

24 problems and 6 questions = 30 points

NO LATE PASSES CAN BE USED ON THIS ASSIGNMENT
 Review Guidelines for Chapter 3 Systems of Linear Equations and Inequalities

- In each section, answer the questions in complete sentences and solve each problem.
- Neatly and clearly show all the major steps in leading to the solution.
- Be prepared to present any of these points to the class if called on to do so.
- Do all work and writing on a separate sheet of graph paper.
- Graphs should be legible and done with a straight edge, and clearly labeled with the scale and appropriate units if applicable

3.1 Solving Linear Systems by Graphing

- What is system of linear equations?
- What is a solution to a system of linear equations?

Graph the linear systems and estimate the solutions. Then check the solution algebraically.

(3) $x + 2y = 3$
 $-7x + 3y = -21$

(4) $2x - 3y = 2$
 $-5x + 2y = -16$

(5) $3x - y = -8$
 $-2x + 5y = 1$

Break-Even Analysis

(6) You purchase a skateboard shop for \$110,000. You estimate that monthly costs will be \$3800. The monthly revenue is expected to be \$5600.

- Let R represent the revenue you bring in during the first t months. Write a linear model for R .
- Let C represent your costs, including the purchase price, during the first t months. Write a linear model for C .
- Graph the revenue and cost equations on the same coordinate plane.
- How many months will it take until revenue and costs are equal (the "break-even point")?

3.2 Solving Linear Systems Algebraically

- What are the two different methods used to solve linear systems algebraically
- Explain what you should look for to determine the best method for a particular system.

Solve the systems using any algebraic method. Be sure to show every step.

(9) $-2x + 3y = 8$
 $x - 5y = -4$

(10) $6x + y = 0$
 $15x + 2y = 9$

(11) $6x - 3y = 1$
 $4x - 2y = 7$

(12) $4x - 16y = 4$
 $-3x + 12y = -3$

(13) **Vacation Trip** You and a friend share the driving on a 280 mile trip. Your average speed is 58 miles per hour. Your friend's average speed is 53 miles per hour. You drive one hour longer than your friend. How many hours did each of you drive? Use the following verbal model.

Your time = Friend's time + 1 hour

Your speed · Your time + Friend's speed · Friend's time = Total distance

3.3 Graphing and Solving Systems of Linear Inequalities

Graph the system of linear inequalities.

(14) $y \geq 0$
 $x < 5$

(15) $x + y < 3$
 $2x - y > 5$

(16) $y \leq 5$
 $x > -3$
 $y \leq 2x - 2$

(17) $y \geq 3x - 4$
 $y \leq -\frac{1}{2}x + 3$
 $x > -2$

(18) **Distance Traveled** You are taking a trip with your family. You are going to share driving time with your dad. You are only allowed to drive for at most two hours at one time. The speed limit on the highway on which you are traveling is 65 miles per hour.

- Write a system of inequalities that describes the number of hours and miles you might possibly drive.
- Is it possible for you to have driven 200 miles?

3.4 Linear Programming

(19) Explain how linear programming might be useful in a business.

Find the minimum and maximum values of the objective function subject to the given constraints.

(20) Objective Function:

$$C = 2x + 4y$$

Constraints:

$$x \leq 3$$

$$x + y \geq 3$$

$$2x - 3y \geq -9$$

(21)

Objective Function:

$$C = 4x - 3y$$

Constraints:

$$x \geq 0$$

$$x \leq 5$$

$$y \geq 0$$

$$2x - 5y \geq -15$$

(22) **Bakery** A bakery is making whole-wheat bread and apple bran muffins. For each batch of bread they make \$35 profit. For each batch of muffins they make \$10 profit. The bread takes 4 hours to prepare and 1 hour to bake. The muffins take 0.5 hour to prepare and 0.5 hour to bake. The maximum preparation time available is 16 hours. The maximum baking time available is 10 hours. How many batches of bread and muffins should be made to maximize profits?

3.5 Graphing Linear Equations in Three Variables

(23) What is the form of a linear equation in three variables?

Plot the ordered triple in a three-dimensional coordinate system.

(24) $(3, 5, 2)$

Sketch the graph of the equation. Label the points where the graph crosses the x , y , and z -axes.

(25) $x + 2y + z = 4$

Write the linear equation as a function of x and y . Then evaluate the function for the given values.

(26) $4x + y + z = 5; f(1, 5)$ (27) $3x + 2y + z = 3; f(0, z)$

(28) **Yearbook Advertisements** The yearbook club's bank account has \$200 remaining from last year's advertising campaign. You are now trying to sell advertisements to local businesses for this year's yearbook. A quarter page ad costs \$35. A half page ad costs \$60. Write an equation for the total amount of money you may spend as a function of the number of quarter and half page ads that you sell. Evaluate the model if you sell 20 quarter page ads and 10 half page ads.

3.6 Solving Systems of Linear Equations in Three Variables

(29) $x - y + 2z = 4$

$$x - 3z = 1$$

$$2y - z = -15$$

(30) $x + y - z = 6$

$$2y - 3z = 4$$

$$-y + 2z = -1$$