Essential Question: How do we solve real-world problems involving linear inequalities?

Do Now:
You receive a gift certificate for $25 to your local movie theater. Matinees are $4.50 each and evening shows are $7.50 each.

      a. Write an inequality that represents the numbers of matinees, m, and evening shows, e, you can attend.

      b. Give one possible combination of the numbers of matinees and evening shows you can attend.

_____

Modeling With Linear Inequalities in Two Variables

1) You have relatives living in both the United States and Mexico. You are given a prepaid phone card worth $50. Calls within the continental United States cost $0.25 per minute and calls to Mexico cost $0.50 per minute.

    a. Write a linear inequality in two variables to represent the number of minutes you can use for calls within the United States (x) and for calls to Mexico (y).

    b. Graph the inequality.
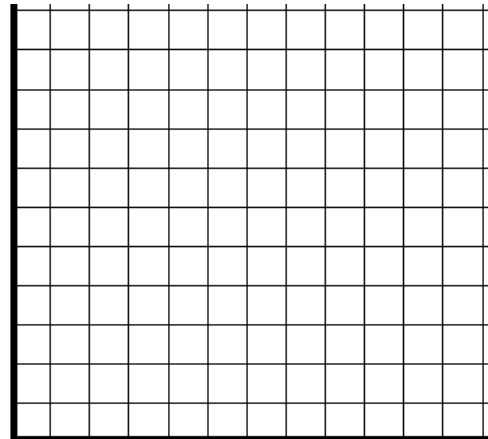
    c. Discuss one possible solution in the context of the real-life situation.

Modeling With Systems Of Linear Inequalities

There are many situations that arise in business and engineering that require <u>systems</u> of linear inequalities. The region in the coordinate plane that solves the system represents all of the possible solutions to the system, so being able to visualize this region can be extremely helpful. It is important to read the problems and understand the quantities involved.

2) Sergio is building a rectangular garden. He wants the length to be at least 30 feet and the perimeter to be no more than 100 feet.

   (a) Write a system of linear inequalities. Let x represent the length of the garden and y represent the width. Graph all possible dimensions of the garden by graphing the system.
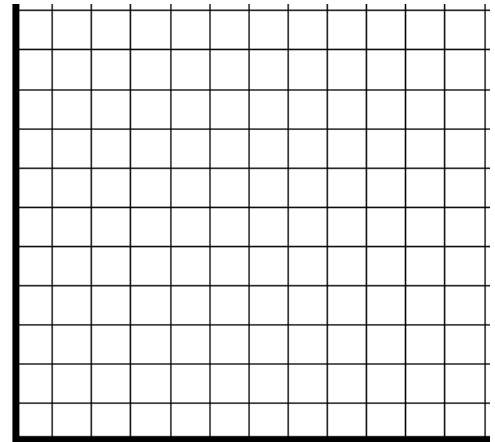
   (b) Is a length of 35 feet and a width of 10 feet a possible combination? How do you know?

   (c) State another set of dimensions possible for the garden.

Summary...

Some solution sets may be restricted to specific quadrants. For example, most linear inequalities representing real-world problem situations have graphs that are restricted to Quadrant _____.

3) Paul works x hours a week at the bagel shop that pays $6 an hour. He has also accepted a job that pays $12 an hour mowing lawns y hours a week. He will work both jobs. Paul wants to earn at least $120 a week, but he must work less than 30 hours a week.

(a) Write a system of inequalities that can be used to represent the situation. Graph the system.
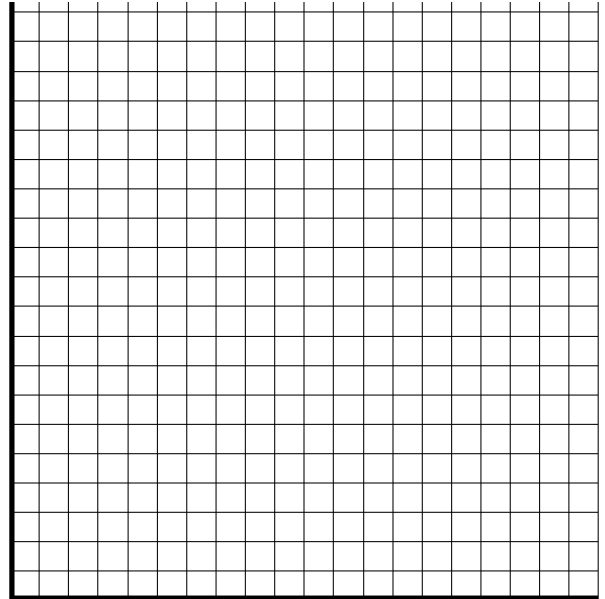
(b) Determine and state one combination of hours that will allow Paul to earn at least $120 per week while working no more than 30 hours.

4) The Royal Crown Players of Roslyn High School are raising money by putting on a production of *The Music Man*. They have only 500 seats in the auditorium that they can use. They are selling student tickets for $5 and non-student tickets for $10. They must sell at least $2000 worth of tickets to cover their expenses.

(a) If x represents the number of student tickets sold and y represents the number of non-student tickets sold, write a system of inequalities that models this situation. Graph the system.
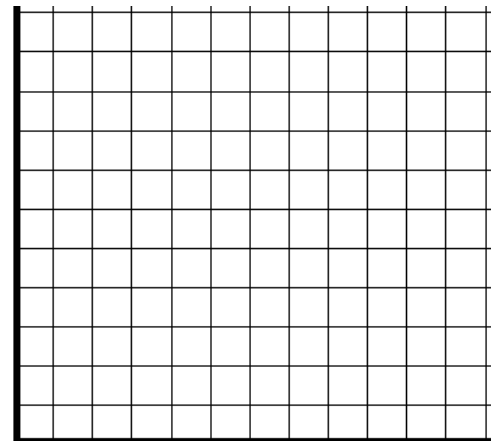
(b) List two possible combinations of student and non-student tickets that can be sold.