Skills Practice

Name _____ Date _____

I. Using Substitution to Solve Linear Systems

A. Solve each system of equations by substitution. Determine whether the system is consistent or inconsistent.

1. $\begin{cases} y = 2x - 3 \\ x = 4 \end{cases}$

2. $\begin{cases} 2x + y = 9 \\ y = 5x + 2 \end{cases}$

3. $\begin{cases} y = 3x - 2 \\ y - 3x = 4 \end{cases}$

4. $\begin{cases} \frac{1}{2}x + \frac{3}{2}y = -7 \\ \frac{1}{3}y = 2x - 10 \end{cases}$

5. $\begin{cases} 0.8x - 0.2y = 1.5 \\ 0.1x + 1.2y = 0.8 \end{cases}$

6. $\begin{cases} 0.3y = 0.6x + 0.3 \\ 1.2x + 0.6 = 0.6y \end{cases}$

B. Write a system of equations to represent each problem situation. Solve the system of equations using any method. Then, answer any associated questions.

1. Rachel needs to print some of her digital photos. She is trying to choose between Lightning Fast Foto and Snappy Shots. Lightning Fast Foto charges a base fee of $5 plus an additional $0.20 per photo. Snappy Shots charges a base fee of $7 plus an additional $0.10 per photo. Determine the number of photos for which both stores will charge the same amount. Explain which store Rachel should choose depending on the number of photos she needs to print.

2. Raja is trying to decide which ice cream shop is the better buy. Cold & Creamy Sundaes charges $2.50 per sundae plus an additional $0.25 for each topping. Colder & Creamier Sundaes charges $1.50 per sundae plus an additional $0.50 for each topping. Determine the number of toppings for which both vendors charge the same amount. Explain which vendor is the better buy depending on the number of toppings Raja chooses.

3. Marcus is selling T-shirts at the State Fair. He brings 200 shirts to sell. He has long-sleeved and short-sleeved T-shirts for sale. On the first day of the fair, he sells $\frac{1}{2}$ of his long-sleeved T-shirts and $\frac{1}{3}$ of his short-sleeved T-shirts for a total of 80 T-shirts sold. How many of each type of T-shirt did Marcus bring to the fair?

4. Alicia has a booth at the flea market where she sells purses and wallets. All of her purses are the same price and all of her wallets are the same price. The first hour of the day, she sells 10 purses and 6 wallets for a total of $193. The second hour, she sells 2 purses and 1 wallet for a total of $37.50. How much does Alicia charge for each purse and each wallet?

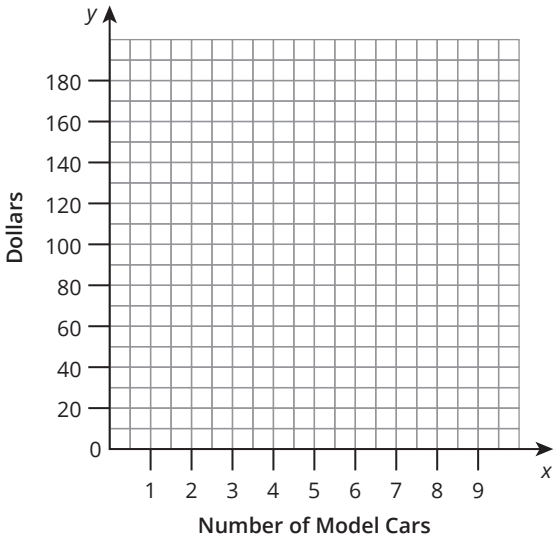
5. Johnny has some nickels and dimes in his pocket, and the change is worth $0.75. He has twice as many dimes as nickels. How many of each type of coin does Johnny have?

6. Ms. Williamson woke up one morning to find that her water heater had sprung a leak. She called two different plumbers to get their rates. The first plumber charges sixty-four dollars just to walk in the door plus twenty-four dollars an hour. The second plumber charges a flat fifty-six dollars an hour. After how many hours will the cost for both plumbers be the same? Explain which plumber Ms. Williamson should use based on the number of hours she expects the repair to take.

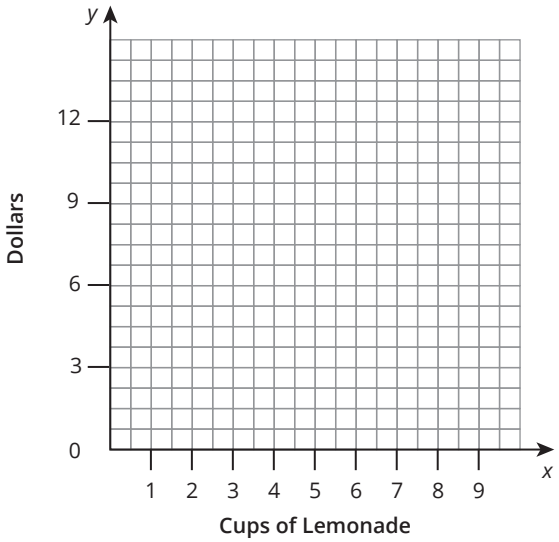
II. Using Graphing to Solve Systems of Equations

A. Write a system of linear equations to represent each problem situation. Define each variable. Then, graph the system of equations and estimate the point of intersection. Explain what the point represents with respect to the given problem situation.

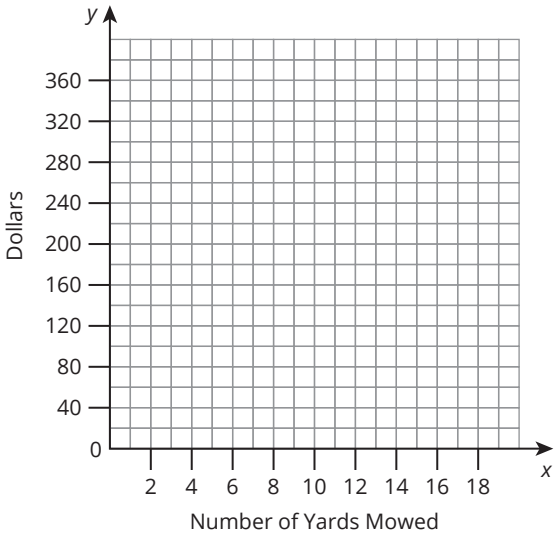
1. Eric sells model cars from a booth at a local flea market. He purchases each model car from a distributor for $12, and the flea market charges him a booth fee of $50. Eric sells each model car for $20.



