



Questions?

5.1.4 Using systems of equations

HW 5-48 to 5-53

5-45

Your math class wants to collect money for a field trip, so it decides to sell two kinds of candy bags. The Chocolate Lovers Bag costs \$4.25 for five chocolate



truffles and two caramel turtle candies. The Combusting Caramel Bag costs \$3.50 for eight caramel turtle candies and two chocolate truffles. How much does each chocolate truffle and caramel turtle candy cost?

Jenny and Ming are selling flower bulbs for a school fundraiser. Customers can buy bags of windflower bulbs and bags of daffodil bulbs. Jenny sold 3 bags of windflower bulbs and 6 bags of daffodil bulbs for a total of \$105. Ming sold 3 bags of windflower bulbs and 4 bags of daffodil bulbs for a total of \$79. Find the cost each of one bag of windflower bulbs and one bag of daffodil bulbs.

The school that Ndiba goes to is selling tickets to a spring musical. On the first day of ticket sales the school sold 1 adult ticket and 4 child tickets for a total of \$56. The school took in \$82 on the second day by selling 1 adult ticket and 6 child tickets. Find the price of an adult ticket and the price of a child ticket.

Solve this system:

$$x^2 + 4x - 33y + 36 = 0$$

$$x - 3y + 4 = 0$$

$$y^2 + 20x - 4y + 55 = 0$$

$$2x + y = -1$$

An airplane flies:

With the wind @ 237 mph

Into the wind @ 195 mph

How fast is it flying?



HOW TALL IS HAROLD? 5-44

Jamal and Dinah were still eating as they came into Algebra 2 class from lunch. Someone had left a book on the floor and they tripped. As they each hit the floor, the food they were carrying went flying across the room directly toward Harold, who was showing off his latest dance moves.

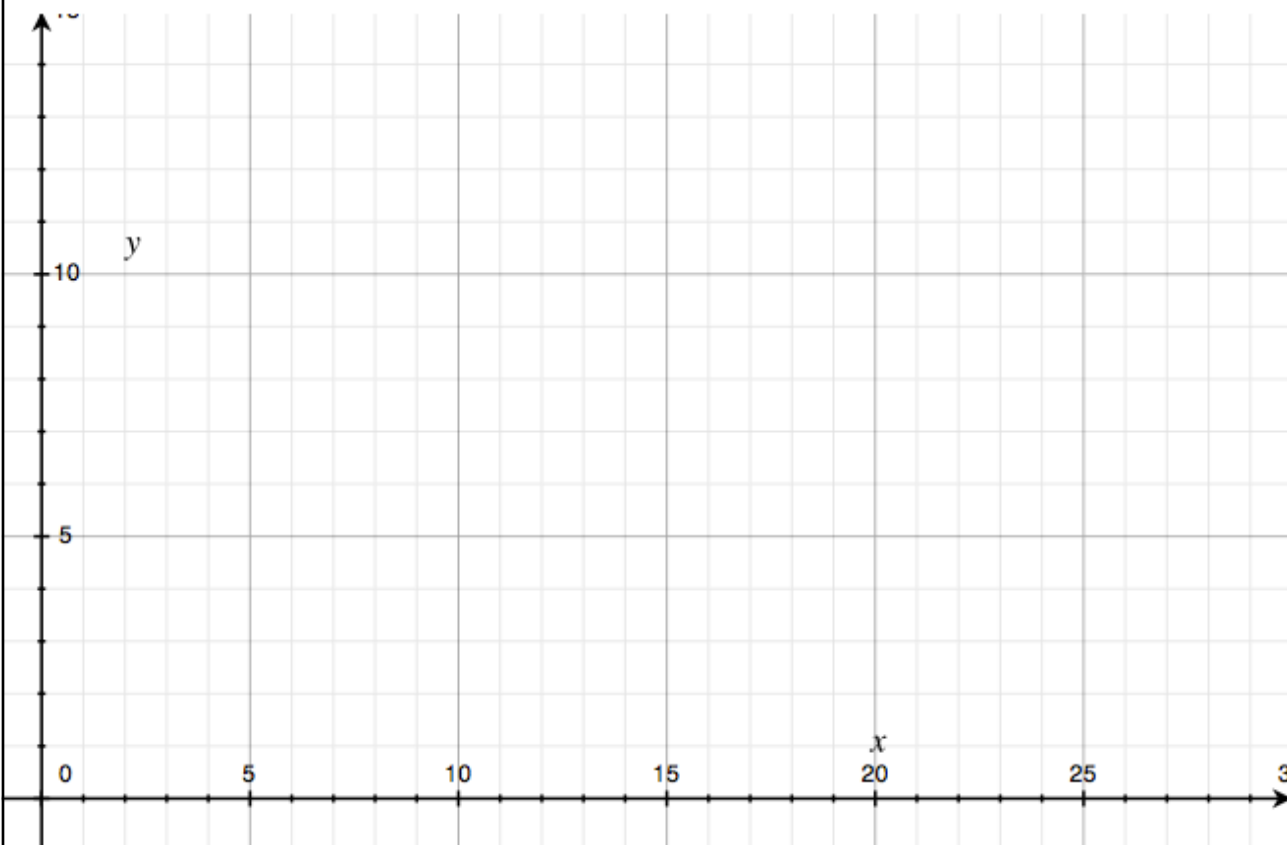
As Jamal and Dinah watched in horror, Jamal's cupcake and Dinah's sandwich splattered Harold right on the top of his head! Jamal's cupcake flew on a path that would have landed on the floor 20 feet away from him if it had not hit Harold. Dinah's sandwich flew on a path that would have landed on the floor 24 feet away from her if it had not hit Harold. Jamal's cupcake got up to 9 feet high, and Dinah's sandwich reached a height of 6 feet, before hitting Harold.



How tall is Harold? Show your solution in as many ways as you can.

5-44

cupcake: 20, 9 and sandwich: 24, 6





5-45

Chocolate Bag: \$4.25 for 5 Tr & 2 Tu

Caramel Bag: \$3.50 for 2 Tr & 8 Tu

How much do Truffles cost? Turtles?

5-46

Lucky you! You are a new college graduate and have already been offered two jobs. Each job involves **exactly** the same tasks, but the salary plans differ, as shown below.

Job A offers a starting salary of \$52,000 per year with an annual increase of \$3,000.

Job B starts at \$36,000 per year with a raise of 11% each year.

- a. Under what conditions would Job A be a better choice? When would Job B be a better choice? Use graphs, tables, and equations to help you **justify** your answer.
- b. How could you change this problem slightly so that Job B is always a better choice? How could you change it so that Job A is always better? If it is not possible for Job A or Job B always to be a better choice, **explain** why not.

5-54

Solve this system.

$$y = 2x^2 + 5x - 3$$

$$y = x^2 + 4x + 3$$

5-54

resource page

Solve this system.

