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## 12.3 Modeling with Linear Systems

**HELP**

1. A company has to buy computers and printers. Each computer,  $x$ , costs \$515 and each printer,  $y$ , costs \$375. If the company spends \$5,670 and buys a total of 14 machines, how many of each did it buy?

Enter a system of equations to represent the situation, then solve the system.

The system of equations is  $x+y=14$  and  $515x+375y=5670$ .

$$\begin{aligned} 515x + 375y &= 5,670 \\ x + y &= 14 \end{aligned}$$

$$\begin{aligned} 515x + 375y &= 5,670 \\ -515x + -515y &= -7,210 \end{aligned}$$

Multiply the second equation by  $-515$  and simplify.

$$\begin{aligned} \cancel{515x} + 375y &= 5,670 \\ -515x + -515y &= -7,210 \\ \hline -140y &= -1,540 \\ \cancel{-140} & \quad \cancel{-140} \\ y &= 11 \end{aligned}$$

Substitute 11 for  $y$ .

$$\begin{aligned} x + y &= 14 \text{ Original second equation} \\ x + 11 &= 14 \\ x &= 3 \end{aligned}$$

The company bought  $3$  computers and  $11$  printers.

2.

Lisa spends part of her year as a member of a gym. She then finds a better deal at another gym, so she cancels her membership with the first gym after  $x$  months and spends the rest of the year,  $y$  months, with the second gym. The membership to the first gym cost \$65, while the membership for the second gym cost \$45. She ended up spending a total of \$740 over the course of the year.

Drag and drop the numbers into the correct boxes to complete a system of equations to represent the situation. Do not solve.

The system of equations is  $\boxed{1}x + \boxed{1}y = \boxed{12}$  and  $\boxed{65}x + \boxed{45}y = \boxed{740}$ .

3.

Jack is selling tickets to an event. Attendees can either buy a general admission ticket,  $x$ , or a VIP ticket,  $y$ . The general admission tickets are \$70 and the VIP tickets are \$90. He does not know how many of each type he has sold, but he knows he sold a total of 26 tickets and made \$2,060.

Drag and drop numbers into the correct boxes to complete a system of equations to represent the situation. Do not solve.

The system of equations is  $\boxed{1}x + \boxed{1}y = \boxed{26}$  and  $\boxed{70}x + \boxed{90}y = \boxed{2060}$

4.

There are 230 adults and 260 children at a zoo. The zoo makes a total of \$5,330 from the entrance fees, and the cost of an adult and a child to attend is \$22.

Let  $a$  represent the price for an adult.

Let  $c$  represent the price for a child.

Drag and drop numbers into the correct boxes to complete a system of equations to represent the situation. Do not solve.

The system of equations is  $\boxed{1}a + \boxed{1}c = \boxed{22}$  and  $\boxed{230}a + \boxed{260}c = \boxed{5330}$ .

5.

Jennifer has 13 coins:  $n$  nickels and  $d$  dimes. The value of her coins is \$1.20.

Drag and drop numbers into the correct boxes to complete a system of equations to represent the situation. Do not solve.

The system of equations is  $\boxed{1}n + \boxed{1}d = \boxed{13}$  and  $\boxed{0.05}n + \boxed{0.10}d = \boxed{1.20}$ .

6. A student has to buy graph paper and printer paper. The graph paper,  $x$ , costs \$4, while the printer paper,  $y$ , costs \$3. She wants to buy at least 7 packs of paper but wants to spend at most \$33.

She wants to buy at least 7 packs of paper

$$x + y \geq 7$$

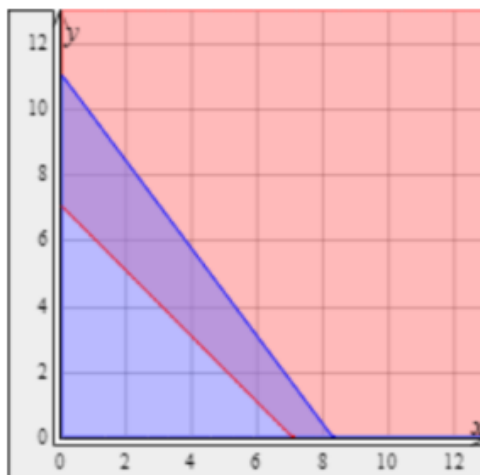
at least  $\geq$

at most  $\leq$

The graph paper,  $x$ , costs \$4, while the printer paper,  $y$ , costs \$3 wants, and she wants to spend at most \$33.