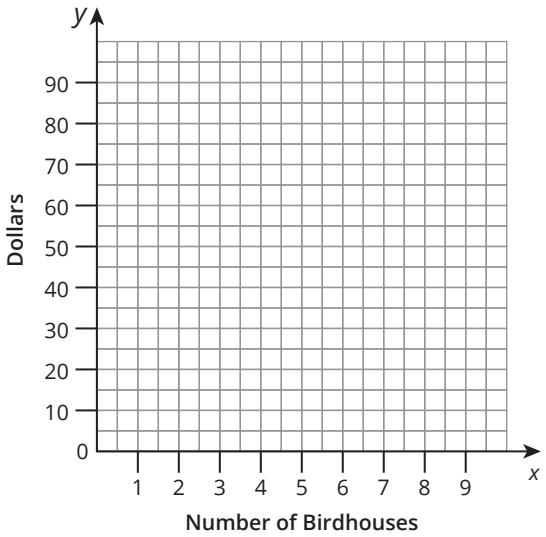
2. Ramona sets up a lemonade stand in front of her house. Each cup of lemonade costs Ramona $0.30 to make, and she spends $6 on the advertising signs she puts up around her neighborhood. She sells each cup of lemonade for $1.50.



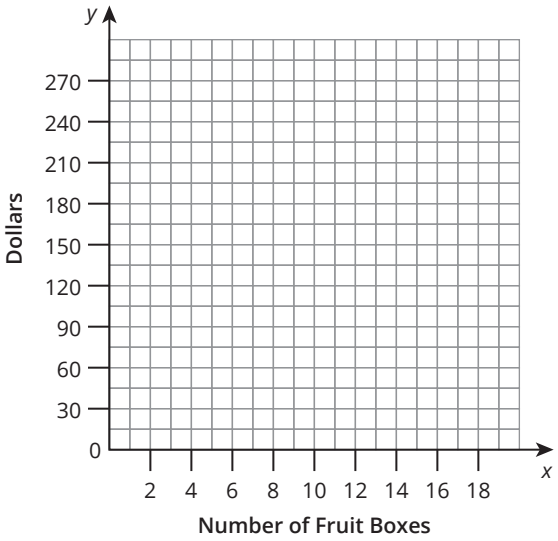
3. Chen starts his own lawn mowing business. He initially spends $180 on a new lawnmower. For each yard he mows, he receives $20 and spends $4 on gas.



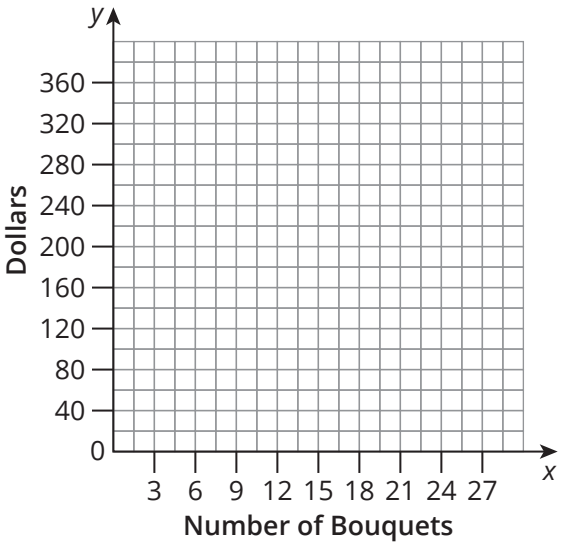
4. Olivia is building birdhouses to raise money for a trip to Hawaii. She spends a total of $30 on the tools needed to build the houses. The material to build each birdhouse costs $3.25. Olivia sells each birdhouse for $10.



5. The Spanish Club is selling boxes of fruit as a fundraiser. The fruit company charges the Spanish Club $7.50 for each box of fruit and a shipping and handling fee of $100 for the entire order. The Spanish Club sells each box of fruit for $15.

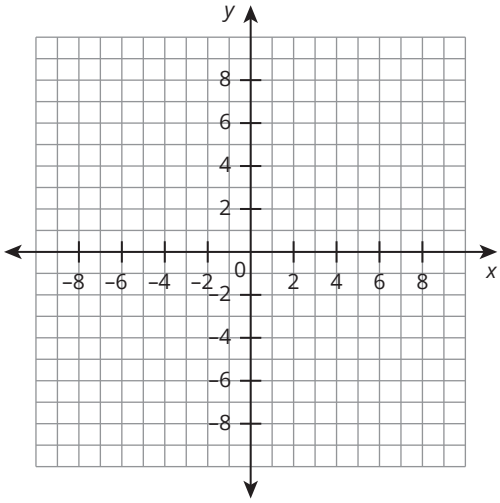


6. Jerome sells flowers online for $12 per bouquet. Each bouquet costs him $5.70 to make. Jerome also paid a one-time fee of $150 to advertise his company.

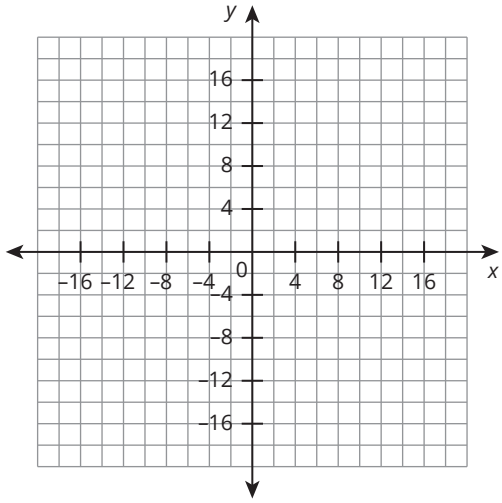


B. Graph the equations in each system. Tell whether the system has one solution, no solutions, or infinite solutions. If the system has one solution, write the values of the variables that make the equations true.