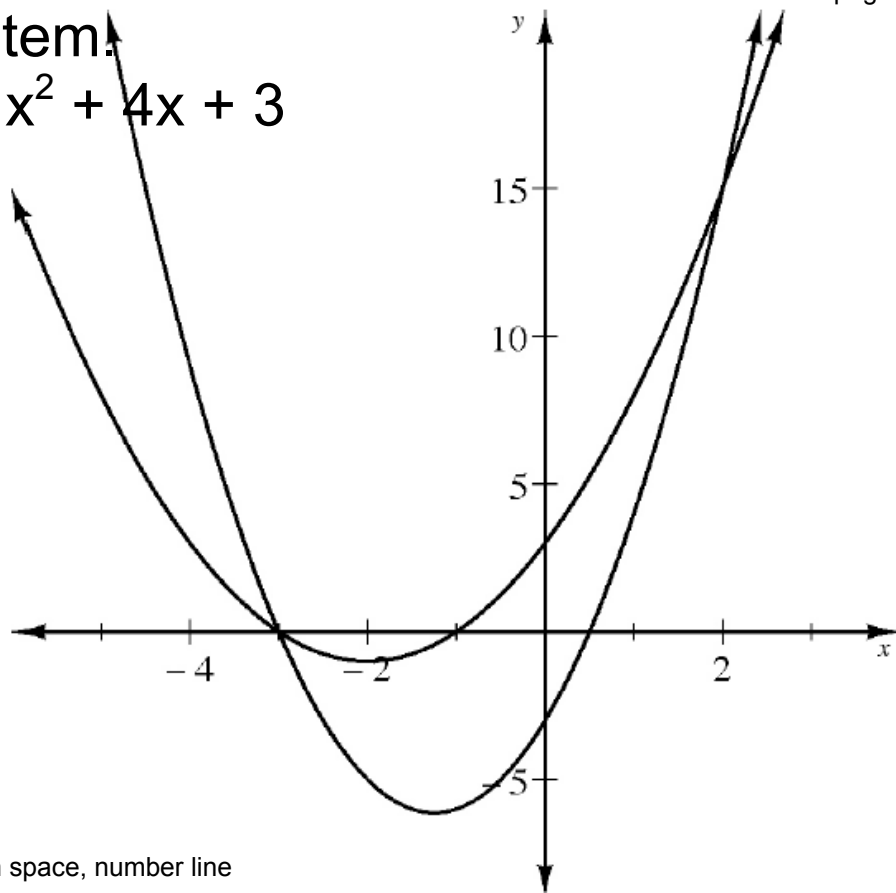
$$2x^2 + 5x - 3 = x^2 + 4x + 3$$

boundaries, regions, solution space, number line

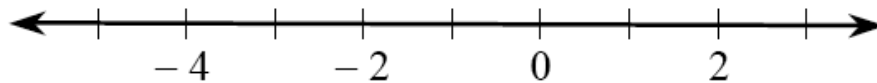
5-54

Solve this system:
 $2x^2 + 5x - 3 = x^2 + 4x + 3$

resource page



boundaries, regions, solution space, number line



Solve these equalities

$$-3x - 8 = 7$$

$$x^2 + x - 8 = 4$$

5-58

Solve graphically

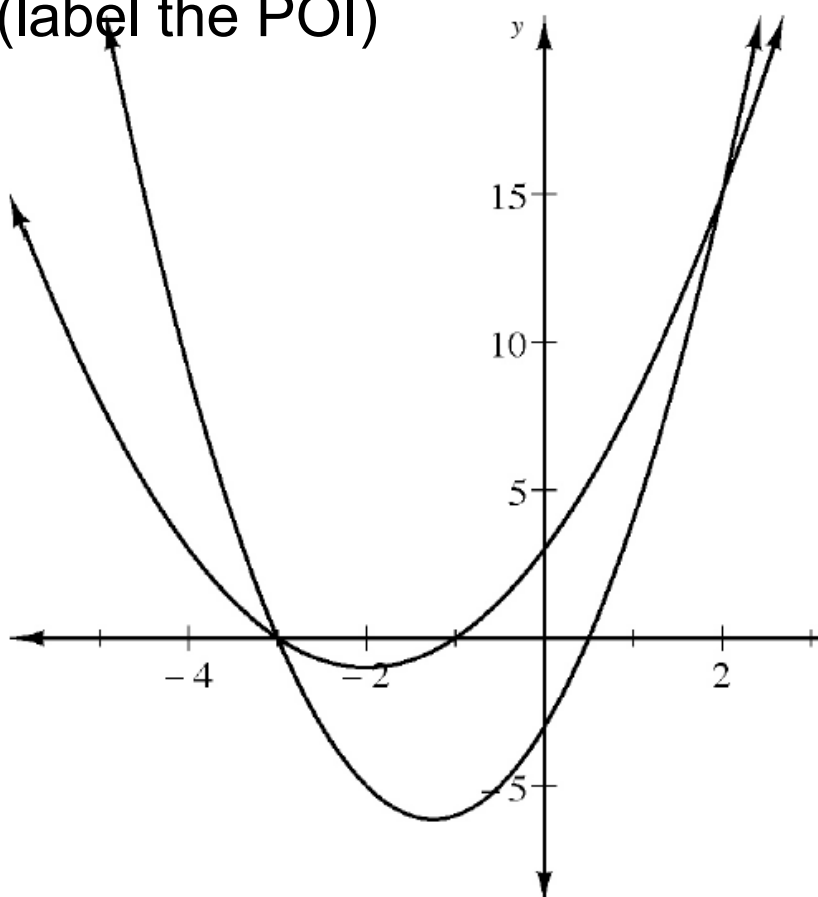
$$4|x + 1| - 2 > 6$$

5-59

Solve graphically (label the POI)

$$y \geq 2x^2 + 5x - 3$$

$$y < x^2 + 4x + 3$$



Factor:

$$x^2 + 7x + 12$$

$$x^2 - x - 12$$

$$x^2 - 7x + 12$$

$$x^2 + x - 12$$

Simplify thru factoring:

$$\frac{x^2 + 6x + 9}{x + 3}$$

$$\frac{x^2 - 9}{x + 3}$$

$$\frac{x^2 - 3x - 10}{x^2 - 25}$$

Solve:

$$x^2 - 5x - 3 = 7x - 30$$

Solve:

$$\frac{1}{2}|x+5|-2=5x$$

See how far you can get solving this system:

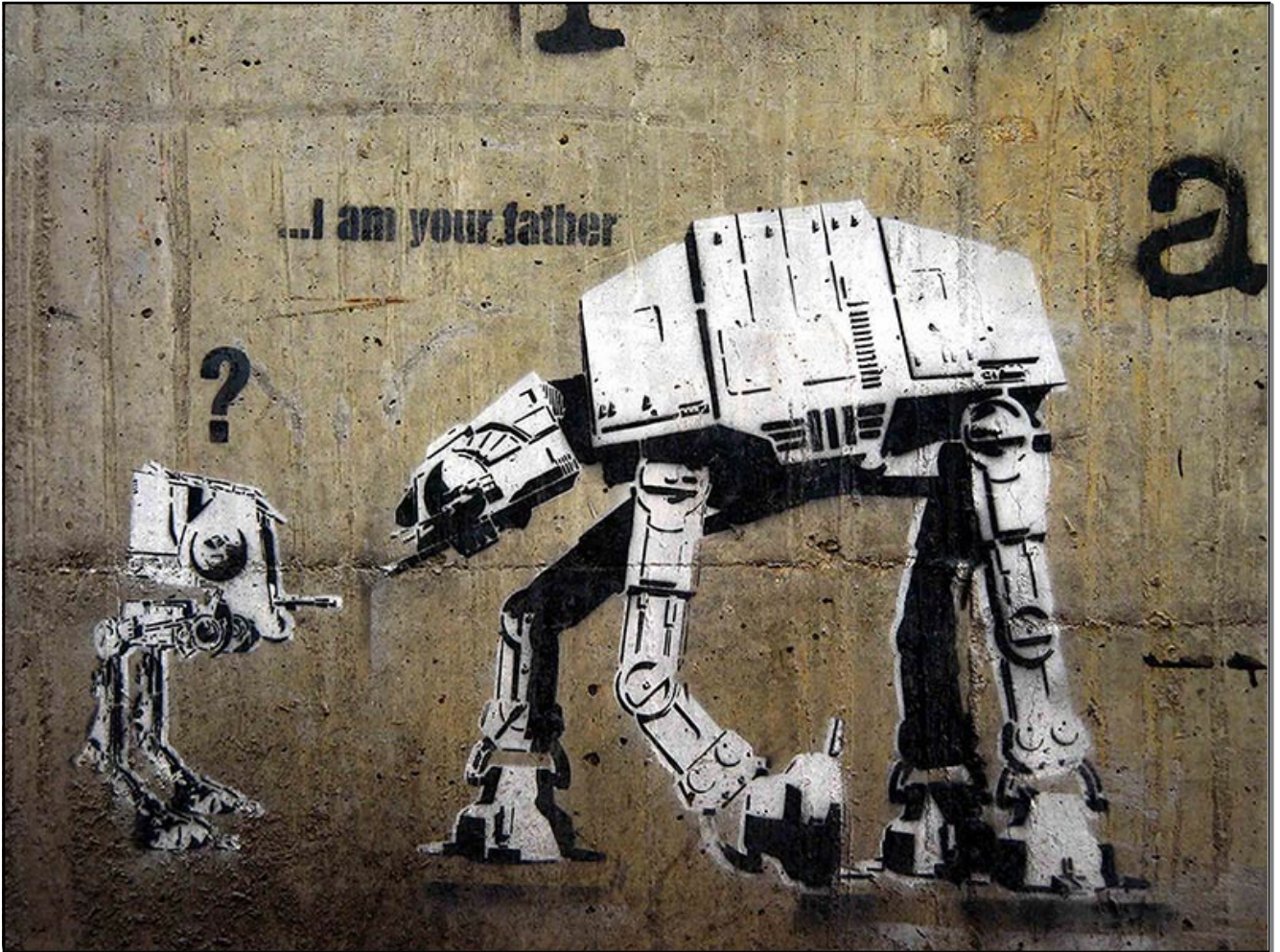
$$x^2 + y^2 = 10$$

$$y = \frac{5}{x}$$

Solve:

