MA162: Finite mathematics

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September 9, 2013

Schedule:

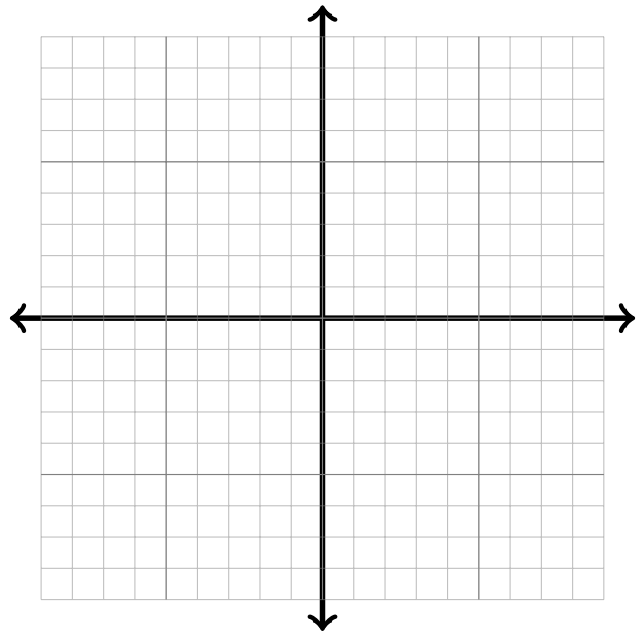
- Second Web Assign assignment (Chapters 1.3 and 1.4) due on Tuesday, Septemeber 10 by 6:00 pm.
- Third Web Assign assignment (Chapter 2.1) due on Friday, Septemeber 13 by 6:00 pm.
- "Miniature exam" over Chapter 1 will be given in recitation on either Tuesday, September 10 or Thursday, September 12.

Today we cover chapter 2.1, an introduction to systems of linear equations.

2 equations, 2 unknowns, Unique Solution

Find the solution to the system of equations:

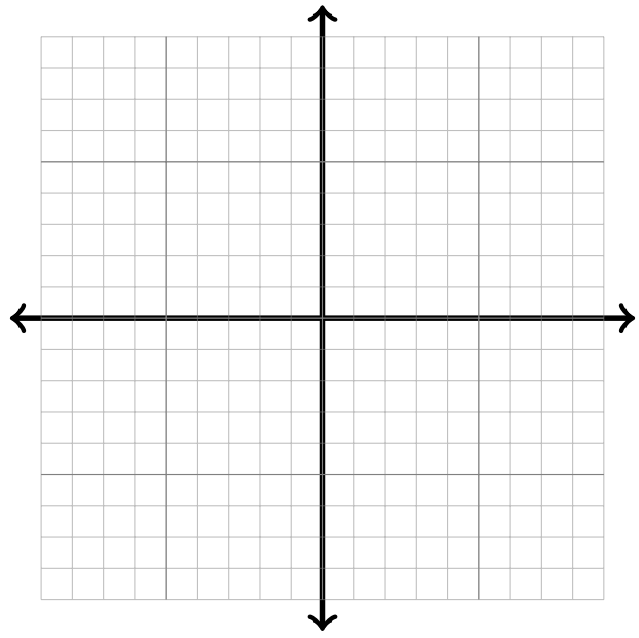
$$\begin{aligned} x &+ 2y &&= 8 \\ 3x &+ 4y &&= 6 \end{aligned}$$



2 equations, 2 unknowns, No Solution

Find the solution to the system of equations:

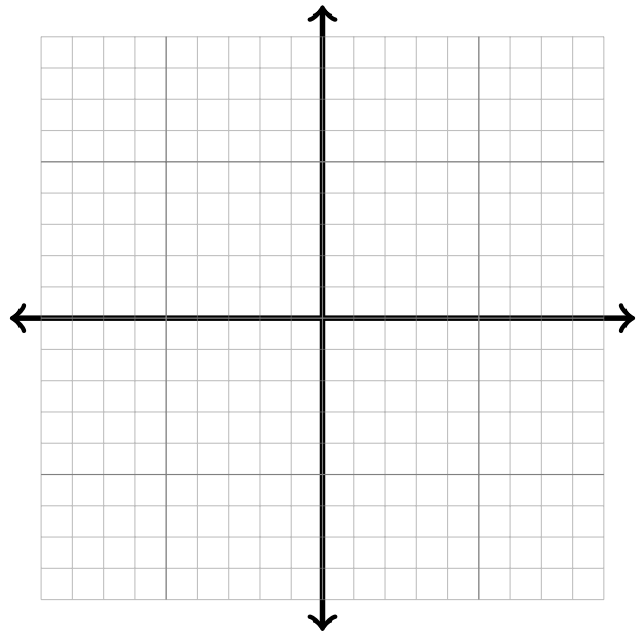
$$\begin{array}{rcrcl} x & - & y & = & 4 \\ -3x & + & 3y & = & 5 \end{array}$$



2 equations, 2 unknowns, Infinitely Many Solutions

Find the solution to the system of equations:

$$\begin{aligned} 3u &+ 6v = 9 \\ 2u &+ 4v = 6 \end{aligned}$$



2 equations, 2 unknowns

Find the value of k for which this system has infinitely many solutions.

$$\begin{aligned} 2x &- y &&= 2 \\ 5x &+ k \cdot y &&= 5 \end{aligned}$$

Then find all solutions corresponding to this value of k.

2 equations, 2 unknowns

Find the value of k for which this system has no solutions.

$$\begin{aligned} 3x &- 2y &&= 3 \\ 6x &+ k \cdot y &&= 4 \end{aligned}$$

Communicating Solutions

- The remaining problems in this lesson are story problems.
- For the moment, we only need to "set up" these problems, ie., we only need to worry about turning the "words" into "math."
- We will "solve" these problems later in chapter 2, as we develop systematic techniques for solving sytems of linear equations.
- You must clearly state the names of your variables, units of measure, etc. On exams and recitaiton quizzes, you will lose points if you do not clearly communicate your solutions!

Tan, Chapter 2.1, Exercise 20 I

Michael Perez has a total of \$2000 on deposit with two savings institutions. One pays interest at the rate of 6%/year, whereas the other pays interest at the rate of 8%/year. If Michael earned a total of \$144 in interest during a single year, how much does he have on deposit in each institution?

Tan, Chapter 2.1, Exercise 27 I

Lawnco produces three grades of commercial fertilizers. A 100-lb bag of grade A fertilizer contains 18 lb of nitrogen, 4 lb of phosphate, and 5 lb of potassium. A 100-lb bag of grade B fertilizer contains 20 lb of nitrogen, 4 lb of phosphate, and 4 lb of potassium. A 100-lb bag of fertilizer C contains 24 lb of nitrogen, 3 lb of phosphate, and 6 lb of potassium. How many 100-lb bags of each of the three grades of fertilizers should Lawnco produce if 26,400 lb of nitrogen, 4900 lb of phosphate, and 6200 lb of potassium are available and all the nutrients are used?

Tan, Chapter 2.1, Exercise 29 I

The management of Hartman Rent-A-Car has allocated \$2.25 million to buy a fleet of new automobiles consisting of compact, intermediate-size, and full-size cars. Compacts cost $\$18,000$ each, intermediate-size cars cost $\$27,000$ each, and full-size cars cost $\$36,000$ each. If Hartman purchases twice as many compacts as intermediate-size cars and the total number of cars to be purchased is 100, determine how many cars of each type will be purchased. (Assume that the entire budget will be used.)