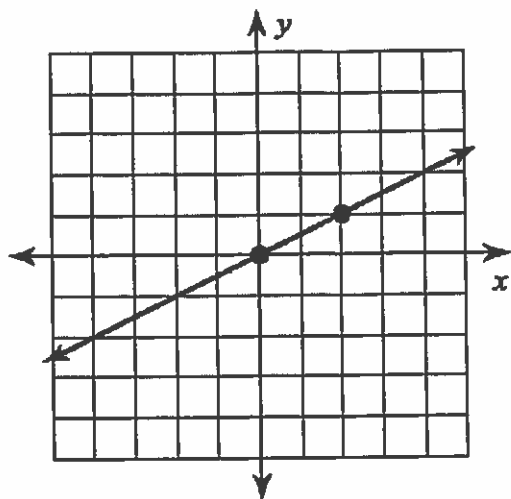


Trigonometry-Linear Review Assignment

Name _____

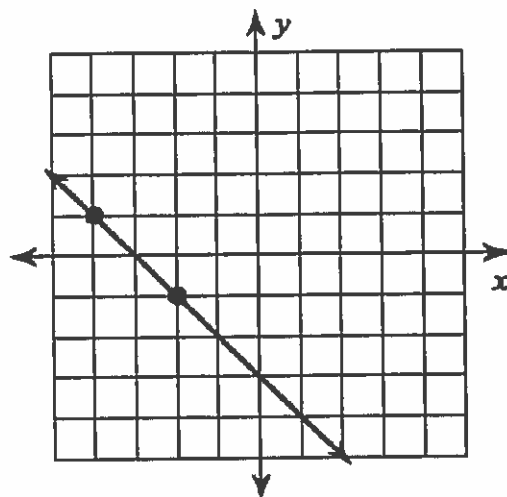
I. Find the slope of each line:

1.



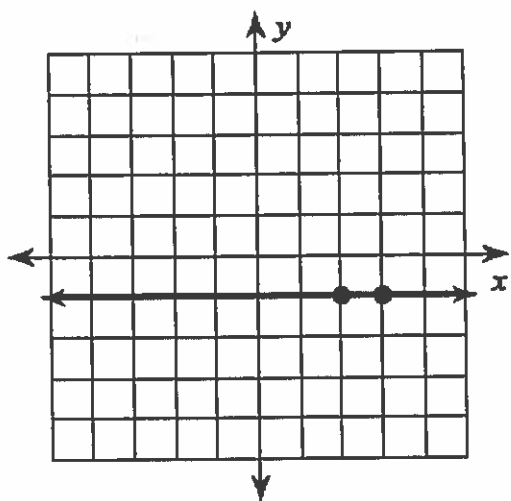
Slope= _____

2.



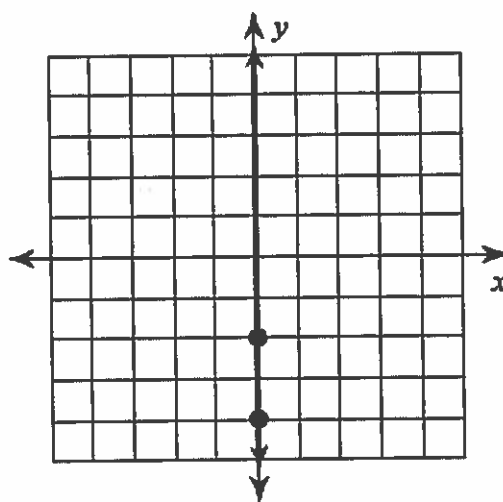
Slope= _____

3.



Slope= _____

4.