$$2 = x^3 + 2x^2 - 5x - 6$$

¿Preguntas? 質問は？ أسئلة؟



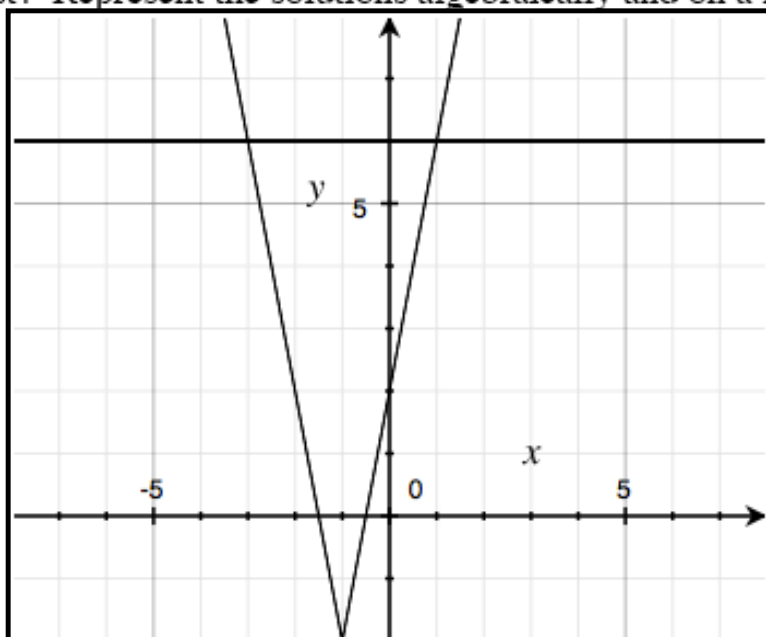
5.2.1 Solving Inequalities

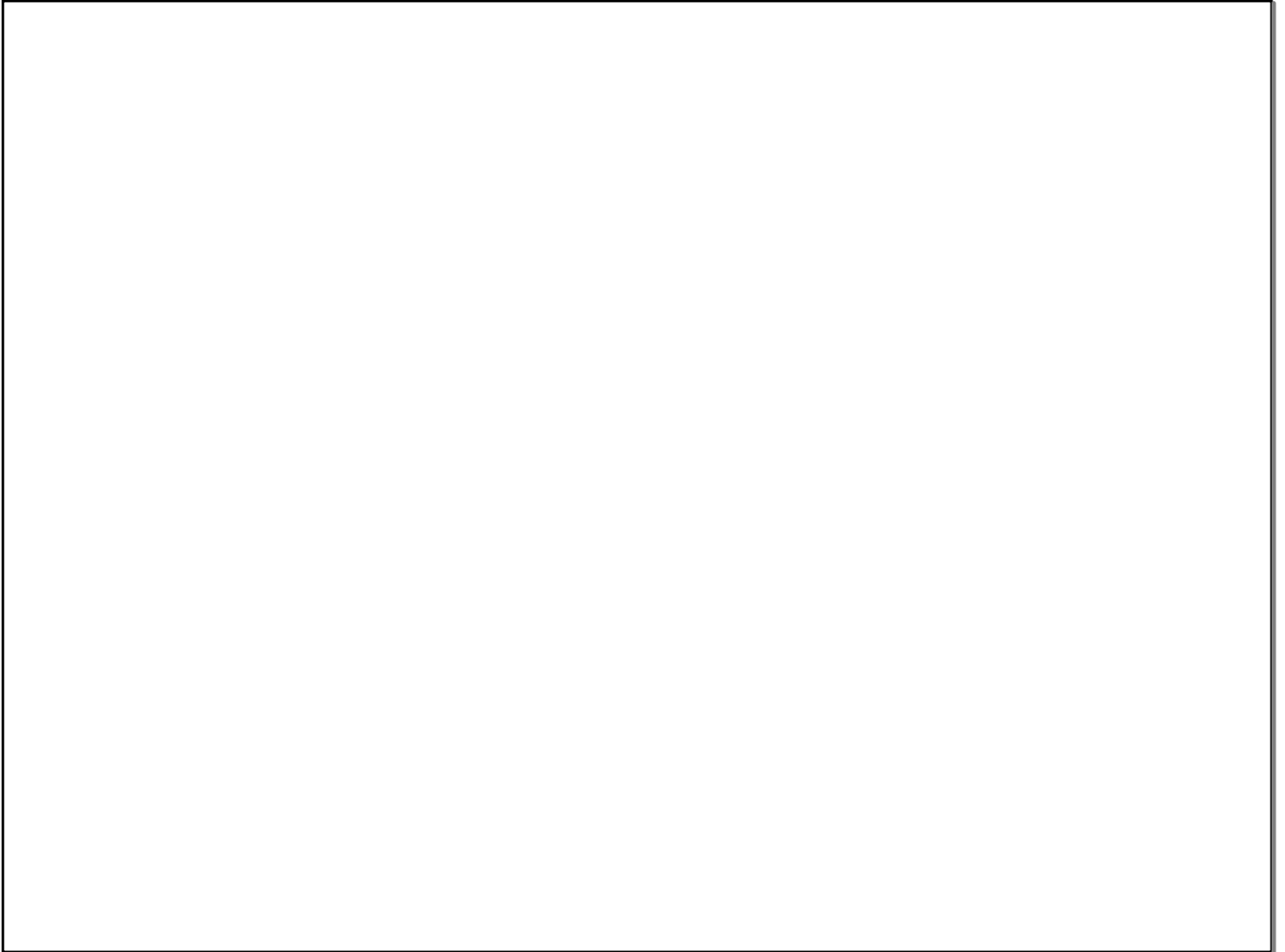
HW 5-62, 63, 67, 68, 69

5-56

Consider the inequality $4|x+1|-2 > 6$.

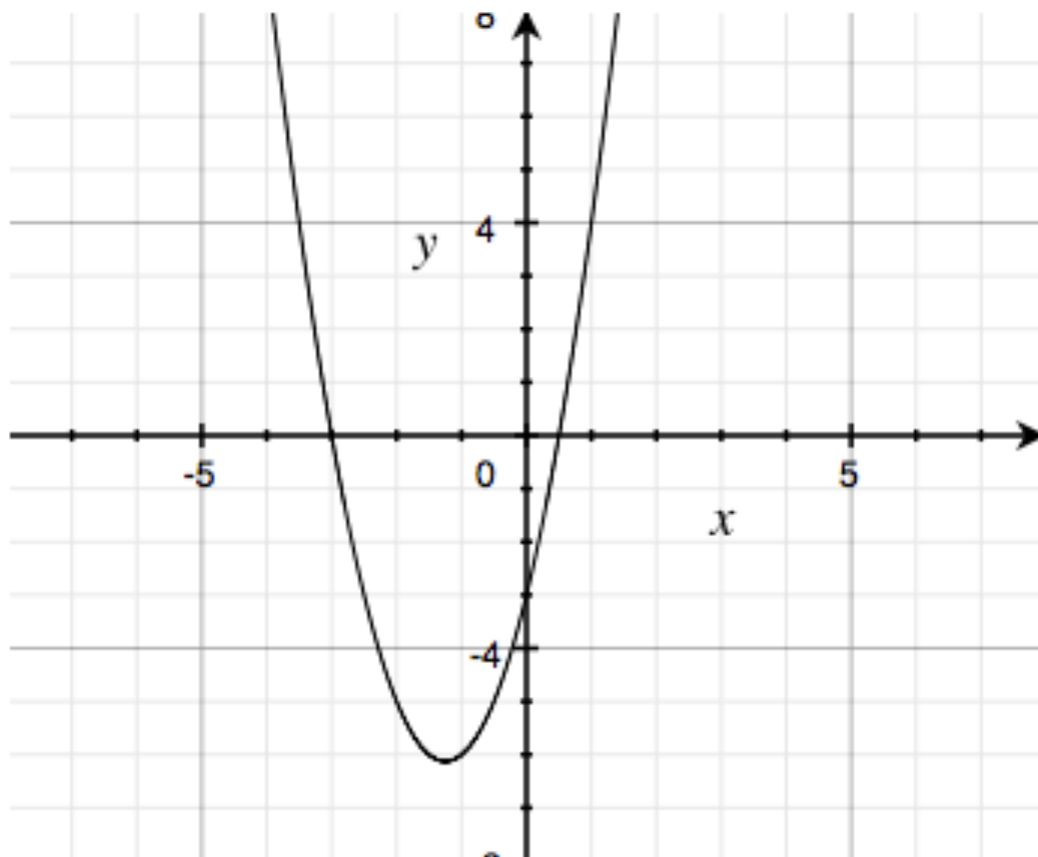
- How many boundary points are there? What are they? Should they be marked with filled or unfilled circles? Make the appropriate markings on a number line.
- Which portions of the number line contain the solutions? How many regions do you need to test? Represent the solutions algebraically and on a number line.





