MyMathLab	p. 157 #1-7, 11, 25, 27, 29-32 all
2.7 (cont'd) pp. 154-157	Further Applications of Linear Equations (Motion Problems) Examples: 5 to 7	MyMathLab	p.161 #35-39 odd, 45-53 odd

### Test #3

3.1 pp. 190-198	<b>Reading Graphs; Linear Equations in Two Variables</b> Examples: 1 to 7	MyMathLab	p. 199 #1-15, 17, 21, 25, 27, 31-37 odd, 41-49 odd, 50-60, 61-69 odd, 70, 73, 77
3.2 pp. 204- 212	Graphing Linear Equations in Two Variables Examples: 1 to 7	MyMathLab	p. 212 #1, 3, 5, 7-12, 17-31 odd, 33, 37, 41, 45, 49, 51, 33-49 eoo, 51, 63
3.3 pp. 217-224	Slope of a Line Examples: 1 to 6	MyMathLab	p. 224 #1-15 odd, 16-21, 25-55 odd, 57, 61, 65-69 odd
3.4 pp. 230-237	Equations of Lines Examples: 1-7	MyMathLab	p. 237 #1-6, 7-33 odd, 37-51 odd, 63, 65, 67
	<b>Group Project</b>		<b>Slope is All Around Us!</b>
3.5 pp. 243-247	Graphing Linear Inequalities Examples: 1 to 3	MyMathLab	p. 247 #1-10, 11-31 odd

## Test #4

4.1 pp. 274-279	Solve Systems of Linear Equations by Graphing Examples: 1 to 5	MyMathLab	p. 279 #1-11 odd 15, 19, 23, 25, 27, 33, 35, 37, 43, 45
4.2 pp. 284-288	Solve Systems of Linear Equations by Substitution Examples: 1,2,3	MyMathLab	p. 289 #1,2, 3, 7, 11, 15, 17, 19, 23, 27, 31, 37, 41 (ignore calculator part of instructions on 37 and 41)
4.3 pp. 291-295	Solve Systems of Linear Equations by Elimination Examples: 1 to 5	MyMathLab	p. 296 #1-4, 5, 9, 11, 13, 17, 21, 25, 29, 33, 37, 49
	<b>Group Project</b>		<b>Creating Systems of Equations</b>
4.4 pp. 300-305	Applications of Linear Systems Examples: 1-4	MyMathLab	p. 305 #1-7, 9, 10, 11-15 odd, 17, 21, 25, 27, 31, 33, 37, 39

**Test #5 (or this material will be tested on the final exam)**