Slope= _____

II. Find the slope of the line between each pair of points:

5. $(-2, 3)$ and $(3, 5)$

6. $(4, 3)$ and $(4, -2)$

7. $(3,2)$ and $(5,2)$

8. $(-3,-5)$ and $(-4,0)$

III. Find the slope and y-intercept for the following equations:

1. $y = -2x - 5$

2. $2x = 3y - 1$

3. $-5y + 2x = 10$

IV. Find the equation of the line through the following pair of points:

1. $(-2,5)$ and $(1,3)$

2. $(4,2)$ and $(5,2)$

Linear Programming

Choices

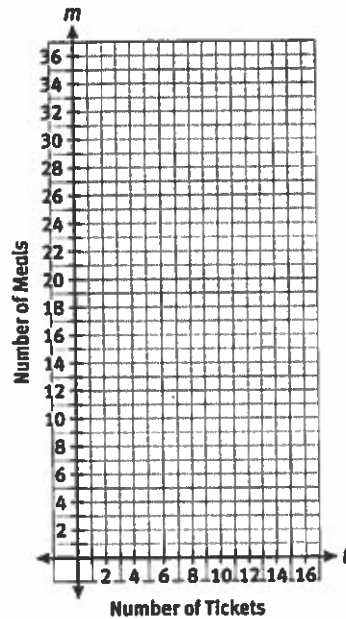
ACTIVITY 1.1

continued

SUGGESTED LEARNING STRATEGIES: Create Representations, Note Taking, Quickwrite

16. To see what the feasible options are, you can use a visual display of the values on a graph.

a. Graph your inequality from Item 13 on the grid below.



b. What is the boundary line of the graph?

c. Which half-plane is shaded? How did you decide?

d. Write your response for each item as points in the form (t, m) .

• Item 14

• Item 15

e. Are both those points in the shaded region of your graph? Explain.

My Notes

MATH TIP

Recall how to graph linear inequalities. First, graph the corresponding linear equation. Then choose a test point not on the line to determine which half-plane contains the set of solutions to the inequality. Finally, shade the half-plane that contains the solution set.

My Notes

MATH TERMS

Constraints are the conditions or inequalities that limit a situation.

SUGGESTED LEARNING STRATEGIES: Activating Prior Knowledge, Create Representations

17. Roy realized that some other conditions or **constraints** apply. Write an inequality for each constraint described below.

a. Roy eats lunch and dinner the first day. On the remaining four days, Roy eats at least one meal each day, but he never eats more than three meals each day.

b. There are only 10 performances playing that Roy actually wants to see while he is in New York City, but he may not be able to attend all of them.

c. Roy wants the number of meals that he eats to be no more than twice the number of performances that he attends.

18. You can use a graph to organize all the constraints on Roy's trip to New York City.

a. List the inequalities you found in Items 13 and 17.

b. Graph the inequalities from Item 17 on the grid in Item 16, which already shows the graph of the inequality from Item 13.

Linear Programming

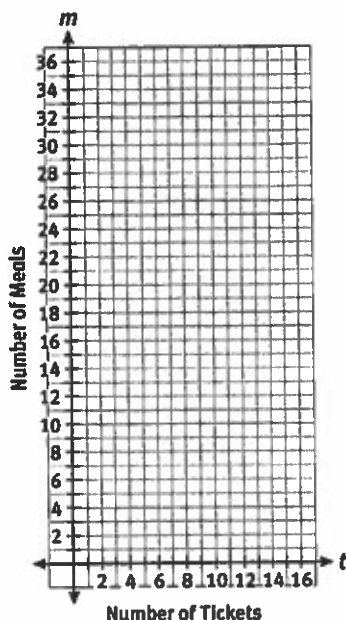
Choices

ACTIVITY 1.1

continued

SUGGESTED LEARNING STRATEGIES: Interactive Word Wall, Quickwrite, Discussion Group

19. There is one region on the graph in Item 16 that contains the set of ordered pairs that are possible solutions to all the constraints on Roy's trip. Label this **feasible region** R on the graph. Explain how you determined this region.



20. By looking at your graph, identify two ordered pairs that fall within the feasible region and then confirm that they satisfy the inequalities listed in Item 18.

a. First ordered pair (t, m) :

b. Second ordered pair (t, m) :

21. Label the point $(6, 10)$ on the grid in Item 16.

a. Interpret the meaning of this point.

b. Is this ordered pair in the feasible region? Explain.

My Notes

ACADEMIC VOCABULARY

The region of all possible solutions is called the **feasible region**. If the feasible region formed by the intersection of a system of inequalities is closed, it is called a **polygonal region**.