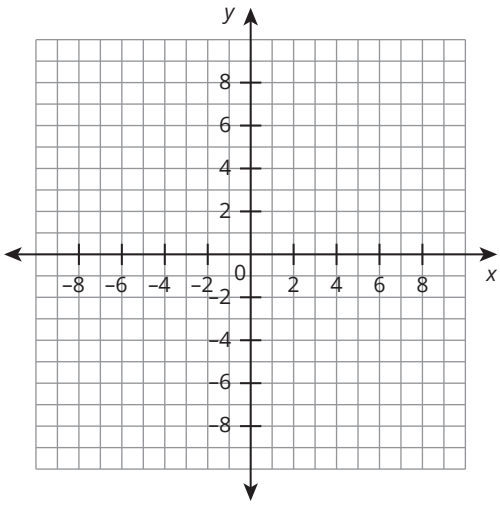
1. $\begin{cases} y = 2x - 1 \\ y = -3x - 11 \end{cases}$



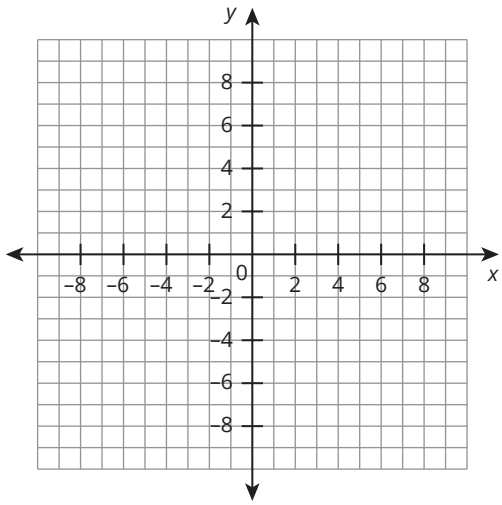
2. $\begin{cases} y = 4x - 30 \\ y = -3x + 5 \end{cases}$



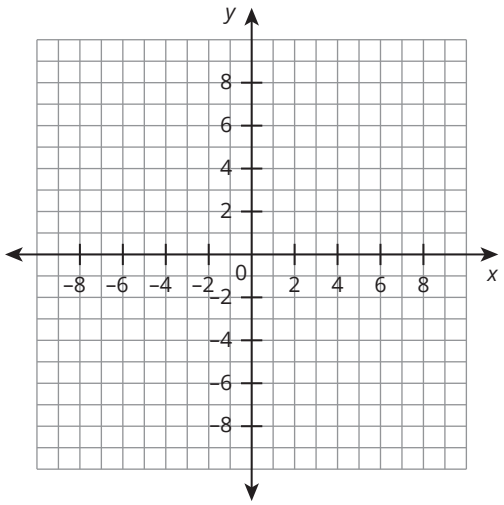
3. $\begin{cases} -5x + 10y = -10 \\ y = \frac{1}{2}x - 2 \end{cases}$



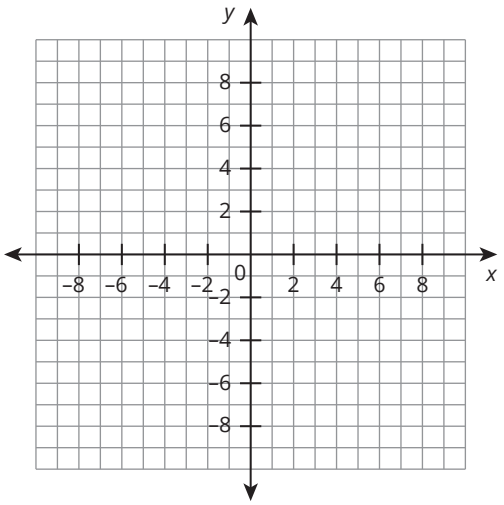
4. $\begin{cases} y = 3x + 17 \\ 10x + 5y = -15 \end{cases}$



