TEST NAME:**A-CED.3**
TEST ID:**363427**
GRADE:**09**
SUBJECT:**Mathematics**
TEST CATEGORY:**My Classroom**

1. Cody is considering going sailing during the summer. He is comparing the prices of two companies that rent the necessary equipment. Water Adventures charges $35 per hour to rent a sailboat plus a $14 fee for a wetsuit. Boat World charges $22 per hour to rent a sailboat plus a $40 fee for a wetsuit. Cody wants to determine the number of hours that Water Adventures will cost less than Boat World. Let x represent the number of hours Cody will spend sailing. Which inequality correctly compares the total costs for sailing at the two companies?

   A. $14x + 35 < 40x + 22$

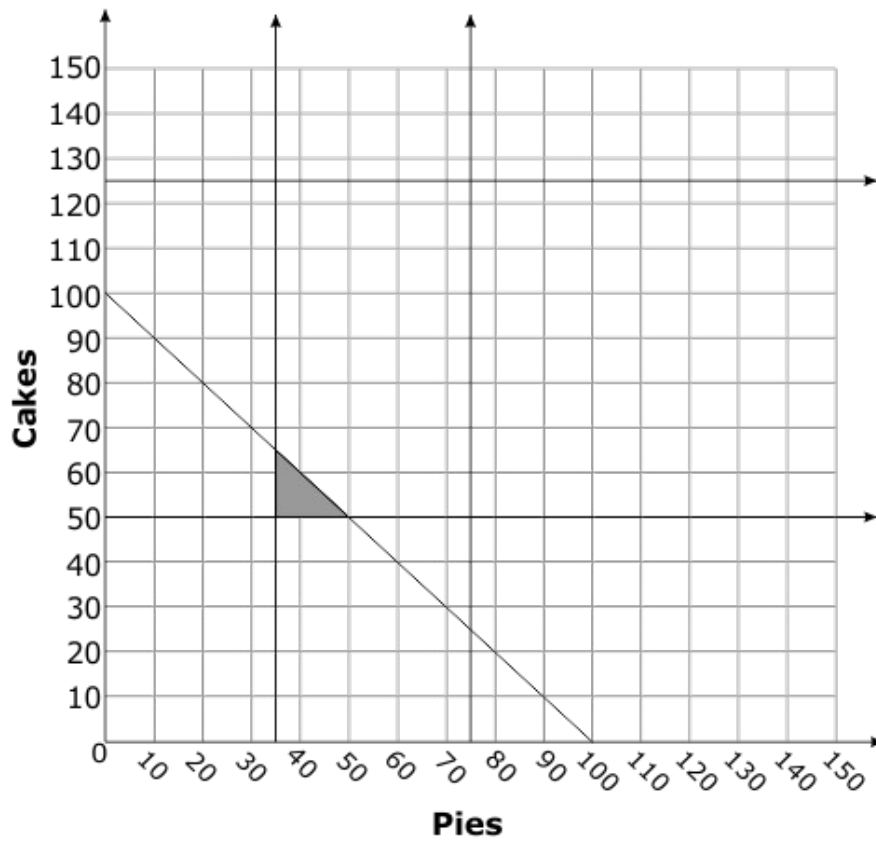   B. $22x + 40 < 35x + 14$

   C. $35x + 14 < 22x + 40$

   D. $40x + 22 < 14x + 35$

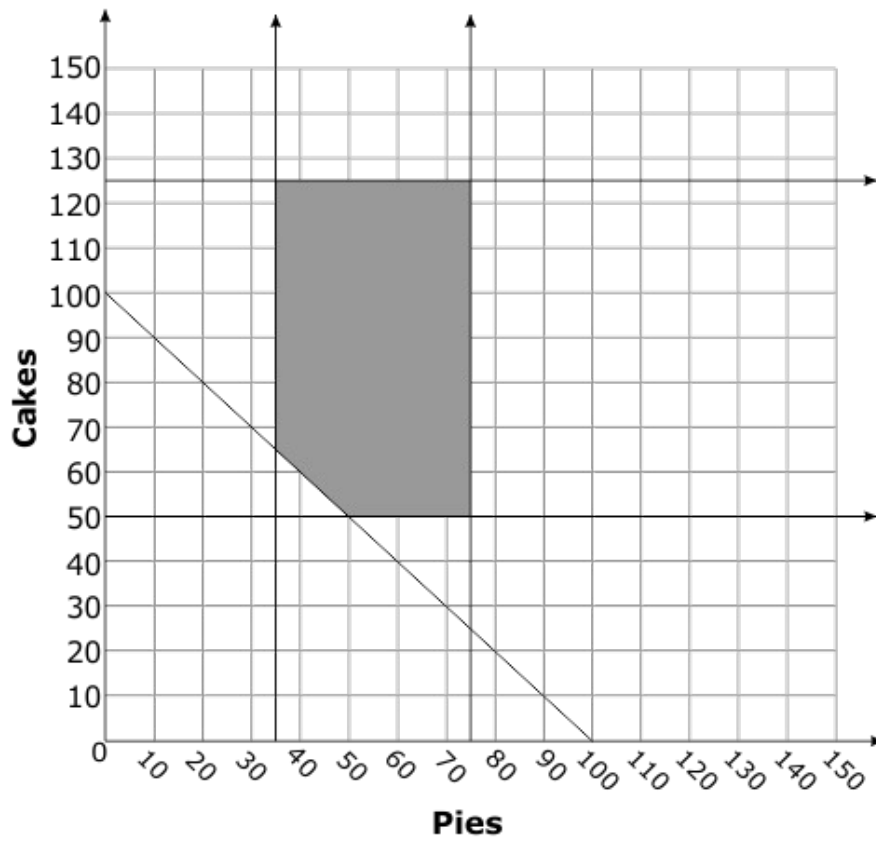2. A bakery sells pies and cakes.

   - The bakery expects to sell at least 50 pies and 35 cakes per day.
   - The bakery is not capable of making more than 125 pies and 75 cakes each day.
   - A total of at least 100 desserts must be delivered each day to satisfy delivery contracts.

