

Name _____

Chapter 6 Performance Task

Planning an Exercise Program

As you complete the task, you'll apply several Standards for Mathematical Practice:

- *You'll analyze given information and constraints to write equations that model Ashley's exercise program*
- *You'll find inequalities that describe how the amounts of time Miguel spends on the two machines are related*

Ashley uses the rowing machine and the stair machine at the gym for an exercise program. Her trainer wants her to do an exercise program that meets these two conditions:

1. Ashley will exercise for 40 minutes, dividing her time between the stair machine and the rowing machine
2. Ashley will spend twice as much time on the stair machine as on the rowing machine.

Miguel also uses the stair machine and the rowing machine at the gym for an exercise program. His trainer wants him on an exercise program that meets these three conditions:

1. Miguel will spend at most 60 minutes working out at the gym.
2. Miguel will exercise for at least 30 minutes, dividing his time between the stair machine and the rowing machine.
3. Miguel will spend at least twice as much time on the stair machine as on the rowing machine.

1. Look at the information about the amounts of time Ashley uses the stair machine and rowing machine at the gym.

a) Define two variables to represent the amounts of time Ashley can spend on the two exercise machines.

b) Write a system of two equations that describes the relationships between the amounts of time Ashley spends on the two machines.

c) Solve the system of equations.

d) Interpret the solution of the system.

2. Look at the information about Miguel's exercise program at the gym. Choose from the following inequalities to complete the sentences below. In each inequality, x represents the number of minutes Miguel spends on the stair machine, and y represents the number of minutes Miguel spends on the rowing machine.

$$x + y \leq 60$$

$$2y \leq x$$

$$x - y \geq 30$$

$$x + y \geq 30$$

$$2y \geq x$$

$$y \geq 2x$$

$$x + 2y \geq 30$$

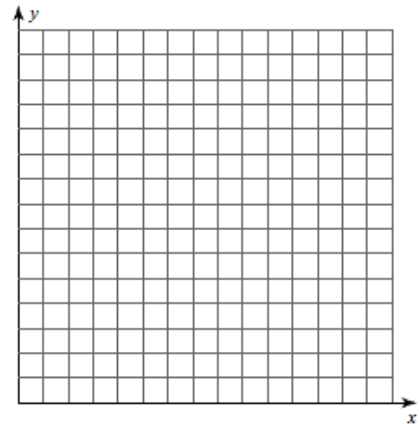
$$x + y \geq 60$$

a) An inequality representing the first condition given by Miguel's trainer is _____.

b) An inequality representing the second condition given by Miguel's trainer is _____.

c) An inequality representing the third condition given by Miguel's trainer is _____.

3. Use the inequalities in #2a-c to solve the system of inequalities and find the maximum number of minutes that Miguel can use the rowing machine. Show all your work and explain each step of your solution.



4. Brittany uses the ski machine and the treadmill at the gym for an exercise program. Her trainer wants her on an exercise program that meets these two conditions:

1. Brittany will exercise for at least 45 minutes and at most 1 hour and 15 minutes, dividing her time between the ski machine and the treadmill.
2. Brittany will spend at least three times as much time on the treadmill as on the ski machine.

a) Write a system of inequalities that models the relationships between the amounts of time Brittany spends on the two machines.

b) Find the minimum number of minutes Brittany can spend on the treadmill.