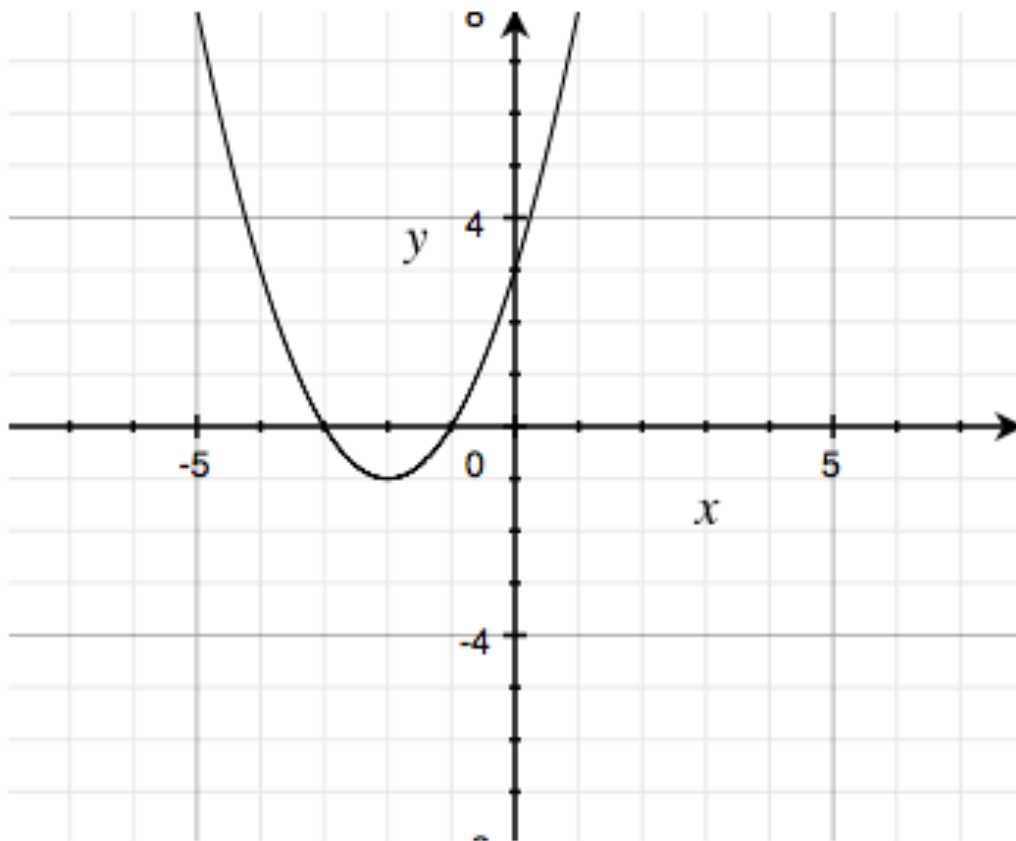
Solve: $y \geq 2x^2 + 5x - 3$

Solve: $y \geq 2x^2 + 5x - 3$



Solve $y < x^2 + 4x + 3$

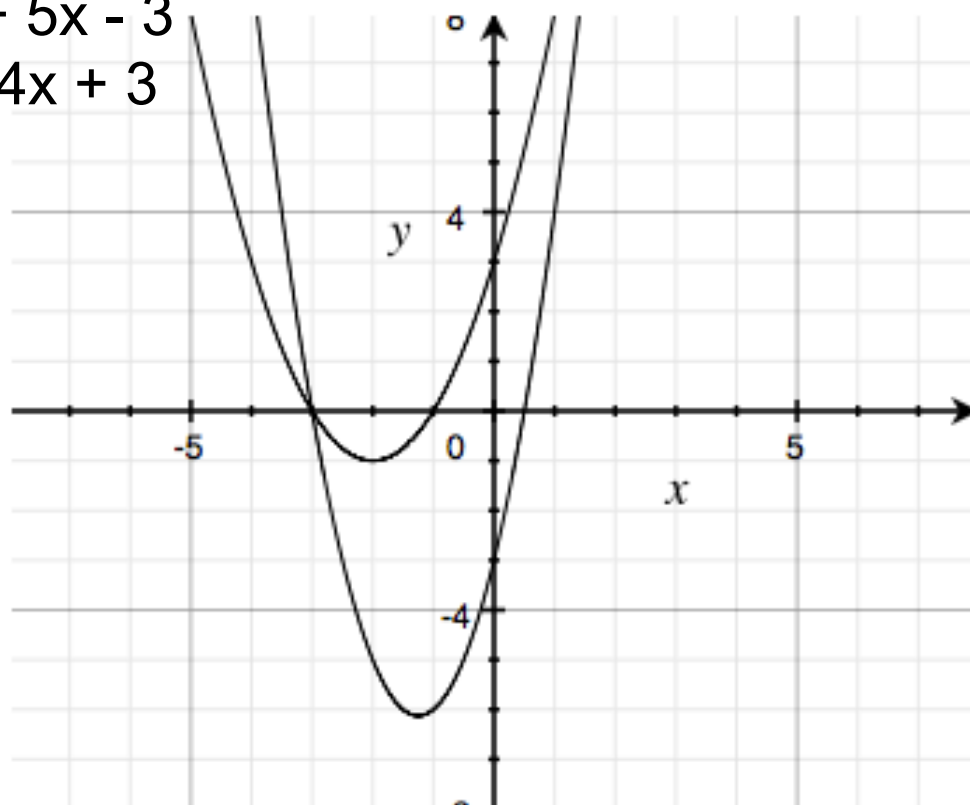
Solve $y < x^2 + 4x + 3$



Now solve as a system:

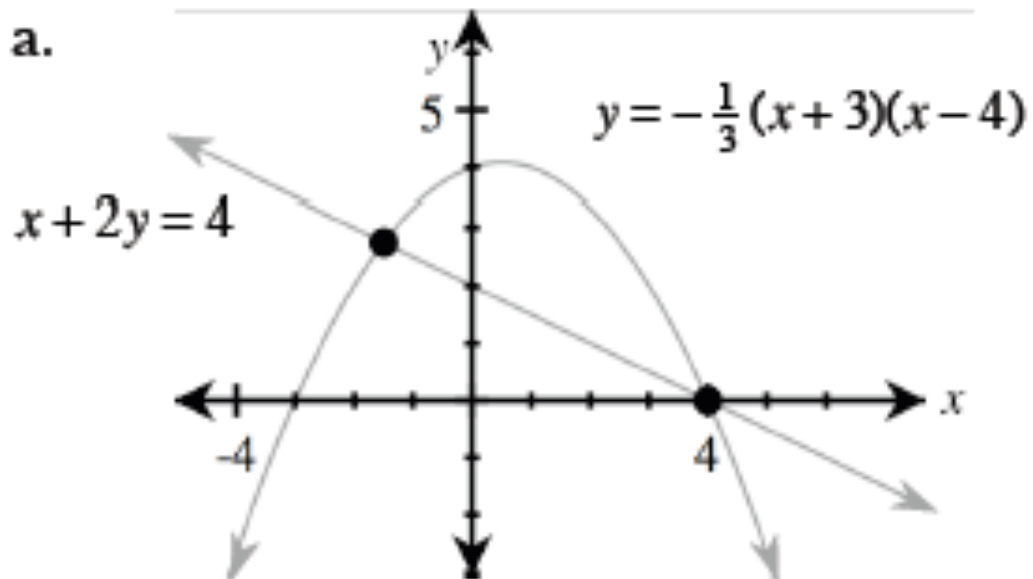
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$$y < x^2 + 4x + 3$$



