

# Day 6 - Systems of Inequalities Applications - Practice

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.

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

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

$$y \leq -2x + 10$$

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

$$10(4) + 5(3) \leq 50$$

$$40 + 15 \leq 50$$

$$55 \leq 50$$

False inequality

Not enough tokens

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

$$10(2) + 5(5) \leq 50$$

$$20 + 25 \leq 50$$

$$45 \leq 50$$

True Inequality

Only used 45 tokens.

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

x-int (5, 0)

y-int (0, 10)

If Sean rides the Ferris wheel 5 times, he will have 0 tokens for the carousel.

If Sean rides the carousel 10 times, he will have 0 tokens for the Ferris wheel.

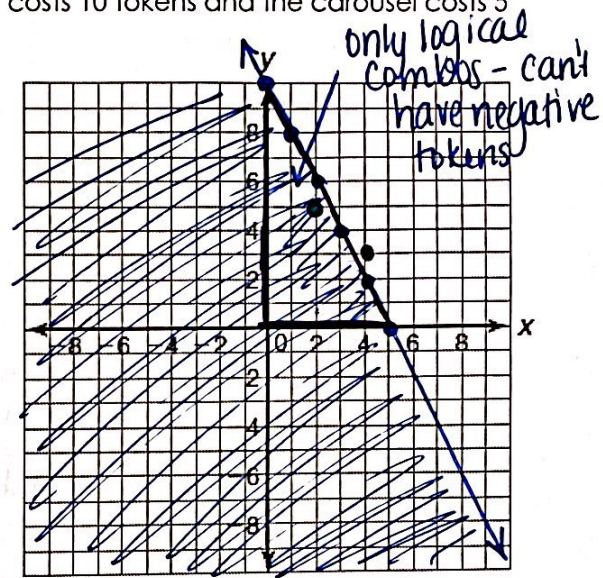
Questions 2 - 4: For each word problem, define your variables and what each equation is going to represent. Then create a system of inequalities to represent it. You do not have to solve.

2. Sarah is selling bracelets and earrings to make money for summer vacation. The bracelets cost \$2 and the earrings cost \$3. She needs to make at least \$60. Sarah hopes she sells more than 25 items.

x: # of bracelets

y: # of earrings

$$\begin{aligned} x + y &> 25 \\ 2x + 3y &\geq 60 \end{aligned}$$



The point is also located outside the shaded region.

The point is located in the shaded region.

3. You can work at most 20 hours next week. You need to earn at least \$92 to cover your weekly expenses. Your dog-walking job pays \$7.50 per hour and your job as a car wash attendant pays \$6 per hour. Write a system of linear inequalities to model the situation.

$x$ : hours at dog walking job  
 $y$ : hours at car wash

$$\begin{aligned}x + y &\leq 20 \\ 7.50x + 6y &\geq 92\end{aligned}$$

4. Marsha is buying plants and soil for her garden. The soil costs \$4 per bag, and the plants cost \$10 each. She wants to buy at least 5 plants and can spend no more than \$100.

$x$ : # of bags of soil  
 $y$ : # of plants

$$\begin{aligned}x + y &\geq 5 \\ 4x + 10y &\leq 100\end{aligned}$$

5. 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  
 $y$ : # of children

$$\begin{aligned}x + y &\leq 15 \\ 200x + 100y &\leq 2200\end{aligned}$$

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

$$\begin{aligned}6 + 7 &\leq 15 \\ 13 &\leq 15 \\ \text{True}\end{aligned}$$

$$\begin{aligned}200(6) + 100(7) &\leq 2200 \\ 1200 + 700 &\leq 2200 \\ 1900 &\leq 2200 \\ \text{True}\end{aligned}$$

This combo is under the 15 person max and 2200 lb max.

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

$$\begin{aligned}10 + 5 &\leq 15 \\ 15 &\leq 15 \\ \text{True}\end{aligned}$$

$$\begin{aligned}200(10) + 100(5) &\leq 2200 \\ 2000 + 500 &\leq 2200 \\ 2500 &\leq 2200 \\ \text{False}\end{aligned}$$

This combo goes over the 2200 pound limit.

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  
 $y$ : # of large candles

$$\begin{aligned}x + y &\geq 20 \\ 3.50x + 5.00y &\leq 80\end{aligned}$$

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.

$$\begin{aligned}x &: \# \text{ of boxes with small books} \\ y &: \# \text{ of boxes with large books}\end{aligned}$$

$$\begin{aligned}x + y &\geq 35 \\ 15x + 8y &\geq 350\end{aligned}$$