5. $\begin{cases} -8x - 8y = -10 \\ x = 3.25 \end{cases}$

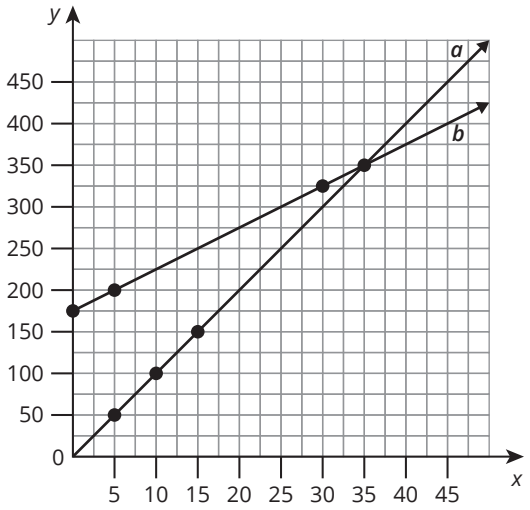


6. $\begin{cases} -1.5x + 0.5y = -2 \\ y + 7 = 3(x + 1) \end{cases}$

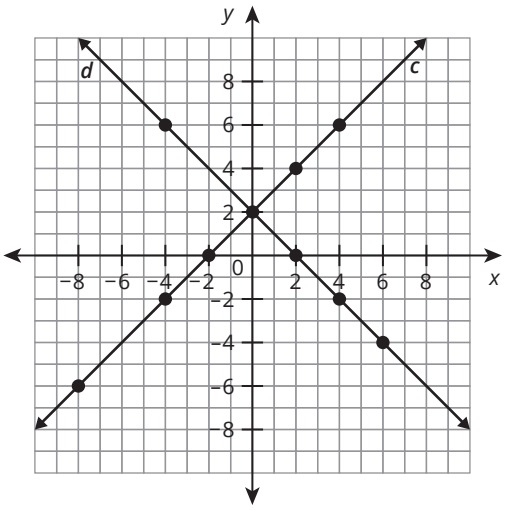


C. Write a system of equations to represent each table or graph.

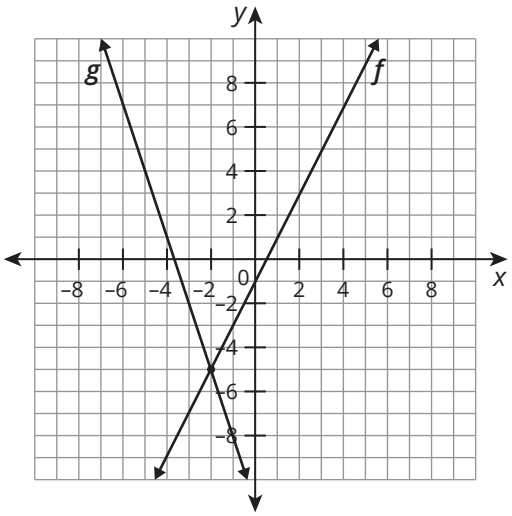
1. Write a system of equations in slope-intercept form that represents lines *a* and *b*.



2. Write a system of equations in standard form that represents lines *c* and *d*.



3. Write a system of equations in slope-intercept form that represents lines *f* and *g*.



4. Write a system of equations in slope-intercept form that represents lines *r* and *s*.

Line *r*

x	*y*
−2	−6
0	−5
3	−3.5
7	−1.5

Line *s*

x	*y*
−5	−16
−1	−8
4	2
8	10

5. Write a system of equations in standard form that represents lines *h* and *k*.

Line *h*

x	*y*
−5	−2
−1	2
2	5
6	9

Line *k*

x	*y*
−2	20
0	12
2	4
3	0

6. Write a system of equations in slope-intercept form that represents lines *m* and *n*.

Line *m*

x	*y*
−4	30
−1	21
3	9
8	−6

Line *n*

x	*y*
−5	18
−2	12
1	6
4	0

III. Using Linear Combinations to Solve a System of Linear Equations

A. Solve each system of equations using the linear combinations method.

1. $\begin{cases} 3x + 5y = 8 \\ 2x - 5y = 22 \end{cases}$

2. $\begin{cases} 4x - y = 2 \\ 2x + 2y = 26 \end{cases}$

3. $\begin{cases} 10x - 6y = 26 \\ 5x - 5y = 5 \end{cases}$

4. $\begin{cases} 2x - 4y = 4 \\ -3x + 10y = 14 \end{cases}$

5. $\begin{cases} 3x + 2y = 14 \\ 4x + 5y = 35 \end{cases}$

6. $\begin{cases} x + 6y = 11 \\ 2x - 12y = 10 \end{cases}$

7. $\begin{cases} 1.5x + 1.2y = 0.6 \\ 0.8x - 0.2y = 2 \end{cases}$

8. $\begin{cases} \frac{3}{4}x + \frac{1}{2}y = -\frac{3}{4} \\ \frac{2}{3}x + \frac{2}{3}y = \frac{2}{3} \end{cases}$

B. Write a system of equations to represent each problem situation. Solve the system of equations using the linear combinations method.

1. The high school marching band is selling fruit baskets as a fundraiser. They sell a large basket containing 10 apples and 15 oranges for $20. They sell a small basket containing 5 apples and 6 oranges for $8.50. How much is the marching band charging for each apple and each orange?

2. Asna works on a shipping dock at a tire manufacturing plant. She loads a pallet with 4 Mudslinger tires and 6 Roadripper tires. The tires on the pallet weigh 212 pounds. She loads a second pallet with 7 Mudslinger tires and 2 Roadripper tires. The tires on the second pallet weigh 184 pounds. How much does each Mudslinger tire and each Roadripper tire weigh?

3. The Pizza Barn sells one customer 3 large pepperoni pizzas and 2 orders of breadsticks for $30. They sell another customer 4 large pepperoni pizzas and 3 orders of breadsticks for $41. How much does the Pizza Barn charge for each pepperoni pizza and each order of breadsticks?

4. Nancy and Warren are making large pots of chicken noodle soup. Nancy opens 4 large cans and 6 small cans of soup and pours them into her pot. Her pot contains 115 ounces of soup. Warren opens 3 large cans and 5 small cans of soup. His pot contains 91 ounces of soup. How many ounces of soup does each large can and each small can contain?

5. Taylor and Natsumi are making block towers out of large and small blocks. They are stacking the blocks on top of each other in a single column. Taylor uses 4 large blocks and 2 small blocks to make a tower 63.8 inches tall. Natsumi uses 9 large blocks and 4 small blocks to make a tower 139.8 inches tall. How tall is each large block and each small block?

6. Dave has 2 buckets that he uses to fill the water troughs on his horse farm. He wants to determine how many ounces each bucket holds. On Tuesday, he fills an empty 2000-ounce water trough with 7 large buckets and 5 small buckets of water. On Thursday, he fills the same empty water trough with 4 large buckets and 10 small buckets of water. How many ounces does each bucket hold?