   Which graph shows the region containing the number of pies, x, and the number of cakes, y, that should be made each day?
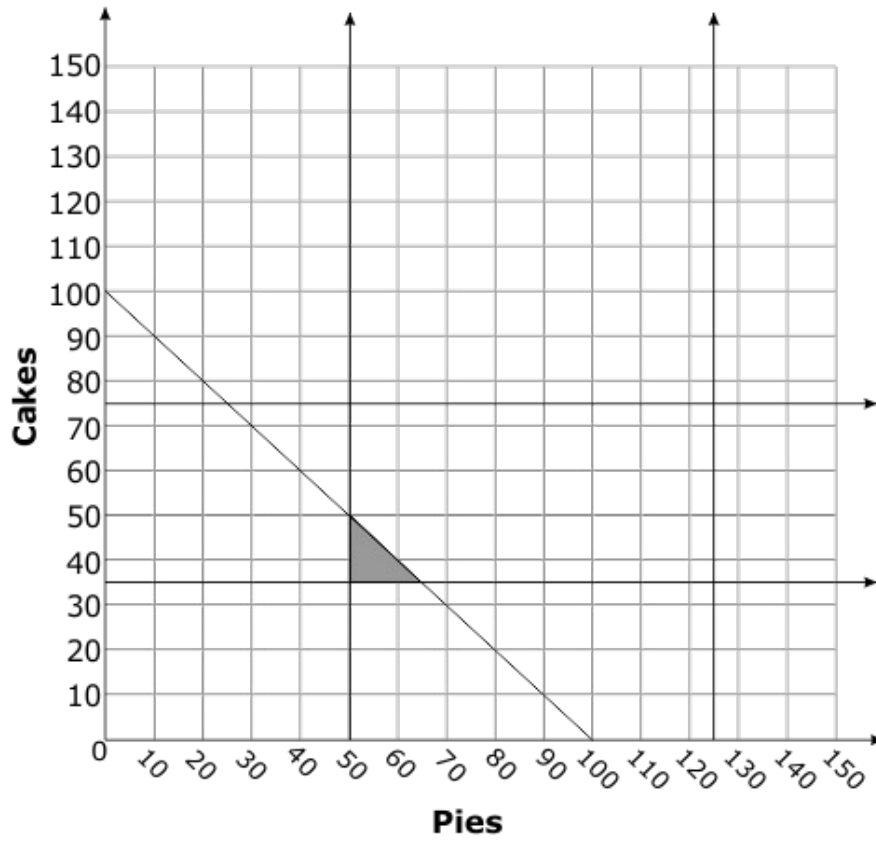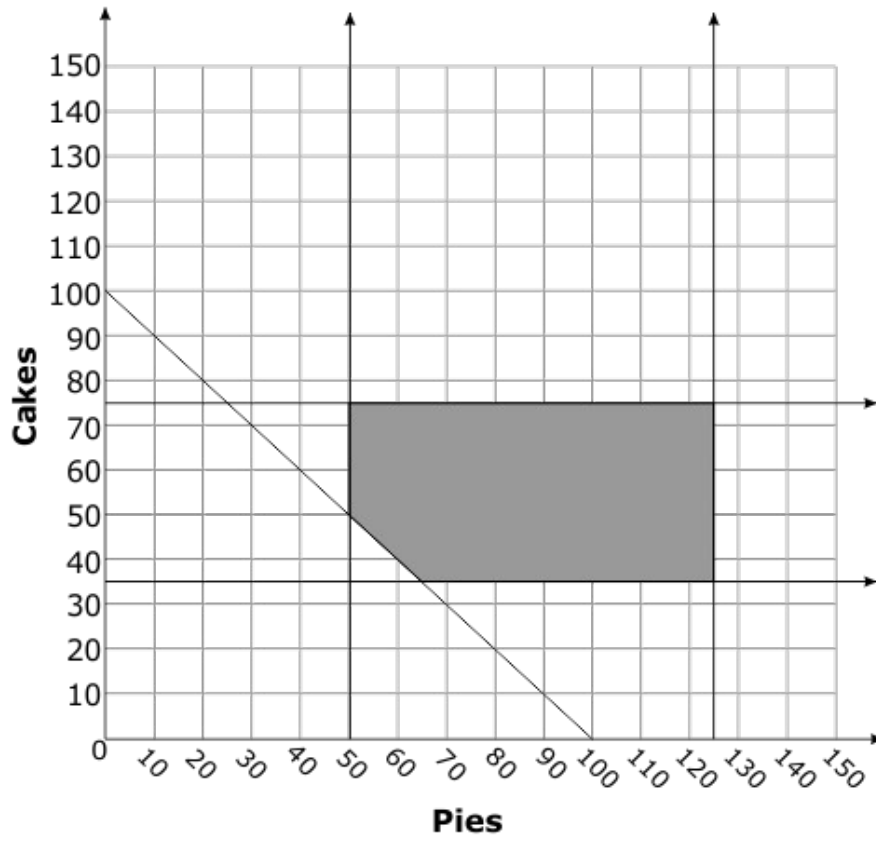
A.

Cakes (y-axis)
Pies (x-axis)

B.

Cakes (y-axis)
Pies (x-axis)

C.

Pies

D.

Pies

3. Ashley wants to add a data plan to her cell phone service. The cell phone carrier offers the following three pricing options.

Plan X

- $80 per month for unlimited data usage
- 75% off a new phone

Plan Y

- $40 per month plus $0.30 per megabyte of data usage
- 30% off a new phone

Plan Z

- $0 per month plus $0.80 per megabyte of data usage
- No discount for a new phone

Part A. Write an equation for each plan to represent how much Ashley will spend per month based on her data usage. Use *C* to represent cost and *D* to represent how much data she uses. Graph each equation.

Part B. Find the plan that offers Ashley the least expensive monthly cost for each of the following levels of data usage.

30 megabytes of data

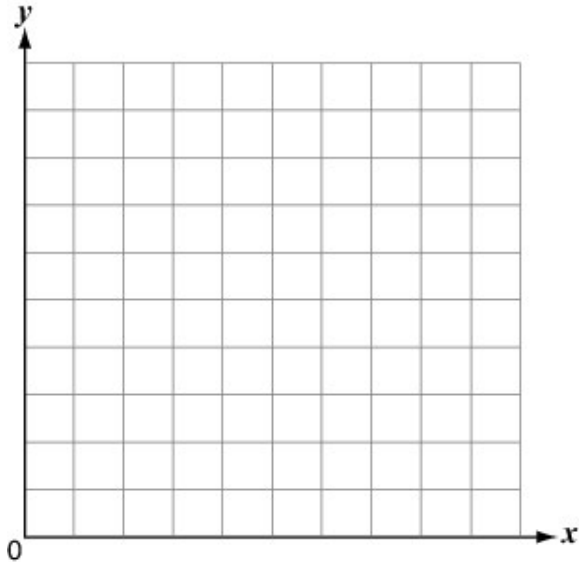90 megabytes of data

150 megabytes of data

Part C. Write an inequality for each plan to describe when it is the most cost-effective choice.

