Sections 3.1 through 3.3 – Solving Systems of Equations

Goals:
1. To solve systems of equations graphically.
2. To solve systems of equations algebraically.
3. To solve systems of equations using technology.
4. To solve systems of inequalities.

- Solving systems Graphically
  - Types
    - ______________ and ______________
    - ______________ and ______________
    - ______________

- Examples
  1. \(x + y = 5\)
     \(3x - 2y = 20\)
  2. \(y = -3x + 5\)
     \(9x + 3y = 15\)

HW p. 139 – 3-12 all, 25

- Algebraically
  - Elimination
    1. \(x + y = 5\)
     \(3x - 2y = 20\)
    2. \(7x - 4y = 17\)
     \(3x + 5y = 14\)

  - Substitution
    1. \(y = -3x + 5\)
     \(9x + 3y = 15\)
    2. \(x + y = 5\)
     \(3x - 2y = 20\)

HW. p. 146 – 1-13 all, 64
• Technology
  1. \( x + y = 5 \)
  2. \( y = -3x + 5 \)
  3. \( 3x - 2y = 20 \)
  4. \( 9x + 3y = 15 \)

HW. p. 139 – 38-41 all

• Inequalities
  1. \( x + y \leq 5 \)
  2. \( y < -3x + 5 \)
  3. \( 3x - 2y \leq 20 \)
  4. \( 9x + 3y > 15 \)

2. \( 2x + 3y \geq 6 \)

2. \( 3x - 2y \geq -4 \)

5. \( 5x + y \leq 15 \)

HW. p. 154 -1-6 all, 9, 23, 27, 28, 43
Section 3.4 – Linear Programming

Goals:
1. To find the maximum and minimum values of a function over a region using linear programming techniques.

Linear Programming Technique
1. Ask yourself, what _____ things do I need to know to answer the question?
2. Make a ________ of items given.
3. Write your maximum or minimum function –
4. Write your _________________
5. Graph the ______________ – should be left with a ________________ ___________.
6. Find the ____________ of the region –
7. Plug in vertices into _____________________ to find the maximum and minimum value

Examples
1. Graph the following constraints. Then find the maximum and minimum values of the function \( f(x, y) = 3x - 2y \).
   \[ \begin{align*}
   x & \leq 5 \\
   y & \leq 4 \\
   x + y & \geq 2
   \end{align*} \]

2. A landscaping company has crews who mow lawns and prune shrubbery. The company schedules 1 hour for mowing jobs and 3 hours for pruning jobs. Each crew is scheduled for no more than 2 pruning jobs per day. Each crew’s schedule is set up for a maximum of 9 hours per day. On the average, the charge for mowing a lawn is $40 and the charge for pruning shrubbery is $120. Find a combination of mowing lawns and pruning shrubs that will maximize the income the company receives per day from one of its crews.

   Profit Function: 
   Constraints:
   a. 
   b. 
   c. 
   d. 

3. A landscaping company has crews who rake leaves and mulch. The company schedules 2 hours for mulching jobs and 4 hours for raking jobs. Each crew is scheduled for no more than 2 raking jobs per day. Each crew’s schedule is set up for a maximum of 8 hours per day. On the average, the charge for raking a lawn is $50 and the charge for mulching is $30. Find a combination of raking leaves and mulching that will maximize the income the company receives per day from one of its crews.

   Profit Function: 
   Constraints:
   a. 
   b. 
   c. 
   d. 

Homework: p. 163 – 1-6 plus Worksheet
Section 3.5 – Solving Systems Equations in Three Variables

Goals:
1. To solve a system of equations with three variables.

A. Method:
   1. Add _______ and _______ equations to _______ one variable. –  the result is where the two _______ intersect (a _______ )
   2. Add _______ and _______ equations to _______ the one variable you eliminated in the previous steps.
   3. Take the two _______ equations ( _______ ) you found and solve for one of the variables, by adding the two equations together.
   4. Now that you found one variable, back _______ to find the ordered _______.

B. Note: systems of three equations can have a _______ solution ( _______ ), _______ of solutions ( _______ ), or _______ solution. – see pictures on page 138

C. Examples

   \[5x + 3y + 2z = 2\]
   1. \[2x + y - z = 5\]
      \[x + 4y + 2z = 16\]

2. There are 49,000 seats in a sports stadium. Tickets for the seats in the upper level sell for $25, the ones in the middle level cost $30, and the ones in the bottom level are $35 each. The number of seats in the middle and bottom levels together equals the number of seats in the upper level. When all of the seats are sold for an event, the total revenue is $1,419,500. How many seats are there in each level?

Homework: p. 171 – 1-7 all, 22