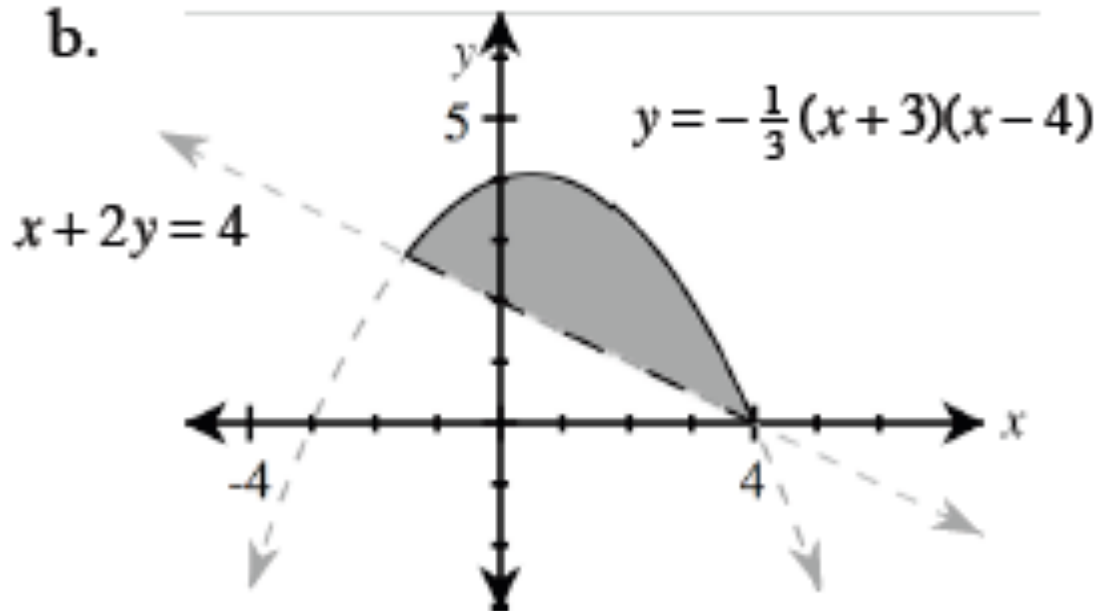
- 5-60. For each of the following graphs, find an equation, inequality, or system that could have the solution shown. Note that the equations for the line and the parabola are given.

a.

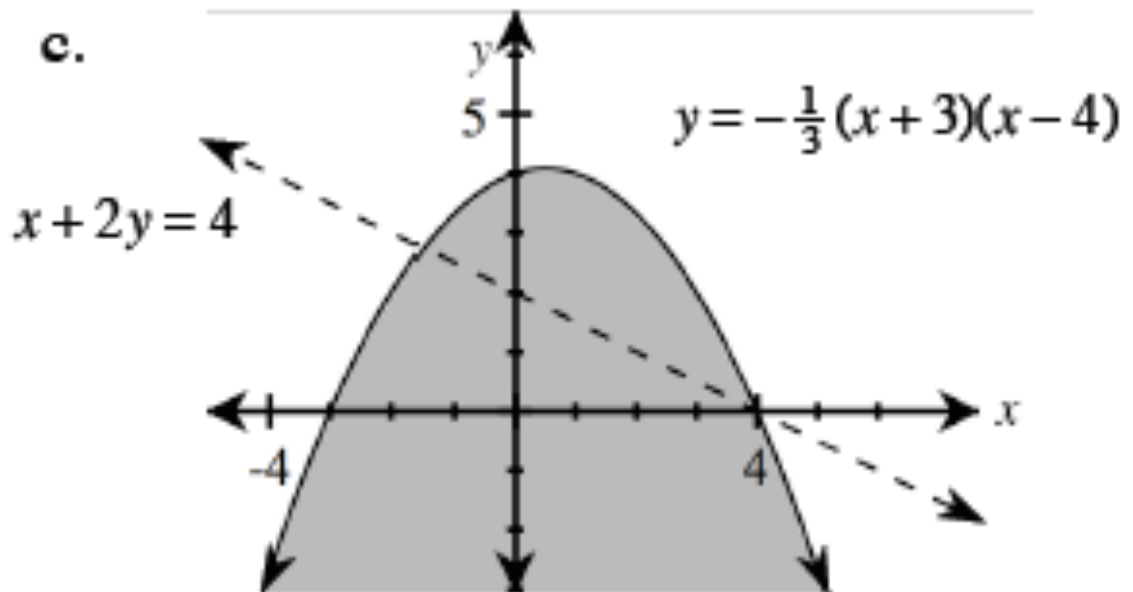


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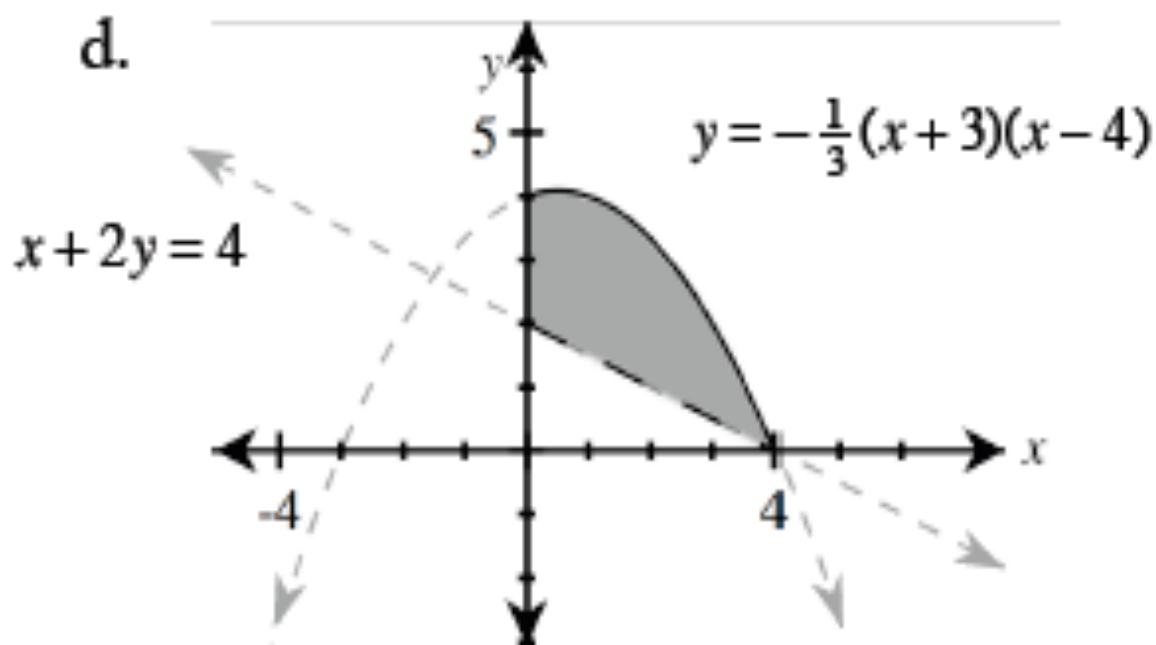
b.



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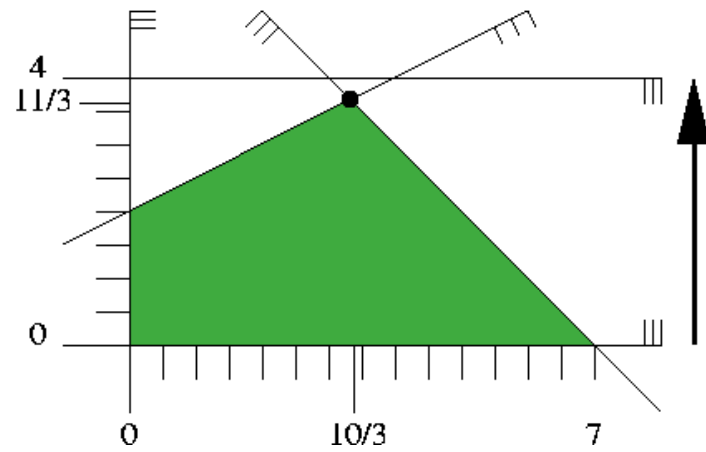
Solve this system:

$$y \leq 4x + 16$$

$$y > -\frac{4}{3}x - 4$$

HW 5-49, 50, 62, 63, 68

Linear Programming



5-75 The Toy Factory



Otto Toyom builds toy cars and trucks. To make each car, he needs 4 wheels, 2 seats, and 1 gas tank. To make each truck, he needs 6 wheels, 1 seat, and 3 gas tanks. His storeroom has 36 wheels, 14 seats, and 15 gas tanks. He is trying to decide how many cars and trucks to build so he can make the largest possible amount of money when he sells them. Help Otto figure out what his options are. **What are all of the choices he could make about how many cars and how many trucks he will build? Make a list of all possible combinations.** Then plot the number of possible cars and trucks in the first quadrant of a graph.