Part D. Suppose Ashley uses 100 megabytes of data per month and purchases a cell phone that costs $400 before any discounts are added. Which plan, including the service plan cost and the cell phone cost, is most cost-effective during the course of one year?

Part E. Ashley decides she cannot spend more than $1000 in one year on her data plan and cell phone purchase. If she uses 120 megabytes of data per month, what is the most expensive cell phone she can afford? You may round your answer to the nearest dollar, if necessary.

4. A painter has exactly 64 pints of yellow paint and 80 pints of green paint. He plans to mix them to make color A and color B to paint the walls of a living room. He uses 3 pints of yellow paint and 5 pints of green paint to make one gallon of color A and 4 pints of yellow paint and 4 pints of green paint to make one gallon of color B.

Part A. Determine the inequalities that satisfy the conditions given above and graph them.

Part B. Find the maximum number of gallons he can mix.

Use words, numbers, and/or pictures to show your work.

5. Duane went to the store to buy hot dogs and buns for a cookout.

- He needs at least 70 of each item.
- Each package of hot dogs contains 10 hot dogs and costs $4.50.
- Each package of buns contains 8 buns and costs $1.75.
- Duane does not want to have any leftover buns.

What is the minimum total price Duane will pay for the hot dogs and buns?

A $43.75

B. $45.50

C. $47.25

D. $51.75

6. Dr. Smith's office is open 8 hours a day. The doctor allows 25 minutes for office visits and 50 minutes for procedures. The doctor can perform up to 5 procedures per day. Let x represent the number of office visits and y the number of procedures. Which system of inequalities models this scenario?

A. $0 \le x \le 5$
$0 \le y$
$25x + 50y \le 480$

B. $0 \le x \le 19$
$0 \le y \le 5$
$25x + 50y \le 480$

C. $0 \le x$
$0 \le y \le 5$
$25x + 50y \le 8$

D. $0 \le x \le 5$
$0 \le y \le 19$
$25x + 50y \le 8$

7. Karen sells clothes. After studying her constraints, she knows that she will make a $10 profit on each jacket, j, she sells and $6 profit on each shirt, s, she sells. Which equation or inequality should she use to show her maximum profit, P?

A. $P > 10j + 6s$

B. $P = 10j + 6s$

C. $P > 6j + 10s$

D. $P = 6j + 10s$

8. Oliver has a faucet leaking at a constant rate outside his home. The equation $y = 2.5x$ can be used to find the number of gallons of water that will leak from the faucet in x days if he does not fix the leak. Which restriction on the value of either variable in this equation is true based on the information provided?

A. x is a rational number greater than 0.

B. x is an irrational number greater than 0.

C. y is a multiple of 5 greater than or equal to 2.5.

D. y is a multiple of 2.5 greater than or equal to 2.5.

9.

Ralph assembles pieces of furniture at a factory. It takes him $3\frac{3}{4}$ hours to assemble a desk. It takes him $2\frac{1}{2}$ hours to assemble a chair.

Ralph can work no more than 40 hours each week. During the week, he must assemble at least 10 chairs and a total of at least 12 pieces of furniture.

In the following inequalities, *d* represents the number of desks and *c* represents the number of chairs that Ralph can assemble within one week. Which system of inequalities can Ralph use to determine the maximum number of each item he can assemble?

A.
$$\begin{cases} c \le -\dfrac{3}{2}d + 16 \\ c \ge 10 \\ c \ge -d + 12 \end{cases}$$

B.
$$\begin{cases} c \ge -\dfrac{3}{2}d + 16 \\ c \le 10 \\ c \le -d + 12 \end{cases}$$

C.
$$\begin{cases} c \le -\dfrac{16}{4}d + 40 \\ c \ge 10 \\ c \ge -d + 12 \end{cases}$$

D.
$$\begin{cases} c \ge -\dfrac{16}{4}d + 40 \\ c \le 10 \\ c \le -d + 12 \end{cases}$$

10. A pottery shop sells plates and bowls.

- The shop expects to sell, at least, 10 plates and 15 bowls each day.
- The shop expects to sell, at most, 50 total pieces each day.
- Each plate sells for $14 and each bowl sells for $8.

How many bowls does the shop sell if they made the maximum daily income?

A. 10

B. 15

C. 35

D. 40

11. A bakery sells cakes, c, and donuts, d. The bakery makes a profit of $6 for each cake it sells and a profit of 45 cents for each donut it sells. Which equation or inequality should the bakery use to show its maximum profit?

A. $P > 6c + 0.45d$

B. $P = 6c + 0.45d$

C. $P > 6c + 45d$

D. $P = 6c + 45d$

12. The Student Council is having a talent show.

- They plan to sell no more than 500 student tickets and no more than 300 general admission tickets.
- It costs $0.50 per ticket to advertise the show to the students and $1 per ticket to advertise the show to the general public.
- The advertising budget is, at most, $400 for the show.
- Student Council makes $6 profit for a student ticket and $9 profit for a general admission ticket.

What is the maximum profit that the Student Council can expect from the show?

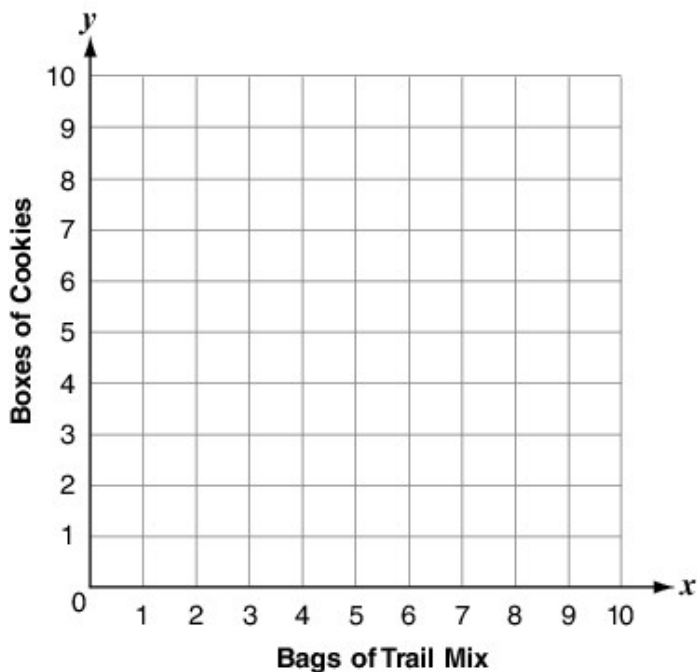A. $4,350

B. $3,900

C. $3,000

D. $2,750

13. **Snacks and Graphs**

Marilda is planning the food for 30 people at a youth group retreat that will be held from Friday night to Sunday afternoon. She has to consider the amount of different kinds of food that will be needed and the amount of money that can be spent.