IV. Graphing Inequalities in Two Variables

A. Tell whether the graph of each linear inequality will have a dashed line or a solid line. Explain your reasoning.

1. $x - 3y \leq 32$

2. $8y + 7x > 15$

3. $y < 14x + 9$

4. $-5.2y - 8.3x \leq -28.6$

5. $\frac{2}{3}x + \frac{4}{9}y \geq 3$

6. $y - 17 > x + 8$

7. $185x + 274y \geq 65$

8. $36 < 9y - 2x$

B. For each inequality, use the test point (0, 0) to determine which half-plane should be shaded.

1. $5x + 7y > -13$

2. $y - 30 \leq 9x$

3. $-8y > 6x + 12$

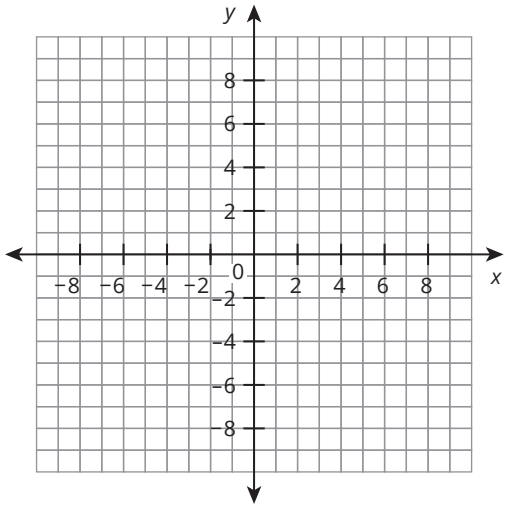
4. $46 \geq -5y + 10x$

5. $31.9x + 63.7y < -44.5$

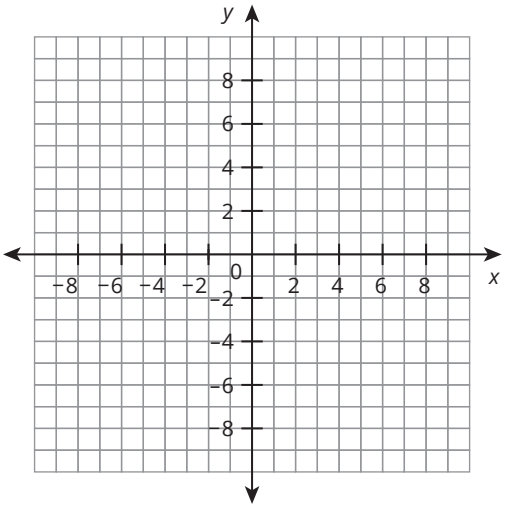
6. $y - \frac{5}{6} > \frac{1}{2}x + \frac{1}{3}$