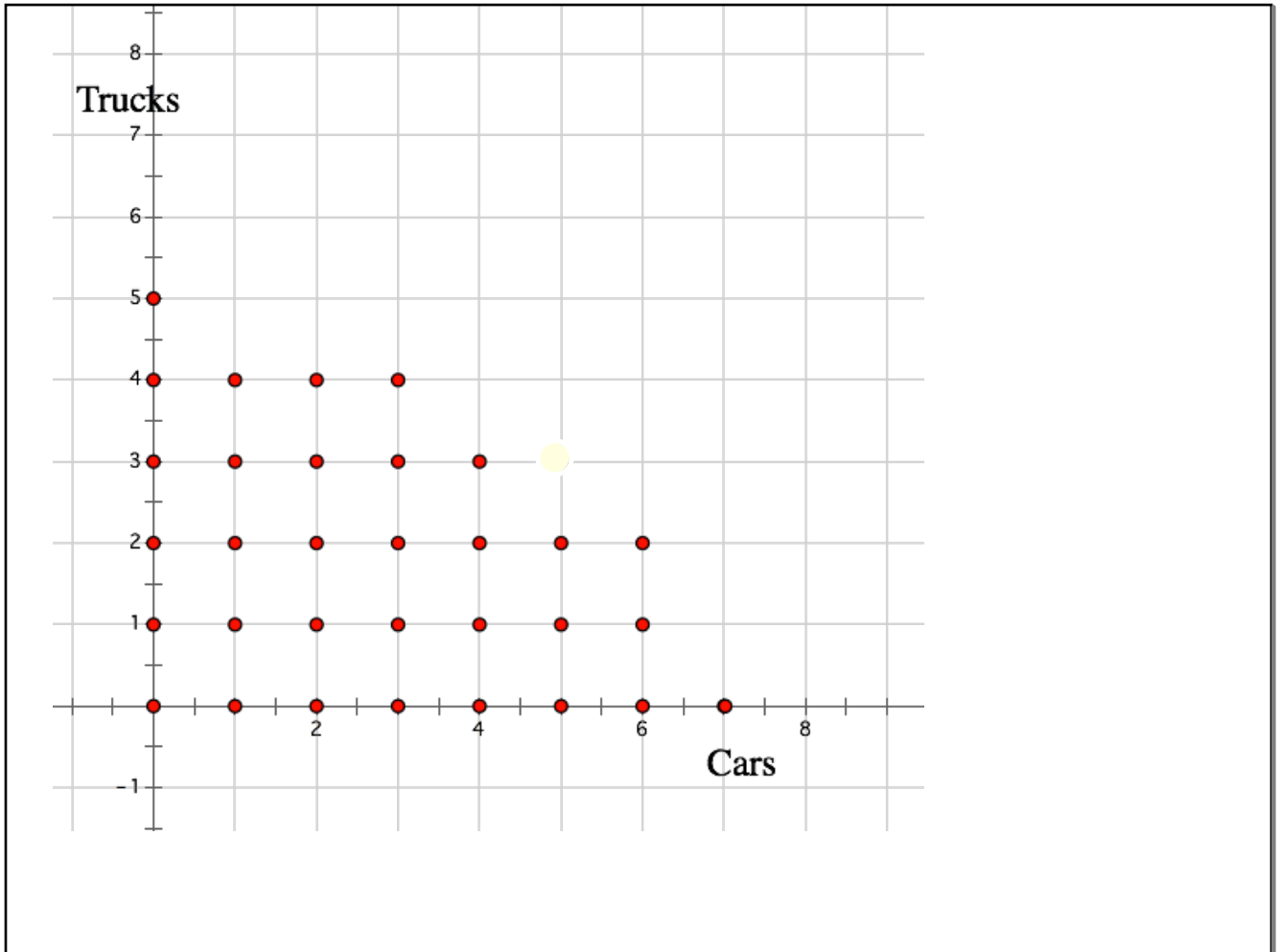
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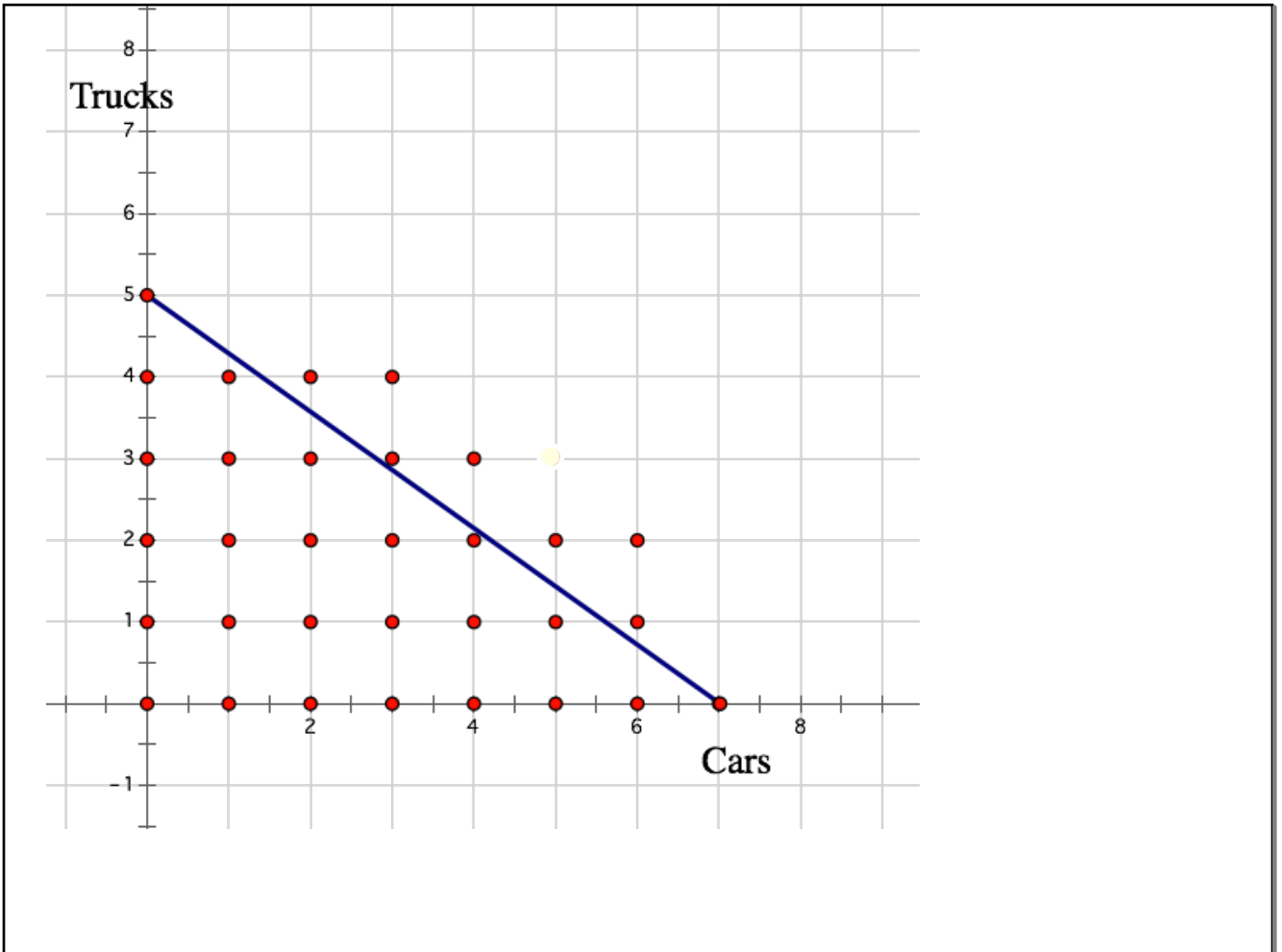
(cars, trucks)

$(0,0)$ $(1,0)$ $(2,0)$ $(3,0)$ $(4,0)$ $(5,0)$ $(6,0)$ $(7,0)$
 $(0,1)$ $(1,1)$ $(2,1)$ $(3,1)$ $(4,1)$ $(5,1)$ $(6,1)$
 $(0,2)$ $(1,2)$ $(2,2)$ $(3,2)$ $(4,2)$ $(5,2)$ $(6,2)$
 $(0,3)$ $(1,3)$ $(2,3)$ $(3,3)$ $(4,3)$
 $(0,4)$ $(1,4)$ $(2,4)$ $(3,4)$
 $(0,5)$

Otto wants to make as much profit as possible. Use your list to find which combination of cars and trucks will make the most profit based on the information below.