Part A. For snacks on Friday evening, trail mix and cookies will be provided. Trail mix comes in bags that cost $5 each, and the cookies cost $4 per box. The maximum that can be spent for the Friday night snack is $40, and at least 2 boxes of cookies are needed.

Let t stand for the number of bags of trail mix and c for the number of boxes of cookies. Write a system of inequalities that represents this situation.

Part B. Graph your inequalities on the grid below.

Part C. The solution $t = -2$ and $c = 12$ would satisfy the inequality that gives the total cost of the snacks. Is this a valid solution for the problem? Why or why NOT?

Part D. Another solution to the inequality that gives the total cost of the snacks is $t = 3.2$ and $c = 5.$ Is this a valid solution for the problem? Why or why NOT?
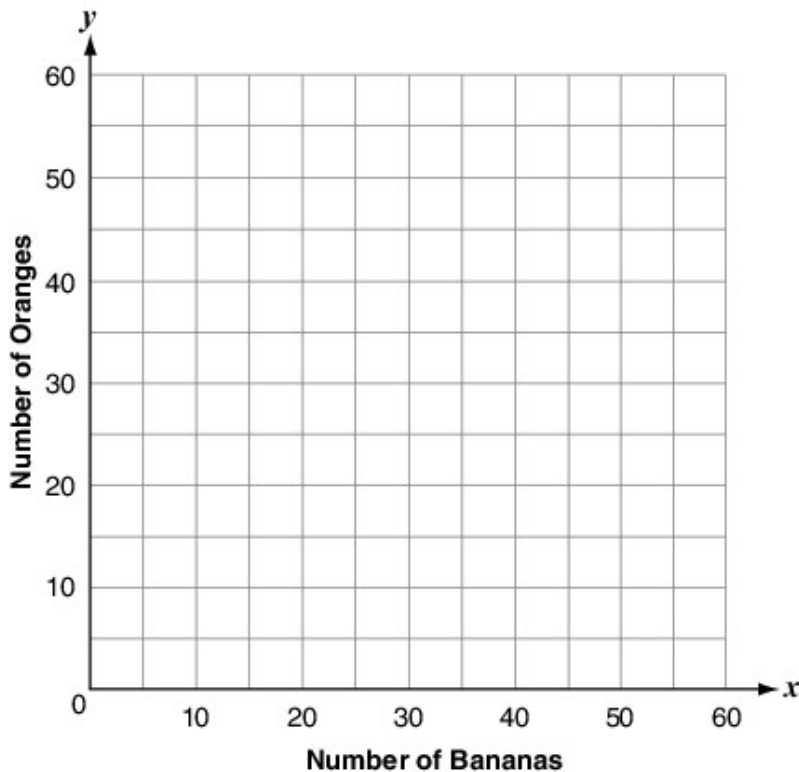
Part E. Complete the chart to show the **maximum** number of boxes of cookies that could be bought given that a certain number of bags of trail mix are bought. Extend the table and fill in the rows to show all the possible combinations of trail mix and cookies.

**MAXIMUM AMOUNTS
OF TRAIL MIX
AND COOKIES**

Bags of Trail Mix	Boxes of Cookies
1	8
2	

Part F. For the two breakfasts on Saturday and Sunday mornings, Marilda buys 1 piece of fruit for each person each day. She gets some bananas, which cost 19¢ per piece, and some oranges, which cost 25¢ per piece. In all, she spends $10.84 (or 1,084¢). Let b stand for the number of bananas and o for the number of oranges. Write and solve a system of equations to show how many pieces of each kind of fruit she buys.

Part G. Graph the system of equations on this grid. Mark the solution with a dot. Make sure it matches the solution you found in part F.

Number of Bananas

14. Charlotte makes bracelets.

- A small bracelet costs $0.50 to make and takes a half hour to create.
- A large bracelet costs $1.50 to make and takes an hour to create.
- Charlotte has only $20 for supplies and 10 hours to work on bracelets each week.

Which is a possible number of small and large bracelets that Charlotte can make each week?

A. 2 small, 13 large

B. 6 small, 7 large

C. 8 small, 12 large

D. 14 small, 6 large

15. Travelz is organizing a three-day city tour and is charging $150 for each adult and $75 for each child. There are twice as many children on the trip as there are adults. The total amount collected for the number of adults, *a*, and the number of children, *c*, that are taking the tour is $5250. Which of these equations can be used to find the total number of adults and children on the tour?

A. $150a + 75c = 5250$
    $2a = c$

B. $150a + 75c = 5250$
    $a = 2c$

C. $225(a + c) = 5250$
    $2a = c$

D. $225(a + c) = 5250$
    $a = 2c$

16. Tina has $50 to spend at the carnival.

- Each game costs $2 to play.
- Each ride costs $4.
- Tina wants to play at least 6 games and ride on at least 3 rides.

What is the maximum number of games Tina can play, if she rides the most rides possible?

A. 6 games

B. 7 games

C. 8 games

D. 9 games

17. A college entrance exam has a verbal section and a math section. A student can score a **maximum** of 800 points in each. To qualify, a student has to score **at least** 600 points in math and a **minimum** total of 1100 points. Which ordered pair represents a combination of math scores, x, and verbal scores, y, of a student who qualifies?

    A. $(800, 900)$

    B. $(600, 590)$

    C. $(590, 600)$

    D. $(600, 490)$

18. A system of inequalities is shown below.

$$y > {}^-2x + 5$$

$$y \le {}^-3$$

Which point is a viable solution to the system?

    A. $(1, {}^-2)$

    B. $(4, {}^-3)$

    C. $(6, 2)$

    D. $(8, {}^-4)$

19. Jerry works for a cable television company. He must sell at least 10 television packages over the next week. Customers have two packages to pick from, Package X and Package Y.

    - Jerry has to sell at least 2 of each package.
    - He can sell at most 12 of Package X.
    - He makes $30 for each Package X he sells.
    - He can sell no more than 17 of Package *Y*.
    - He makes $25 for each Package Y he sells.

    Which inequality is a constraint for Jerry's sales?

    A. $x \ge 12$

    B. $y \ge 2$

    C. $x + y > 10$

    D. $30x + 25y \ge 55$

20. A baseball team hosts an exhibition game in order to raise at least $5,000 for new equipment. Regular stadium seats sell for $5 each, but each of the 400 premium seats sells for $10.