C. Graph each linear inequality.

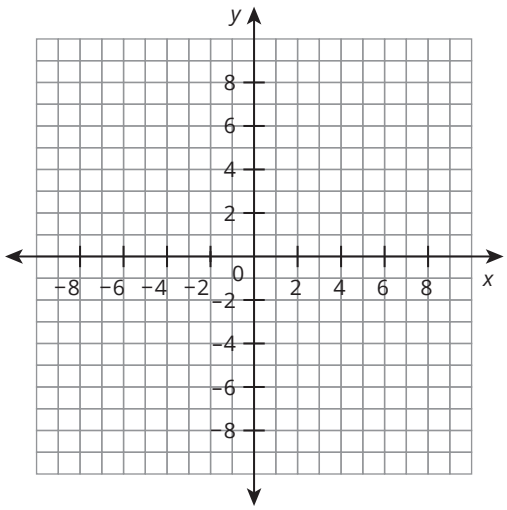
1. $y < 4x + 2$



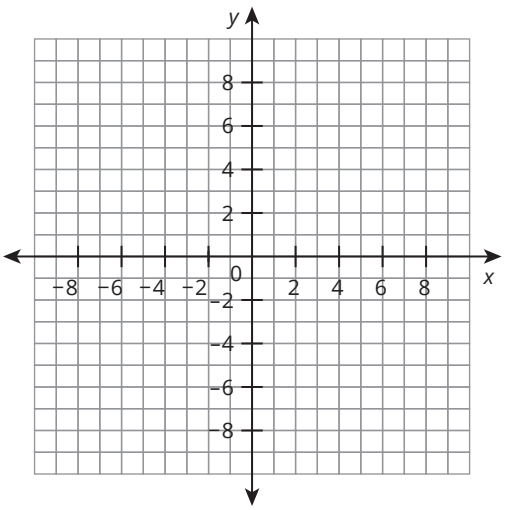
2. $y \geq 10 - x$



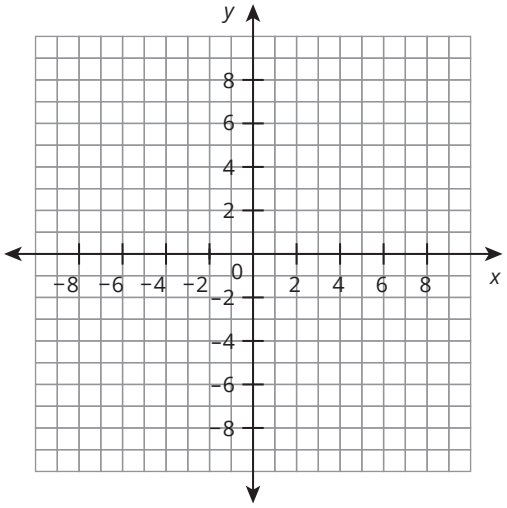
3. $y \geq \frac{1}{2}x - 3$



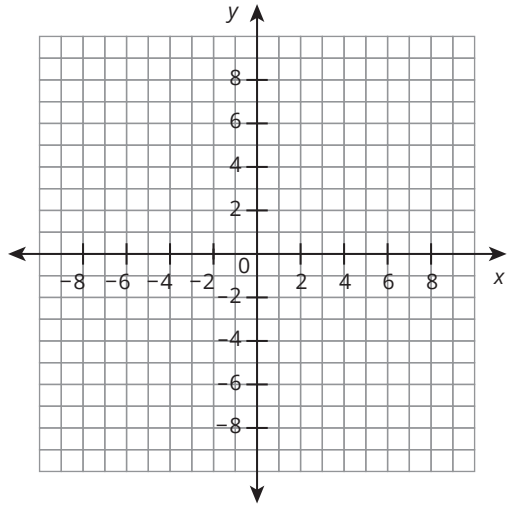
4. $-x + y > 1$



5. $3x - 4y \geq 8$

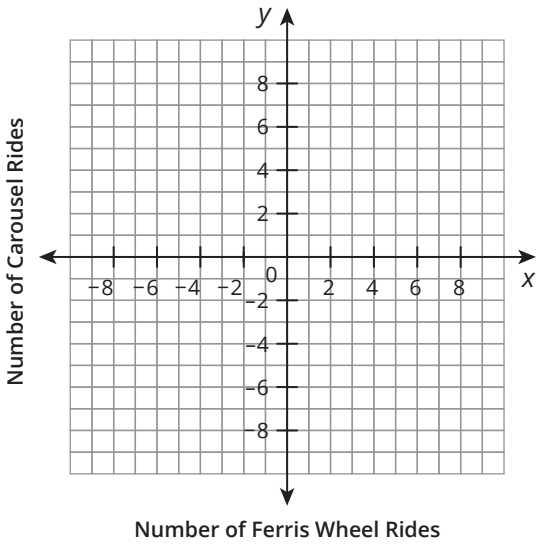


6. $\frac{3}{8}y - \frac{1}{4}x < \frac{3}{4}$

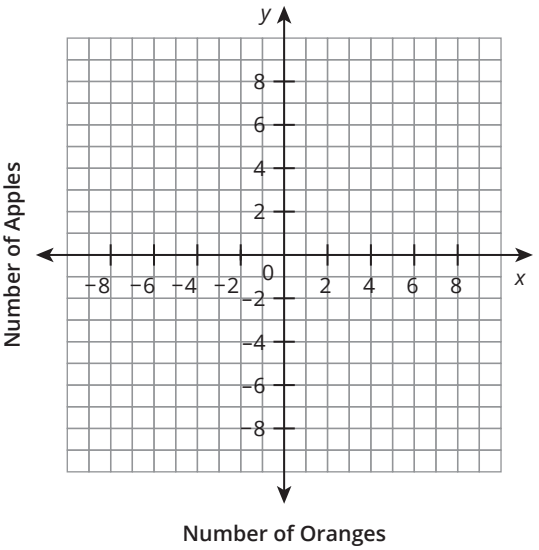


D. Write and graph an inequality for each problem situation. Then determine if the ordered pair is a solution for the problem situation.

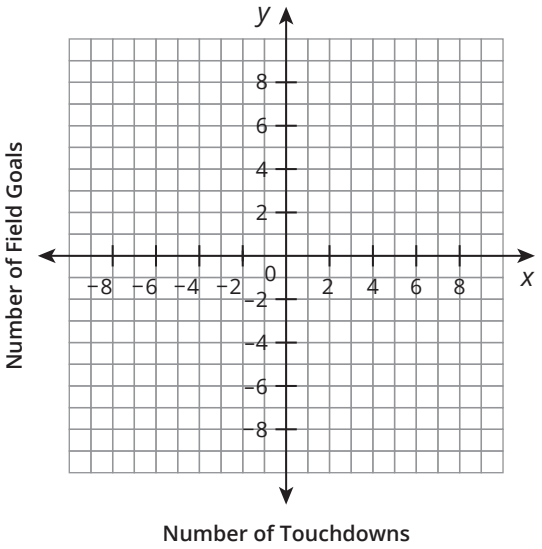
1. Marcus has 50 tokens to spend at the school carnival. The Ferris wheel costs 7 tokens and the carousel costs 5 tokens. Write and graph an inequality that represents the possible ways Marcus could use his tokens on the two rides. Is the ordered pair (6, 3) a solution for the problem situation?



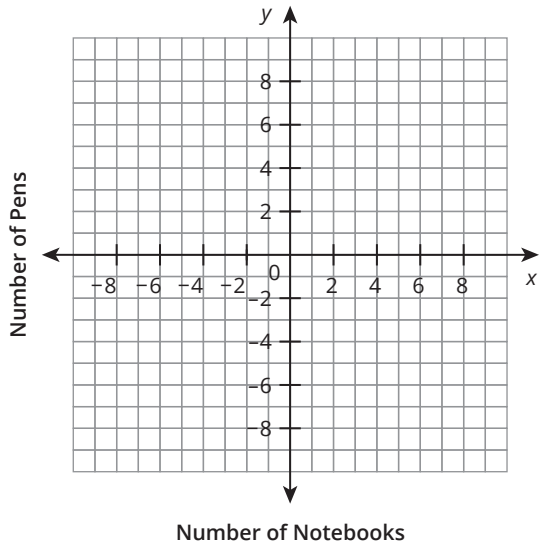
2. Sophia has $2 to buy oranges and apples. Oranges cost $0.45 each and apples cost $0.25 each. Write and graph an inequality that represents the possible ways Sophia could spend her $2. Is the ordered pair (2, 3) a solution for the problem situation?



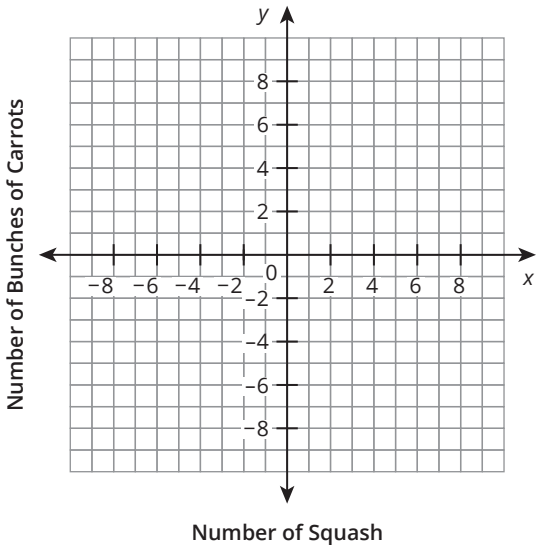
3. Noah plays football. His team's goal is to score at least 15 points per game. A touchdown is worth 6 points and a field goal is worth 3 points. Noah's league does not allow teams to try for the extra point after a touchdown. Write and graph an inequality that represents the possible ways Noah's team could score points to reach their goal. Is the ordered pair (6, −1) a solution for the problem situation?