ACTIVITY 1.1

continued

Linear Programming

Choices

My Notes

WRITING MATH

Since E is uniquely determined by two variables, you write the notation $E(t, m)$, where E is the name of the function defined in terms of t and m .

MATH TERMS

An **objective function** is in the form

$$F(x, y) = Ax + By.$$

A **linear programming problem** finds the maximum or minimum value of an objective function that has constraints on the values of x and y .

SUGGESTED LEARNING STRATEGIES: Interactive Word Wall, Close Reading, Create Representations, Discussion Group

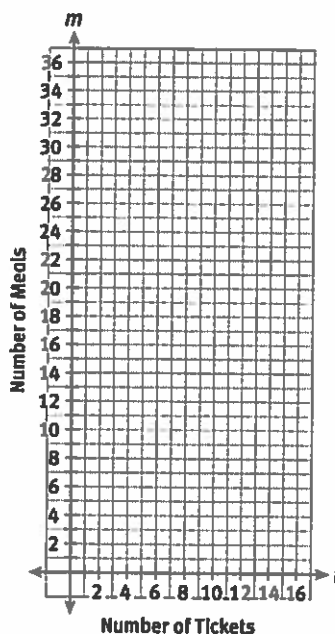
22. If Roy uses his prize money to purchase 6 tickets and eat 10 meals, how much money will he have left over for other expenses? Show your work.

Roy's hometown newspaper offered to pay Roy to write reviews during his trip. Roy will receive \$30 for each performance that he reviews, and \$15 for each meal review. Roy has decided to write about all the performances he attends and all the meals he eats.

23. Write an objective function E in terms of t and m . This function will give the amount of money E that Roy would earn after reviewing t performances and m meals.

24. You can use a graph to see how the objective function relates to the feasible region when finding the maximum or minimum.

- a. Copy *only* the feasible region R from your graph in Item 16 onto the grid below. Shade the feasible region.



SUGGESTED LEARNING STRATEGIES: Create Representations, Look for a Pattern

My Notes

24. (continued)

b. On the grid in Part (a), graph these objective functions for different values of $E(t, m)$, amount of earnings.

- $E(t, m) = 165$, or \$165 earnings: $30t + 15m = 165$
- $E(t, m) = 255$, or \$255 earnings: $30t + 15m = 255$
- $E(t, m) = 375$, or \$375 earnings: $30t + 15m = 375$
- $E(t, m) = 510$, or \$510 earnings: $30t + 15m = 510$

c. What do you notice about the graphs of the lines?

d. Which graphs intersect the feasible region?

e. How do the graphs change as the value of E increases?

f. Suppose more lines for different values of E are graphed, moving outward from $(0, 0)$. Where do you think these lines will last touch the feasible region?

g. Where do you think the maximum and minimum values of the objective function will occur?

ACTIVITY 1.1

continued

Linear Programming**Choices****SUGGESTED LEARNING STRATEGIES:** Notetaking, Group Presentation

My Notes

25. Using what you observed in Item 24, complete this theorem.

Vertex Theorem of Linear Programming

If an _____ has a maximum or minimum solution, then that value occurs at one of the _____ of the _____.

26. Use the theorem above to find the maximum amount that Roy can earn for conducting reviews while on his trip.

- Write the coordinates of the vertices of region R .
- Substitute the coordinates of the vertices into the objective function to find which point gives the maximum. At most, how much can Roy earn?

CHECK YOUR UNDERSTANDING

Write your answers on notebook paper or grid paper. Show your work.

- Find the equation of the line with y -intercept -4 and a slope of $\frac{3}{2}$. Graph the equation.
- Find the equation of the line that passes through the point $(-2, -3)$ and has a slope of 5 . Graph the equation.
- Graph the line $f(x) = 3 - \frac{1}{2}(x - 2)$.
- Graph the inequality $y < -2 + \frac{1}{4}x$.
- Graph these inequalities on the same grid and shade the polygonal region: $y \geq 2$, $x \leq 8$, and $y \leq 2 + \frac{1}{2}x$.
- Using the constraints from Item 5 and the objective function $Z(x, y) = x + 2y$, find the maximum and minimum values and identify the coordinates at which they occur.
- MATHEMATICAL REFLECTION** Describe what the feasible region represents.