The coach draws up a feasible region in the coordinate plane, where x represents the number of premium seats the game sells, and y represents the number of regular seats the game sells. Which of the following inequalities is NOT a boundary condition for the feasible region?

A. $10x + 5y \geq 5000$

B. $x + y \geq 5000$

C. $x \leq 400$

D. $x \geq 0$

21. Peggy is saving her money. She has a total of $70 in quarters and dollar bills. If the number of dollar bills Peggy has is three times the number of quarters, which equations will help her determine the number of quarters, x, and dollar bills, y, she has?

A. $\begin{cases} x + 4y = 70 \\ \quad x = 3y \end{cases}$

B. $\begin{cases} x + 4y = 280 \\ \quad x = 3y \end{cases}$

C. $\begin{cases} x + 4y = 70 \\ \quad 3x = y \end{cases}$

D. $\begin{cases} x + 4y = 280 \\ \quad 3x = y \end{cases}$

22. A company needs to sell at least 30 subscriptions, s, for every free subscription, c, they give away. Which inequality would be representative of this constraint?

A. $s \geq 30c$

B. $s \geq 30 + c$

C. $c \leq 30s$

D. $c \leq 30 + s$

23. Peyton makes bracelets of two kinds: those with beads and those with stones. She can make at most 25 bracelets in one week. Peyton makes at most 8 bracelets with beads per week, which she sells for $35 each. The bracelets with stones sell for $45 each. Peyton wants to sell at least $1,000 in bracelets this week. Use b to represent the number of bracelets with beads and s to represent the number of bracelets with stones. Which set of inequalities bounds the acceptable region for Peyton's sales?

A.
$$\begin{cases} b \le 8 \\ b \le -s + 25 \\ b \ge -\dfrac{9}{7}s + \dfrac{200}{7} \end{cases}$$

B.
$$\begin{cases} s \le 8 \\ s \le -b + 25 \\ s \ge -\dfrac{9}{7}b + \dfrac{200}{7} \end{cases}$$

C.
$$\begin{cases} b \le 8 \\ b + s \le 25 \\ 45b + 35s \ge 1000 \end{cases}$$

D.
$$\begin{cases} b \le 8 \\ b \le -s + 25 \\ b + s \le 1000 \end{cases}$$

24. Cell phone companies try to sell at least 4 smartphones for every 1 non-smartphone. If x is the number of smartphones and y is the number of non-smartphones, which ordered pair meets the constraint?

A. (11, 57)

B. (47, 25)

C. (63, 15)

D. (97, 25)

Evan has a job selling magazine and newspaper subscriptions. He earns $23 for each magazine subscription and $54 for each newspaper subscription that he sells. His goal is to make more than $642 per week. He expects to sell at least 10 subscriptions per week. If m represents the number of magazine subscriptions sold and n represents the number of newspaper subscriptions sold, which system of inequalities models the given situation?

A. $m+n \geq 10$
    $23m+54n > 642$

B. $m+n \geq 10$
    $54m+23n > 642$

C. $m+n > 10$
    $23m+54n > 642$

D. $m+n > 10$
    $54m+23n > 642$

26. Three friends each have different monthly payment plans for sending text messages.

- Naomi pays a flat fee of $30 for an unlimited number of text messages.
- Tina pays a base fee of $6.00 plus $0.10 per text message.
- Chris pays a base fee plus $0.05 per text message. Last month, he paid $18.00 for 100 text messages.

Naomi researched how much she would have to pay if she switched to Tina or Chris's plan. She decided that her plan is the least expensive based on the number of text messages she uses each month. What is the minimum number of text messages Naomi must use each month for her plan to be the least expensive?

A. 140 text messages

B. 241 text messages

C. 341 text messages

D. 601 text messages

27. A library charges late fees based on one of the two equations shown.

- The equation y=0.25x is used to find the late fee for a book late *x* days.
- The maximum late fee is $12.

Under which condition would $y = 0.25x$ be used?

A. A book is 1 to 48 days late.

B. A book is more than 48 days late.

C. A book is 25 to 60 days late.

D. A book is more than 12 days late.

28. Sarah is going to eat raisins and bananas in order to get the amount of potassium recommended each day.

- She wants to eat at least 1 box of raisins and at least 2 bananas each day.
- Each box of raisins has 322 mg of potassium and 129 calories.
- Each banana has 361 mg of potassium and 90 calories.
- She needs between 2,000 and 2,500 mg of potassium each day.

Which system below could be used to find the number of boxes of raisins, *x*, and bananas, *y*, that Sarah needs to minimize her weekly calorie intake?

A. $x \geq 1$
$y \geq 2$
$14,000 \leq 322x + 361y \leq 17,500$
Calories $= 129x + 90y$

B. $x \geq 1$
$y \geq 2$
$2,000 \leq 322x + 361y \leq 2,500$
Calories $= 129x + 90y$

C. $x \geq 7$
$y \geq 14$
$14,000 \leq 322x + 361y \leq 17,500$
Calories $= 129x + 90y$

D. $x \geq 7$
$y \geq 14$
$2,000 \leq 322x + 361y \leq 2,500$
Calories $= 129x + 90y$

29. Alyssa has $150 to spend on new school clothes.

- She wants to buy at least 2 times as many shirts as pairs of pants.
- Each shirt costs $15, and each pair of pants costs $20.

What is the maximum number of pairs of pants that Alyssa can buy to meet the constraints?

A. 2

B. 3

C. 6

D. 10

30. Trevor is making two types of bracelets.

- Each Type P bracelet needs 12 inches of leather and 3 inches of string.
- Each Type Q bracelet needs 4 inches of leather and 18 inches of string.
- Trevor has 5 yards of leather and 6 yards of string.
- x equals the number of Type P bracelets Trevor makes.
- y equals the number of Type Q bracelets Trevor makes.

Which system of equations models the constraints on the number of bracelets Trevor can make?

A. $12x + 4y \leq 180$
$3x + 18y \leq 216$
$x \geq 0$
$y \geq 0$

B. $12x + 3y \leq 180$
$4x + 18y \leq 216$
$x \geq 0$
$y \geq 0$

C. $12x + 4y \leq 5$
$3x + 18y \leq 6$
$x \geq 0$
$y \geq 0$

D. $12x + 3y \leq 5$
$4x + 18y \leq 6$
$x \geq 0$
$y \geq 0$

31. A high school band is planning a trip that will cost $180 per person. The band has a bake sale to raise money. They charge $1.50 for a bag of cookies and $8.00 for a pie. Which combination would pay for the 16 band members to go on the trip and have extra spending money?