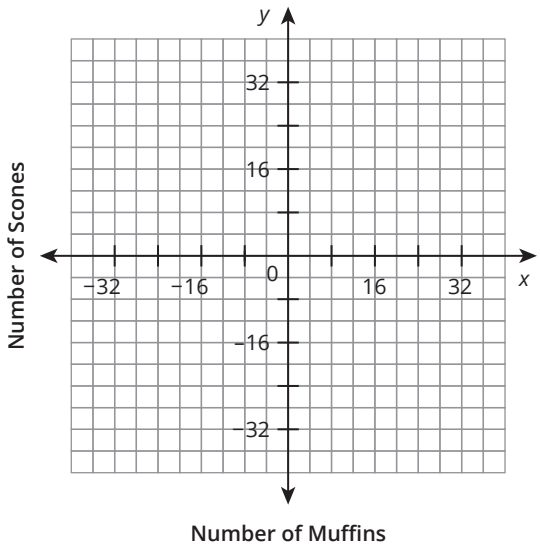
4. Lea has $5 to buy notebooks and pens. Notebooks cost $1.25 each and pens cost $0.75 each. Write and graph an inequality to represent the possible ways Lea could spend her $5. Is the ordered pair (5, 2) a solution for the problem situation?



5. Leon has $10 to buy squash and carrots. Squash cost $1.50 each and carrots cost $2.75 per bunch. Write and graph an inequality that represents the possible ways Leon could spend less than $10. Is the ordered pair (–2, 4) a solution for the problem situation?



6. Olivia makes and sells muffins and scones at a school bake sale. She sells muffins for $0.50 each and scones for $0.80 each. She hopes to raise more than $20. Write and graph an inequality that represents the possible ways Olivia could reach her goal. Is the ordered pair (20, 32) a solution for the problem situation?



V. Systems of Linear Inequalities

A. Write a system of linear inequalities that represents each problem situation. Remember to define your variables.

1. Jamal runs the bouncy house at a festival. The bouncy house can hold a maximum of 1200 pounds at one time. He estimates that adults weigh approximately 200 pounds and children under 16 weigh approximately 100 pounds. For 1 four-minute session of bounce time, Jamal charges adults $3 each and children $2 each. Jamal hopes to make at least $24 for each session.

2. Carlos works at a movie theater selling tickets. The theater has 300 seats and charges $7.50 for adults and $5.50 for children. The theater expects to make at least $2000 for each showing.

3. The maximum capacity for an average passenger elevator is 15 people and 3000 pounds. It is estimated that adults weigh approximately 200 pounds and children under 16 weigh approximately 100 pounds.

4. Pablo's pickup truck can carry a maximum of 1000 pounds. He loads his truck with 20-pound bags of cement and 80-pound bags of cement. He hopes to load at least 10 bags of cement into his truck.

5. Eiko is drawing caricatures at a fair for 8 hours. She can complete a small drawing in 15 minutes and charges $10 for the drawing. She can complete a larger drawing in 45 minutes and charges $25 for the drawing. Eiko hopes to make at least $200 at the fair.

6. Sofia is making flower arrangements to sell in her shop. She can complete a small arrangement in 30 minutes that sells for $20. She can complete a larger arrangement in 1 hour that sells for $50. Sofia hopes to make at least $350 during her 8-hour workday.

B. Determine whether each given point is a solution to the system of linear inequalities.

1. $\begin{cases} 2x - y > 4 \\ -x + y \leq 7 \end{cases}$

Point: $(-2, -10)$

2. $\begin{cases} x + 5y < -1 \\ 2y \geq -3x - 2 \end{cases}$

Point: $(0, -1)$

3. $\begin{cases} 4x + y < 21 \\ \frac{1}{2}x \leq 36 - 5y \end{cases}$

Point: $(3, 7)$

4. $\begin{cases} 5x + 3y > 6 \\ -2x + 2y < 20 \end{cases}$

Point: $(-2, 6)$

5. $\begin{cases} 15x + 25y \geq 300 \\ 20x + 30y \leq 480 \end{cases}$

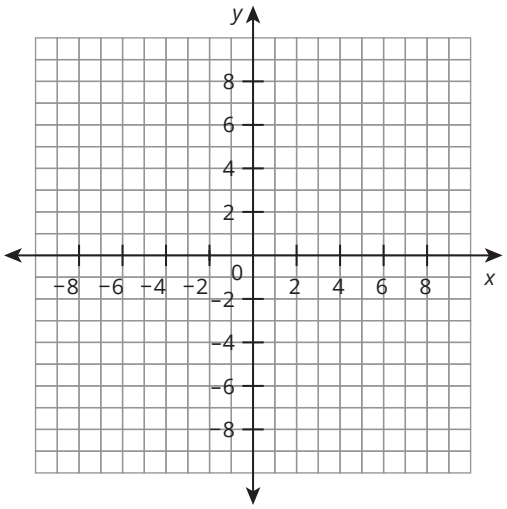
Point: $(14, 8)$

6. $\begin{cases} -2.1x + 7y \geq -49.5 \\ -y \leq -6.3x + 78 \end{cases}$

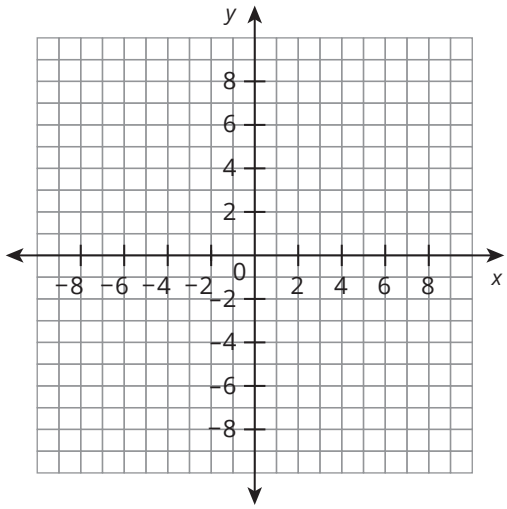
Point: $(10, -8)$

C. Graph each system of linear inequalities and identify two solutions.

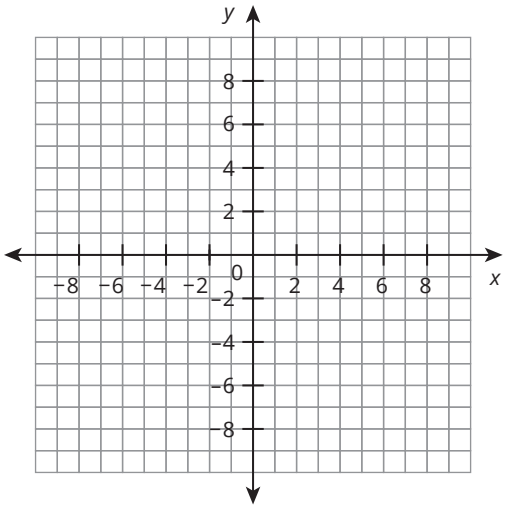
1. $\begin{cases} 3x - y > -5 \\ y + x > 3 \end{cases}$