- a. Which of Otto's options gives him the greatest profit if he makes \$1 on each car and \$1 on each truck he sells? How do you know?
- b. The market has just changed, and Otto can now make \$2 for each truck but only \$1 for each car. What is his best choice for the number of cars and the number of trucks to make now? How can you be sure? Explain.





Write three inequalities to represent the relationship between the number of cars (x), the number of trucks (y), and the number of:

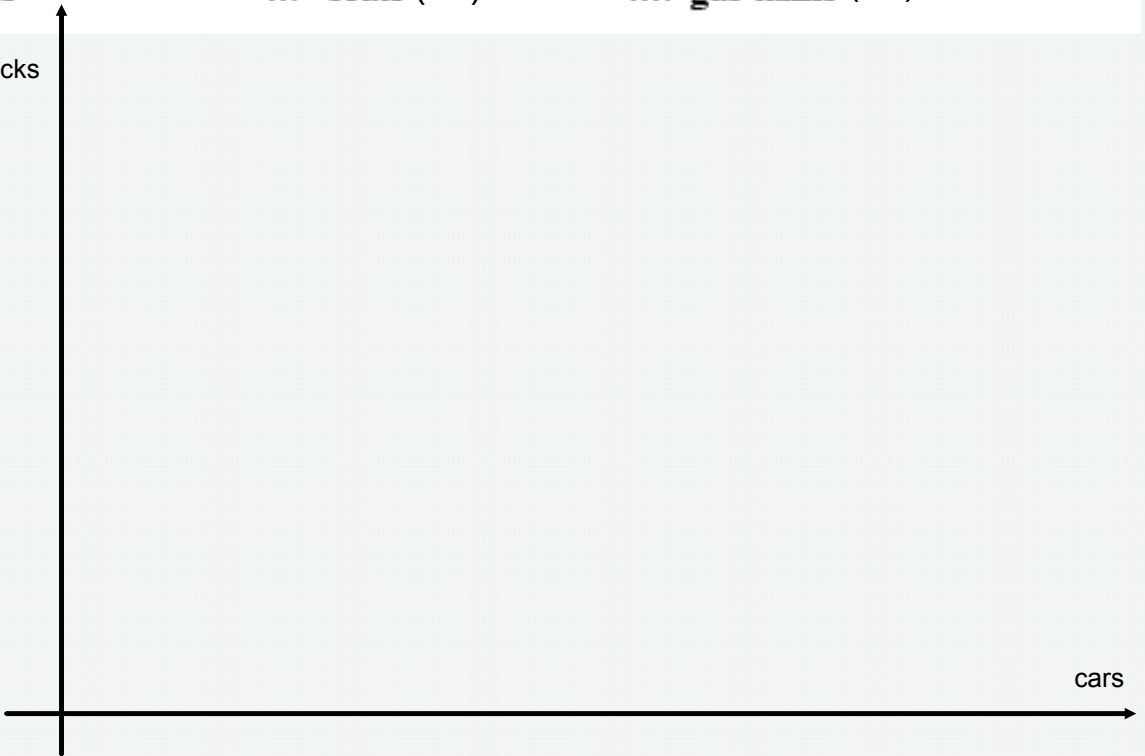
i. wheels (36)

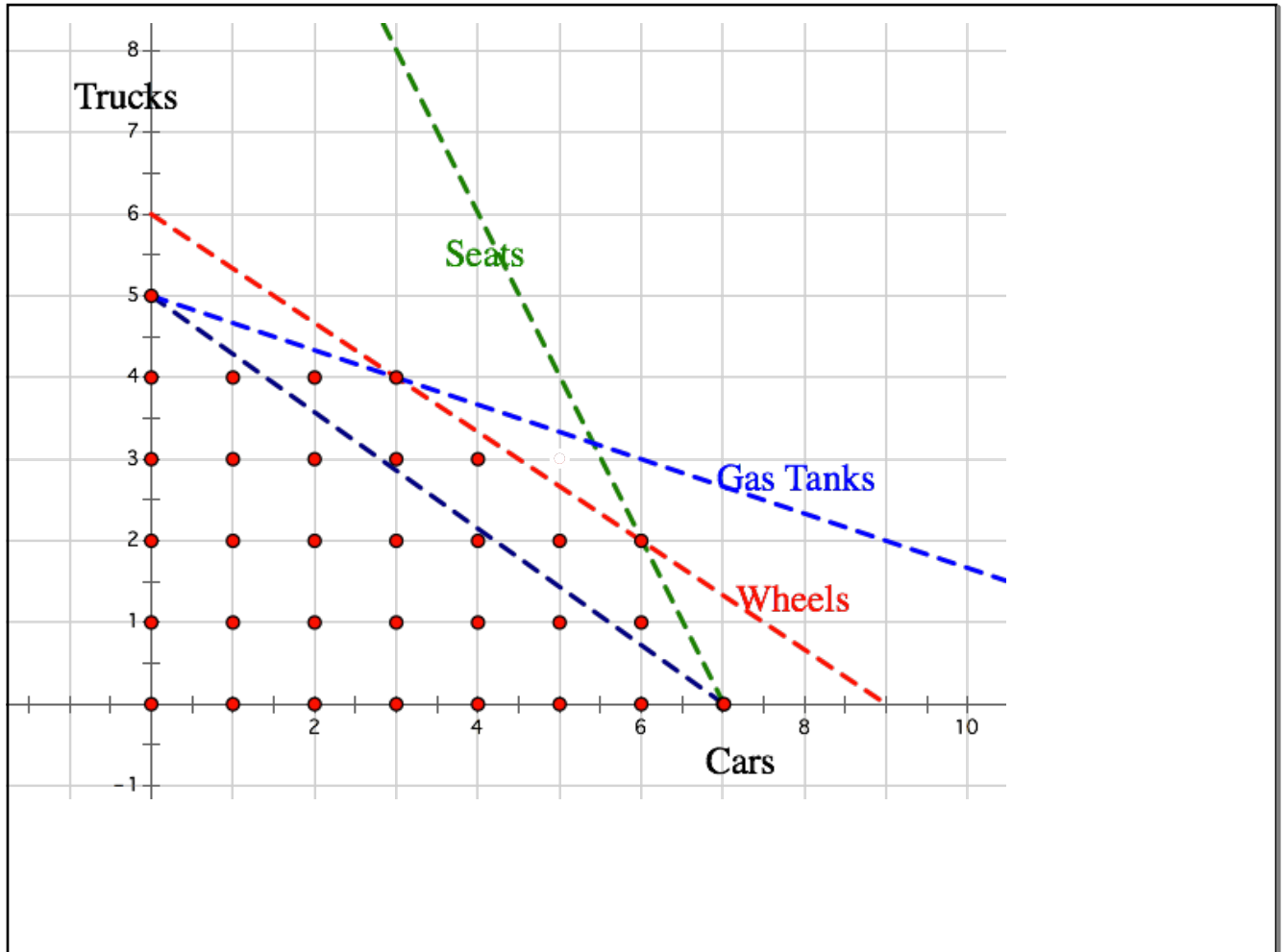
ii. seats (14)

iii. gas tanks (15)

trucks

cars





- Yield management at American Airlines

Critical to an airline's operation is the effective use of its reservations inventory.

The 4pm flight from Chicago O'Hare to New York JFK has 100 passenger seats 70 economy @ \$200s and 30 business @ \$1000.

Suppose we have sold 10 business class tickets and 69 economy tickets.

A potential passenger phones up requesting an economy ticket. ***Would you sell it to them ?***

Do you think the fares \$200 economy, \$1000 business, affect the answer to this question or not ?