   A.   320 bags of cookies, 300 pies

   B.   264 bags of cookies, 320 pies

   C.   192 bags of cookies, 324 pies

   D.   64 bags of cookies, 348 pies

32. Kim works at a nail salon doing manicures and pedicures.

- Each manicure takes 30 minutes, and each pedicure takes 45 minutes.
- She has at least 3 manicures a day.
- She earns a profit of $10 per manicure and $20 per pedicure.
- She can only work 8 hours per day.

To maximize her profit, how many more pedicures than manicures should Kim do?

   A.   7

   B.   6

   C.   4

   D.   2

33. Cecil is buying almonds and cashews.

- A bag of almonds costs $7.00 and a bag of cashews costs $9.00.
- Cecil has $60 to spend on the nuts.
- Cecil wants to purchase at least 2 bags of almonds.
- Cecil does not want the cost of the cashews to exceed the cost of the almonds.

What is the maximum number of bags of cashews that Cecil can buy?

   A.   2

   B.   3

   C.   4

   D.   5

34. Jenny is baking cakes and pies.

- Each cake requires 1.25 cups of flour and 2 eggs.
- Each pie requires 1 cup of flour and 1 egg.
- Jenny has 12 cups of flour and 18 eggs.

Using the ingredients she has, which is a possible number of cakes and pies Jenny can make?

A. 5 cakes and 6 pies

B. 6 cakes and 5 pies

C. 7 cakes and 4 pies

D. 8 cakes and 2 pies

35. A system of inequalities is shown below.

$$y \le \frac{1}{2}x - 4$$

$$y \le 0$$

$$x \ge 2$$

Which point is a viable solution to the system?

A. $(4, {}^-1)$

B. $(3, 2)$

C. $(5, {}^-2)$

D. $(7, 0)$

36. Jill bakes banana bread and nut bread for a bake sale.

- Banana bread uses 2 eggs and half a pound of flour.
- Nut bread uses 1 egg and 1 pound of flour.
- Jill has 8 eggs and 5 pounds of flour to use.
- She makes a profit of $3 for each loaf of banana bread and $2 for each loaf of nut bread.

How many loaves of banana bread should Jill bake to maximize her profit?

A. 0

B. 2

C. 4

D. 5

37. Susan wants to make cupcakes and cookies to sell at the school bake sale.

- It takes her 30 minutes to make a dozen cookies and 1 hour to make a dozen cupcakes.
- It costs her $3 to buy supplies for each dozen cookies and $4 to buy supplies for each dozen cupcakes.
- She has 14 hours available to cook and has $50 to spend on supplies.
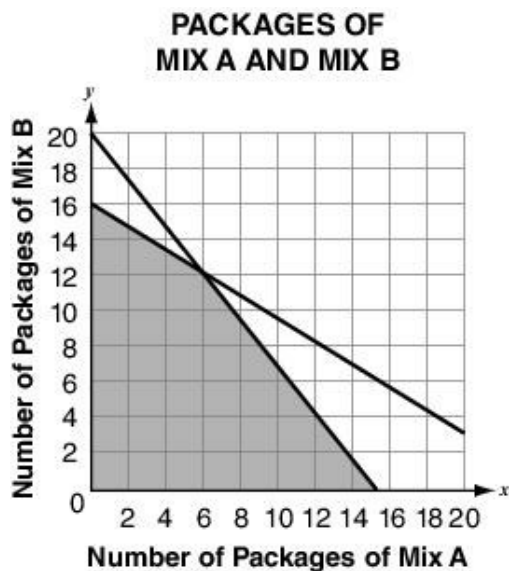- She will make at least 1 dozen cookies and 1 dozen cupcakes.

Which system of inequalities models these constraints?

A.
$0.5x + y \leq 50$
$3x + 4y \leq 14$
$x \geq 1$
$y \geq 1$

B.
$0.5x + y \leq 50$
$4x + 3y \leq 14$
$x \geq 1$
$y \geq 1$

C.
$0.5x + y \leq 14$
$3x + 4y \leq 50$
$x \geq 1$
$y \geq 1$

D.
$0.5x + y \leq 14$
$4x + 3y \leq 50$
$x \geq 1$
$y \geq 1$

38. The length, x, of a rectangular garden is 4 times the width, y. Cody estimates that the perimeter of the garden is 70 meters. Which system of equations models the dimensions of the garden?

A. $x = 4y; x + y = 35$

B. $4x = y; x + y = 35$

C. $x = 4y; x + y = 70$
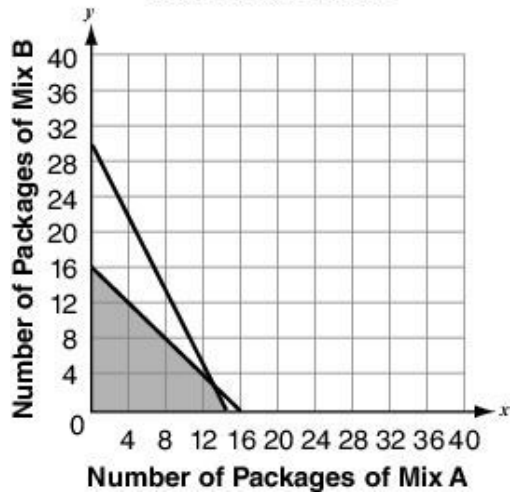
D. $4x = y; x + y = 70$

39. A wholesale distributor of packaged nuts sells two different mixes of peanuts and cashews, mix A and mix B. Each package of mix A nuts contains 8 ounces (oz.) of peanuts and 4 oz. of cashews. Each package of mix B nuts contains 6 oz. of peanuts and 6 oz. of cashews. Let x represent the number of packages of mix A nuts and let y represent the number of packages of mix B nuts. No more than 120 oz. of peanuts and no more than 96 oz. of cashews can be used each day. Which graph represents the numbers of packages of mix A and mix B that can be produced?
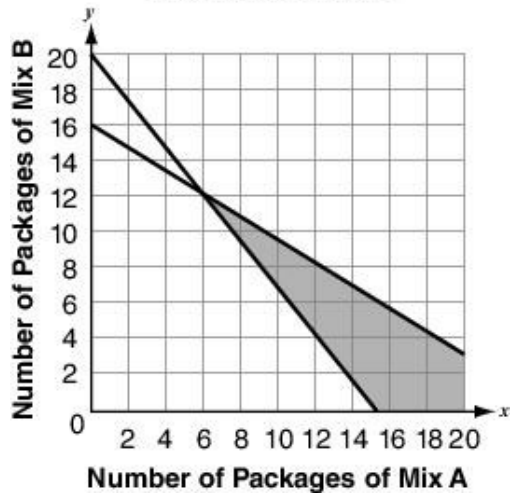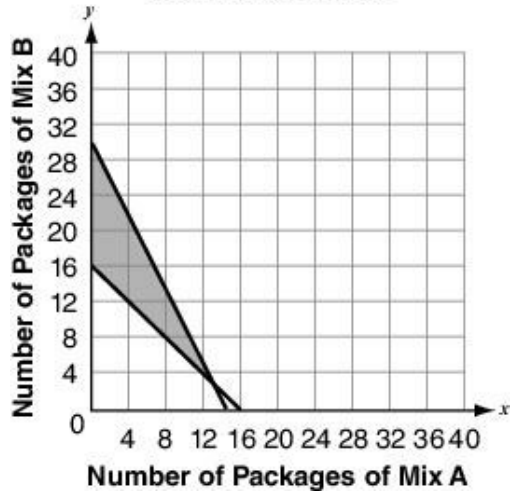
A.