$$\$4x + \$3y \leq \$33$$

<https://www.desmos.com/>



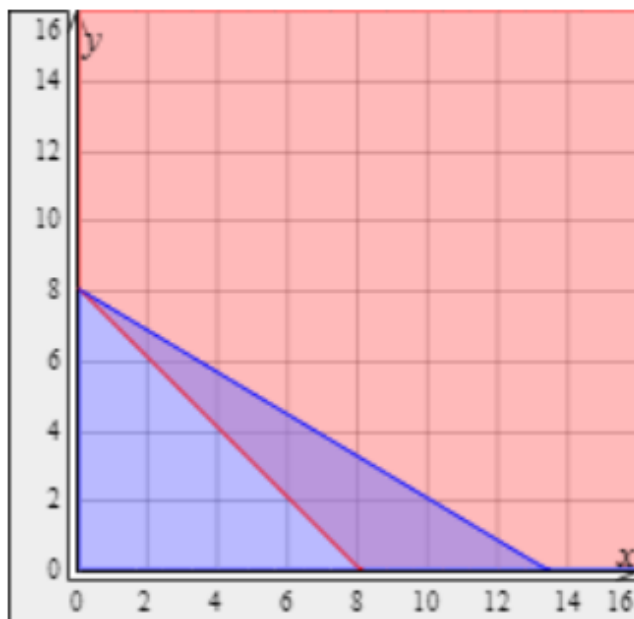
The point (5, 5) is not  a solution because it  does not  lie in the region shared by the two inequalities and it  does not  satisfy both inequalities.

7.

A student has to buy graph paper and printer paper. The graph paper,  $x$ , costs \$3, while the printer paper,  $y$ , costs \$5. She wants to buy at least 8 packs of paper but wants to spend at most \$40.

Enter a system of inequalities for the given situation and select the graph of the system. Then determine if the point  $(6, 4)$  is a solution to the system.

The system of inequalities is  and .



The point  $(6, 4)$  is  a solution because it  lie in the region shared by the two inequalities and it  satisfy both inequalities.

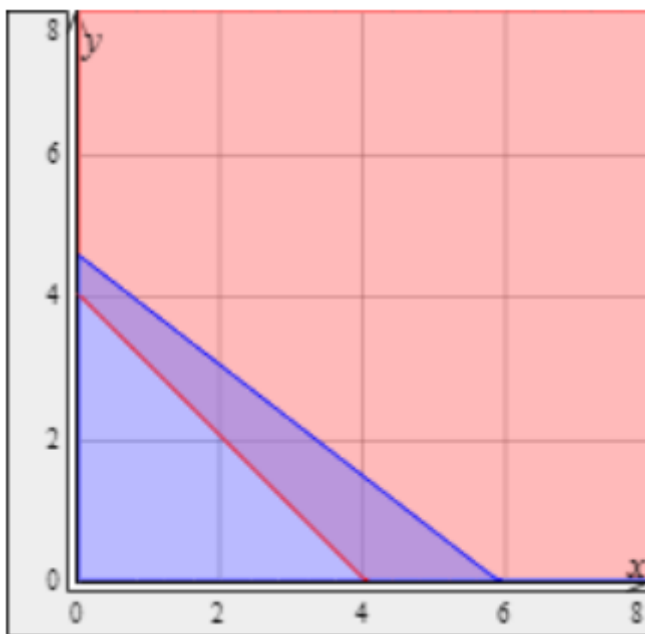


8.

Angelique is buying towels for her apartment. She finds some green towels,  $x$ , that cost \$7 each and blue towels,  $y$ , that cost \$9 each. She wants to buy at least 4 towels, but does not want to spend more than \$41. How many of each towel can she purchase?

Enter the system of inequalities that represents the situation. Then select the graph of the system and select one possible solution.

The system of inequalities is  $x+y \geq 4$  and  $7x+9y \leq 41$  .