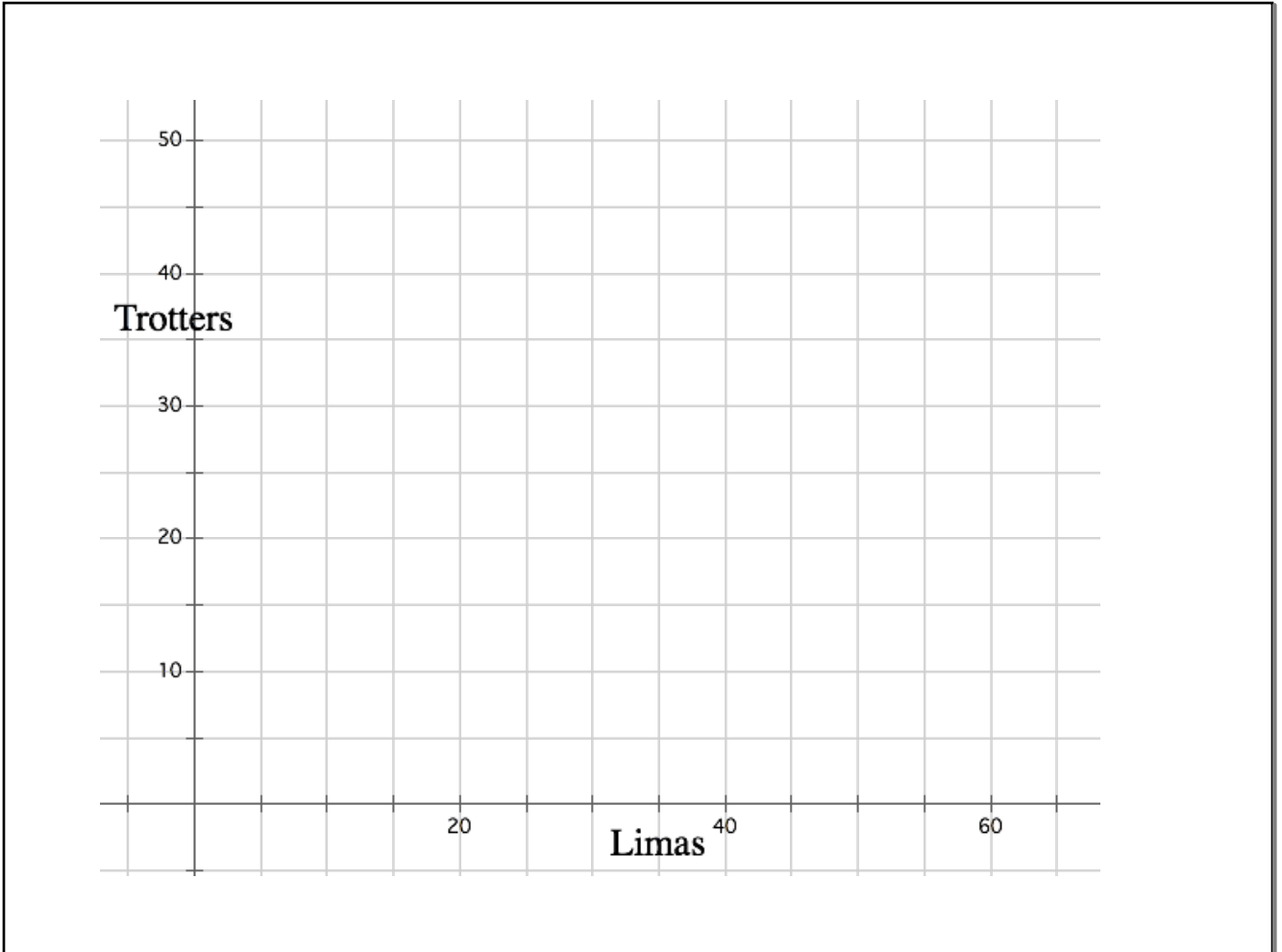


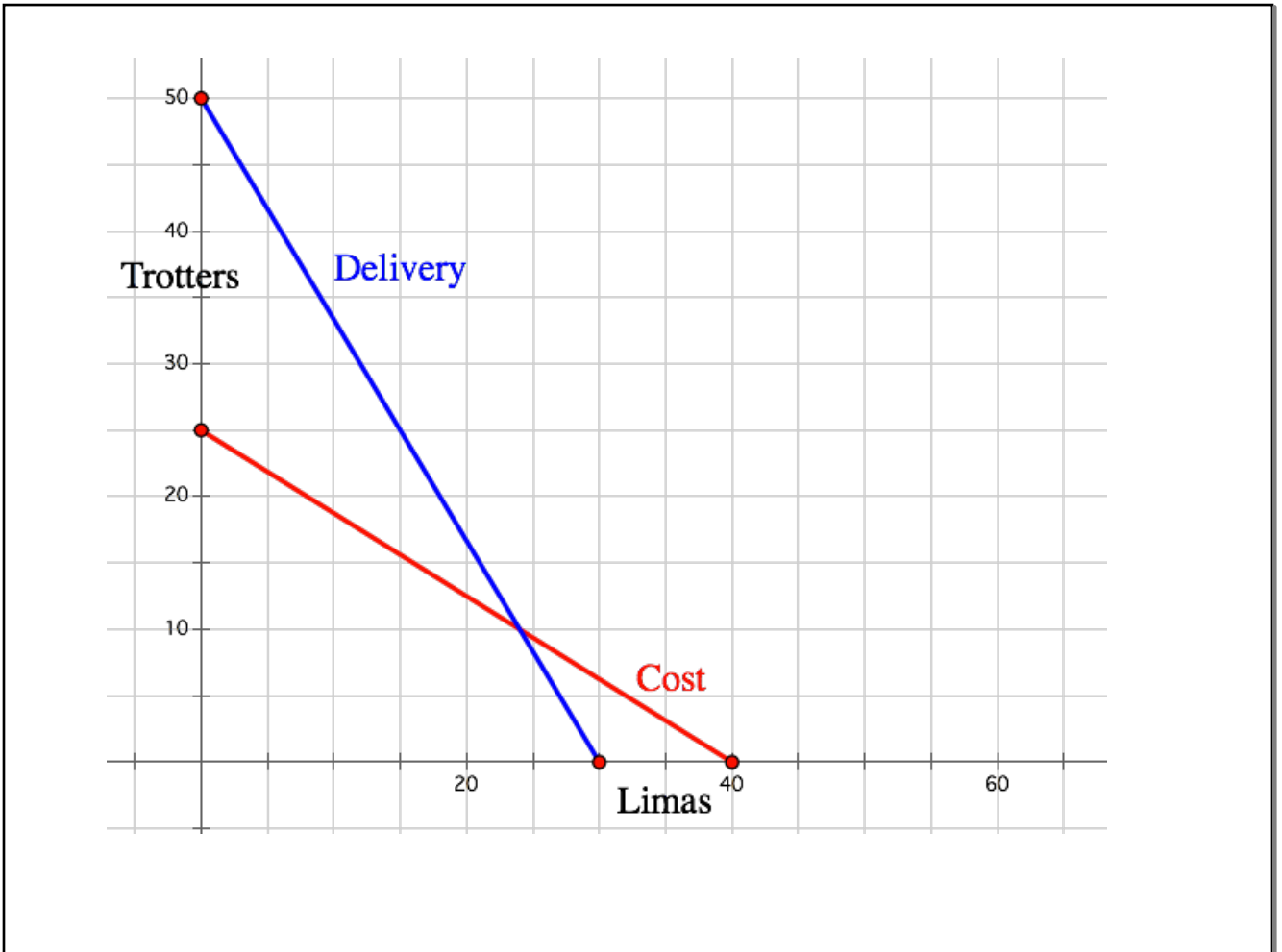
Fundraising

You want to sell snacks to raise money for your knitting club.

- You have \$600 to buy snacks to sell.
- Tasty Trotters come 12 per case and cost \$24 per case and you'll make \$18 profit per case.
- Lemony Limas come 20 per case and cost \$15 per case and you'll make \$15 profit per case.
- Delivery is free if you order no more than 600 units (not cases).

Maximize your profit.





Two Mines Company

The Two Mines Company owns two different mines that produce three grades of ore: high, medium and low-grade. The company has contracted to provide a smelting plant with 12 tons of high-grade, 8 tons of medium-grade and 24 tons of low-grade ore per week. The two mines have different operating characteristics as detailed below.

Mine	Cost per day (\$'000)	Production (tons/day)		
		High	Medium	Low
X	180	6	3	4
Y	160	1	1	6

How many days per week should each mine be operated to fulfill the smelting plant contract?