PACKAGES OF MIX A AND MIX B

B.

PACKAGES OF MIX A AND MIX B

C.

PACKAGES OF MIX A AND MIX B

D.

PACKAGES OF MIX A AND MIX B

40. A factory produces *x* packs of pencils and *y* packs of pens each day.

- The factory can produce no more than a total of 50 packs of pens and pencils each day.
- At least 10 packs of pencils are produced each day.
- At least 20 packs of pens are produced each day.
- The company makes $0.25 on a pack of pencils and $0.50 on a pack of pens.

What are the vertices of the feasible region for the system of inequalities that models the constraints?

A. (10, 20), (10, 40), (30, 20)

B. (20, 10), (20, 30), (40, 10)

C. (15, 40), (30, 40), (30, 50)

D. (20, 20), (25, 15), (25, 40)

41. The Randolph family has a 100-acre farm where the family raises two crops, *x* and *y*. The Randolphs take part in a government grant program which requires them to plant at least 20 acres of each crop.

It costs the Randolphs $20 per acre to raise crop *x* and $40 per acre to raise crop *y*. The family has $2,600 to cover costs. This year, the profit from selling crop *x* is $25 per acre and the profit from selling crop *y* is $60 per acre.

The Randolphs want to calculate how many acres of each crop they should plant in order to maximize their profit. On an *xy*-coordinate graph, where the *x* and *y*-values of a point represent the number of acres of each crop planted, find:

- the equations for the constraints of the feasable region, and
- the coordinates that indicate the maximum profit.

A. $x + y \leq 100$
   $20x + 40y \leq 2600$
   $x \geq 0, y \geq 0$
   $(0, 65)$

B. $x + y \leq 100$
   $20x + 40y \leq 2600$
   $x \geq 20, y \geq 20$
   $(20, 55)$

C. $x + y \leq 100$
   $20x + 40y \leq 2600$
   $x \geq 0, y \geq 0$
   $(70, 30)$

D. $x + y \leq 100$
   $20x + 40y \leq 2600$
   $x \geq 20, y \geq 20$
   $(80, 20)$

42. A factory produces cars and trucks to sell.

- The factory can produce no more than 60 vehicles per day.
- The factory produces at least 25 cars each day.
- The factory produces at least 15 trucks each day.
- The factory makes $2,000 profit on each car.
- The factory makes $4,000 profit on each truck.

How many of each type of vehicle should the company make to maximize profit?

- A. 25 cars and 35 trucks

- B. 30 cars and 30 trucks

- C. 35 cars and 25 trucks

- D. 45 cars and 15 trucks

43. A school is purchasing kneepads and headbands for the gym. The school budget this year allows the staff members to spend no more than $1,500, and they want to order **at least** 250 items. They must buy **at least** as many kneepads as headbands. Each kneepad costs $5 and each headband costs $8. Which of these combinations of number of kneepads, x, and number of headbands, y, will satisfy the given conditions?

- A. $(60, 200)$

- B. $(100, 150)$

- C. $(150, 100)$

- D. $(200, 60)$

44. Johnnie can buy n notebooks for $0.99 each and p pens for $0.25 each, including tax on each price. He needs to purchase **at least** 8 notebooks and 2 pens out of $15.00 he has to spend. Which statement is true about the restrictions on either of the variables?

- A. p is a rational number such that $p \le 2$.

- B. p is a rational number such that $p \ge 2$.

- C. n is an integer such that $n \ge 8$.

- D. n is an integer such that $n \le 8$.

45. A delivery truck can transport packages weighing at most 3,800 pounds (lbs) and with a volume of no more than 400 cubic feet (ft^3). The truck transports only two sizes of packages: a small package weighing 30 lbs with a volume of 4 ft^3 and a large package weighing 65 lbs with a volume of 9 ft^3. Let x represent the number of small packages and y represent the number of large packages. Which system of inequalities describes the possible numbers of packages the truck can transport at one time?

A. $6x + 13y \geq 760$
   $4x + 9y \geq 400$

B. $6x + 13y \leq 760$
   $4x + 9y \leq 400$

C. $15x + 2y \leq 1,900$
   $65x + 9y \leq 400$

D. $15x + 12y \geq 1,900$
   $65x + 9y \geq 400$

46. A farmer has 12 acres of land. He plans to plant w acres of wheat and b acres of barley on his land. If he plans to plant wheat in no more than 3 acres of land, which system of inequalities represents the possible values for b and w?

A. $w \geq 0$
   $b \geq 0$
   $w + b \geq 12$
   $w \geq 3$

B. $w \geq 0$
   $b \geq 0$
   $w + b \geq 12$
   $w \leq 3$

C. $w \geq 0$
   $b \geq 0$
   $w + b \leq 12$
   $w \leq 3$

D. $w \geq 0$
   $b \geq 0$
   $w + b \leq 12$
   $w \geq 3$

A coffee shop is having a clearance sale for two types of coffee beans, arabica and robusta. The coffee shop is charging $3 per pound for arabica beans and $4 per pound for robusta beans. On a given day, a total of 55 pounds of coffee beans was sold, and $195 was the total value of the sales. Which statement accurately compares the sales of the two types of coffee beans for this day?

    A. The coffee shop took in $5 more selling arabica beans.

    B. The coffee shop took in $5 more selling robusta beans.

    C. The coffee shop took in $45 more selling arabica beans.

    D. The coffee shop took in $45 more selling robusta beans.

48. Carlos and Thomas are each buying motor scooters and bicycles. Carlos buys 6 scooters and 3 bicycles for $4515. Thomas buys 5 scooters and 4 bicycles for $3995. Which system of equations can be used to determine the cost of one scooter, where s represents the number of of scooters and b represents the number of bicycles?

