

Day 14 – Systems of Inequalities Applications

Name: Key  
Date: \_\_\_\_\_ Block: \_\_\_\_\_

Extra Practice Assignment

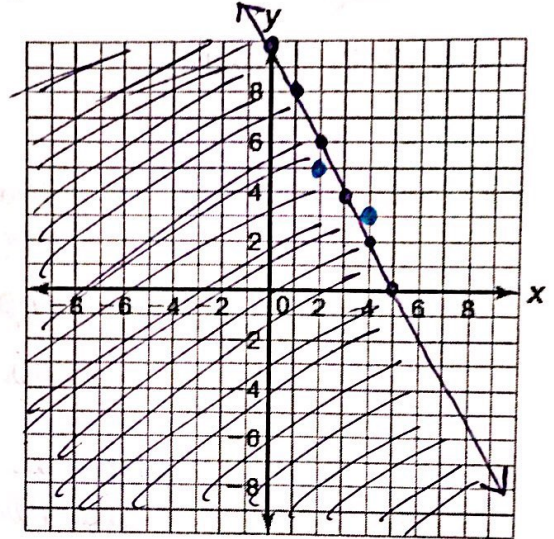
1. Sean has 50 tokens to spend at the school carnival. The Ferris wheel costs 10 tokens and the carousel costs 5 tokens. Answer the following questions:

a. Create an inequality to represent this scenario.

$$10x + 5y \leq 50$$

b. Graph this inequality on the graph.

$$\begin{array}{r} 10x + 5y \leq 50 \\ -10x \quad -10x \\ \hline 5y \leq -10x + 50 \\ \frac{5y}{5} \leq \frac{-10x}{5} + \frac{50}{5} \\ y \leq -2x + 10 \end{array}$$



c. If Sean rides the Ferris wheel 4 times and the carousel 3 times, will he have enough tokens? Explain why algebraically and graphically. (4,3)

Graphically, it falls outside the solution area, so it is not a solution.

Algebraically:

$$\begin{aligned} 10(4) + 5(3) &\stackrel{?}{\leq} 50 \\ 40 + 15 &\leq 50 \\ 55 &\leq 50 \end{aligned}$$

This combo would require 55 tokens, so it is not a solution.

d. If Sean rides the Ferris wheel 2 times and the carousel 5 times, will he have enough tokens? Explain why algebraically and graphically. (2,5)

Graphically, it falls inside the solution area, so it is a solution.

Algebraically:

$$\begin{aligned} 10(2) + 5(5) &\stackrel{?}{\leq} 50 \\ 20 + 25 &\leq 50 \\ 45 &\leq 50 \end{aligned}$$

This combo would require 45 tokens so it is a solution.

e. Calculate the x and y-intercepts and explain what they mean in terms of the problem scenario.

x-int (x, 0)

$$\begin{aligned} 10x + 5(0) &= 50 \\ 10x &= 50 \\ x &= 5 \end{aligned}$$

If you ride the Ferris wheel 5 times, you cannot ride the carousel → you will be out of tokens.

y-int (0, y)

$$\begin{aligned} 10(0) + 5y &= 50 \\ 5y &= 50 \\ y &= 10 \end{aligned}$$

If you ride the carousel 10 times, you cannot ride the Ferris wheel.

2. The maximum capacity for an average passenger elevator is 15 people and 2200 pounds. It is estimated that adults weigh 200 pounds and children under 16 weigh 100 pounds.

a. Define what your variables will represent. Create a system of inequalities to represent this scenario.

$x$ : # of adults

$$200x + 100y \leq 2200$$

$y$ : # of Children

$$x + y \leq 15$$

b. If 7 children and 6 adults get on the elevator, will that combo satisfy the constraints? Explain why or why not.

$$200(6) + 100(7) \leq 2200$$

$$7 + 6 \leq 15$$

$$1200 + 700 \leq 2200$$

$$13 \leq 15$$

$$\underline{1900} \leq 2200$$

This combo is under the 2200 pound limit and under the 15 person limit, so it satisfies the constraints.

c. If 10 adults and 5 children get on the elevator, will that combo satisfy the constraints? Explain why or why not.

$$200(10) + 100(5) \leq 2200$$

$$2000 + 500 \leq 2200$$

$$\underline{2500} \leq 2200$$

This combo goes over the 2200 pound limit so it does not satisfy the pound constraint.

3. Define your variables and create a system of inequalities for each scenario below:

a. Jonah is going to the store to buy candles. Small candles cost \$3.50 and large candles cost \$5.00. He needs to buy at least 20 candles, and he can spend no more than \$80.

$x$ : # of small candles

$$3.50x + 5.00y \leq 80$$

$y$ : # of large candles

$$x + y \geq 20$$

~~b.~~ John is packing books into boxes. Each box can hold either 15 small books or 8 large books. He needs to pack at least 35 boxes and at least 350 books.