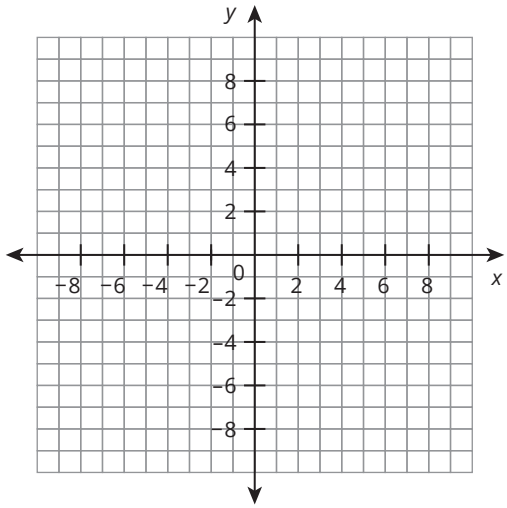
2. $\begin{cases} y > 2x + 3 \\ y < 2x - 5 \end{cases}$



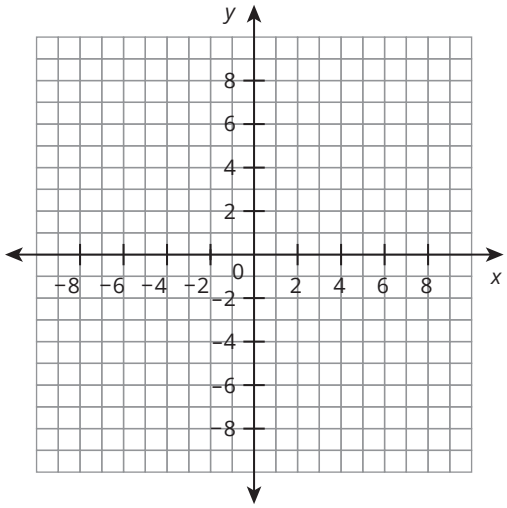
3. $\begin{cases} y \leq -\frac{2}{3}x + 3 \\ y \geq 3x - 4 \end{cases}$



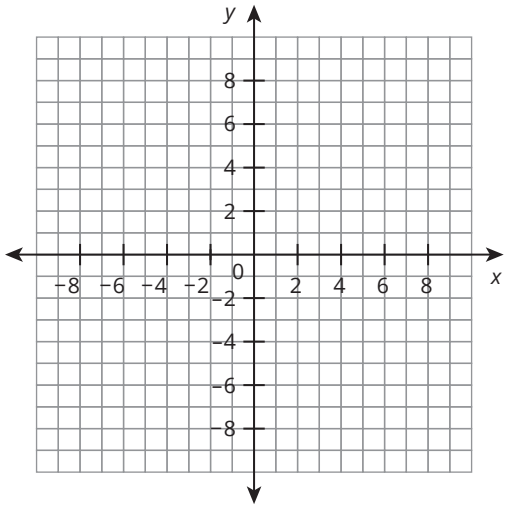
4. $\begin{cases} y - 2 < -\frac{1}{2}(x - 8) \\ y < 2x + 1 \end{cases}$



5. $\begin{cases} y \geq -\frac{1}{3}x + 4 \\ 2x - y \leq -5 \end{cases}$



6. $\begin{cases} y > -4x + 8 \\ 4x + y < -2 \end{cases}$



VI. Solving Systems of Equations and Inequalities

A. Write a system of equations or inequalities to represent each problem situation. Solve the system using your preferred method and answer any associated questions.

1. Jun received two different job offers to become a real estate sales agent. Dream Homes offered Jun a base salary of $20,000 per year plus a 2% commission on all real estate sold. Amazing Homes offered Jun a base salary of $25,000 per year plus a 1% commission on all real estate sold. Determine the amount of real estate sales in dollars for which both real estate companies will pay Jun the same amount. Explain which offer Jun should accept based on the amount of real estate sales he expects to have.

2. Stella is trying to choose between two rental car companies. Speedy Trip Rental Cars charges a base fee of $24 plus an additional fee of $0.05 per mile. Wheels Deals Rental Cars charges a base fee of $30 plus an additional fee of $0.03 per mile. Determine the amount of miles driven for which both rental car companies charge the same amount. Explain which company Stella should use based on the number of miles she expects to drive.

3. Renee has two job offers to be a door-to-door food processor salesperson. Pro Process Processors offers her a base salary of $15,000 per year plus an additional $25 for each processor she sells. Puree Processors offers her a base salary of $18,000 per year plus an additional $21 for each processor she sells. Determine the number of food processors Renee would have to sell for both companies to pay her the same amount. Explain which job offer Renee should accept based on the number of food processors she expects to sell.

4. Alex needs to rent a bulldozer. Smith's Equipment Rentals rents bulldozers for a delivery fee of $600 plus an additional $37.50 per day. Robinson's Equipment Rentals rents bulldozers for a delivery fee of $400 plus an additional $62.50 per day. Determine the number of rental days for which both rental companies charge the same amount. Explain which company Alex should choose based on the number of days he expects to rent a bulldozer.

5. The school volleyball team is selling t-shirts and baseball hats as a fundraiser for their program. The t-shirts are selling for $15 each and the baseball hats are selling for $12 each. If the school volleyball team sold a total of 84 items for a total of $1146, determine how many of each item they sold.

6. At Bonnie's Burgers the total bill for one table of diners included 4 veggie burger combos and 2 beef burger combos for $97.94. At another table the total bill came to $78.95 for 2 veggie burger combos and 3 beef burger combos. Determine the cost of a veggie burger combo and the cost of a beef burger combo at Bonnie's Burgers.