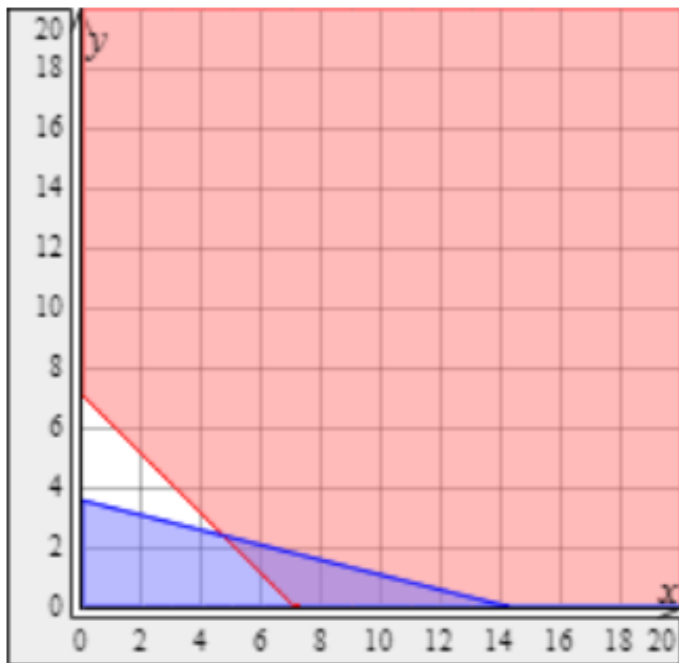
Angelique could buy  $3$  and  $2$  green and blue towels respectively.

9.

The sum of two numbers is at least 7, and the sum of one of the numbers,  $x$ , and 4 times the second number,  $y$ , is no more than 14.

Enter the system of inequalities that represents the situation. Then select the graph of the system and select one possible solution.

The system of inequalities is  $x+y \geq 7$  and  $x+4y \leq 14$  .



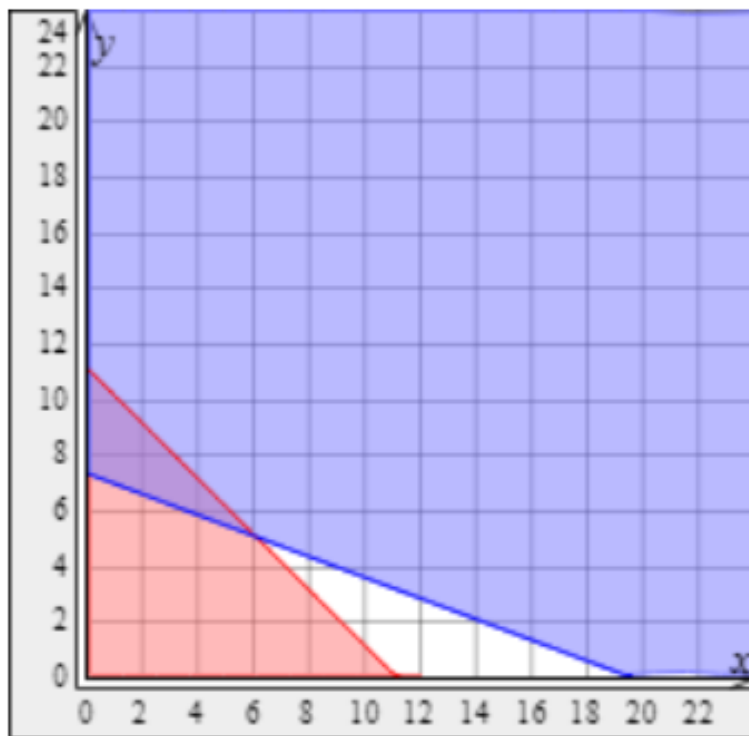
One possible solution is that the first and second numbers have the values  $5$  and  $2$  respectively

10.

The sum of two numbers is at most 11, and the sum of 3 times the first number,  $x$ , and 8 times the second number,  $y$ , is at least 58.

Enter the system of inequalities that represents the situation. Then select the graph of the system and select one possible solution.

The system of inequalities is  $x+y \leq 11$  and  $3x+8y \geq 58$  .



One solution is that the first and second numbers have the values  $4$  and  $6$  respectively.