A.
$$\begin{cases} s = -\dfrac{1}{2}b + 752.5 \\ s = -\dfrac{4}{5}b + 799 \end{cases}$$

B.
$$\begin{cases} s = -\dfrac{1}{2}b + 655.83 \\ s = -\dfrac{4}{5}b + 903 \end{cases}$$

C.
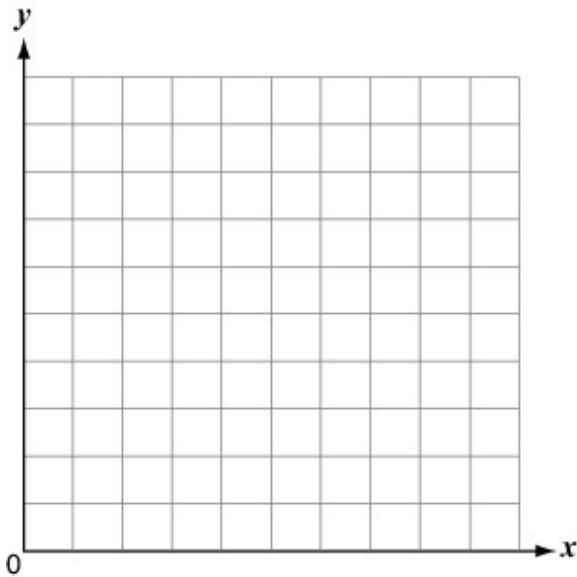$$\begin{cases} s = -2b + 752.5 \\ s = -\dfrac{5}{4}b + 799 \end{cases}$$

D.
$$\begin{cases} s = -2b + 1505 \\ s = -\dfrac{5}{4}b + 998.75 \end{cases}$$

49. A certain roller coaster ride at a theme park can hold up to 50 people, both children and adults. On a particular day, due to mechanical issues, 4 seats cannot be used. On that day, which combination would be a viable solution?

   A.   24 children, 26 adults

   B.   28 children, 20 adults

   C.   30 children, 11 adults

   D.   32 children, 15 adults

50. Ingrid has 13 quarts of orange juice and 7 quarts of apple juice. She plans to mix them to make mixed-fruit drinks A and B. She uses 3 quarts of orange juice and 1 quart of apple juice to make one gallon of fruit drink A and 2 quarts of orange juice and 2 quarts of apple juice to make one gallon of fruit drink B.

Part A. Write a system of inequalities to represent the constraints of this situation. Make sure to define the variables used in your system of inequalities.

Part B. Graph the system of inequalities written in Part A on the coordinate grid below. What does the shaded region of your graph represent?

Part C. Determine a function for the profits Ingrid earns if she sells 1 quart of fruit drink A for a profit of $0.60 and 1 quart of fruit drink B for a profit of $0.80.

Part D. What is the maximum profit that Ingrid can earn? Explain your answer.

Use words, numbers, and/or pictures to show your work.

51. A computer company hopes to sell more than 4 times as many laptop computers as desktop computers. The company sold 10 desktop computers last week. Which would be a viable number of laptops the company could sell to meet their goal?

    A. 27

    B. 36

    C. 40

    D. 52

52. A dance department is planning a holiday show. The department needs to raise at least $450 in order to cover the cost of costumes and decorations. Tickets will be sold at $5 for adults and $3 for students. Let *a* represent the number of adult tickets and *s* represent the number of student tickets. Which inequality should be used to represent the number of tickets that must be sold in order to raise the amount of money needed for the show?

    A. $3a + 5s > 450$

    B. $3a + 5s \leq 450$

    C. $5a + 3s < 450$

    D. $5a + 3s \geq 450$

53. The Math Club has a budget of $100 for a pizza party. The club can get large pizzas, *x*, for $12 and cases of soda, *y*, for $5.50. The club would like to buy at least 6 large pizzas and at least 4 cases of soda. Which system models the situation?

    A. $12x + 5.50y \leq 100$
       $x \geq 6$
       $y \geq 4$

    B. $12x + 5.50y \leq 100$
       $x \leq 6$
       $y \leq 4$

    C. $12x + 5.50y \geq 100$
       $x \leq 6$
       $y \leq 4$

    D. $12x + 5.50y \geq 100$
       $x \geq 6$
       $y \geq 4$

54. Greg makes chairs and tables.

- Each chair takes him 4 days to make.
- Each table takes him 6 days to make.
- Greg works no more than 26 days in a month.
- Greg makes at least 2 tables a month.

What is the maximum number of chairs Greg can make in one month?

A. 6

B. 5

C. 4

D. 3

55. Xian is planning a party at the skating rink. The cost for each person attending is $3.50 for skate rental and $5.00 for food. Xian cannot spend more than $300. Which inequality could be used to find the greatest number of people, p, that can attend?

A. $3.5p + 5p > 300$

B. $3.5p + 5p < 300$

C. $3.5p + 5p \geq 300$

D. $3.5p + 5p \leq 300$

56. Anna had $5000, which she invested in two different banks. She deposited x amount of money in bank A, which paid 3.5% simple interest annually. She deposited y amount of money in bank B, which paid 1.2% simple interest annually. The total interest Anna earned over a 6-year period was $774. Which system of equations represents the given situation?

A. $x + y = 5000$
$0.21x + 0.072y = 774$

B. $x + y = 774$
$0.21x + 0.072y = 5000$

C. $x + y = 5000$
$0.035x + 0.012y = 774$

D. $x + y = 774$
$0.035x + 0.012y = 5000$

57. Karen is making bird houses, *x,* and dog houses, *y,* to earn money. She found that her feasible region intersected at the points (9, 20), (0, 16), and (11, 0). She knows that she will lose $1 on each bird house, but will make $5 on each dog house that she sells. How many dog houses will Karen need to sell to maximize her profit?

    A. 91

    B. 80

    C. 20

    D. 16

58. A high school is hosting a basketball tournament. Their goal is to raise at least $1,500.00. Students can buy tickets for $3.00 and non-students for $5.00. The seating capacity for the gym is 400 people. Which could represent the number of each type of ticket sold to meet the high school's goal and not exceed the capacity of the gym?

    A. 100 student, 200 non-student

    B. 125 student, 175 non-student

    C. 150 student, 350 non-student

    D. 170 student, 229 non-student

59. The Thompson family went to a baseball game. Mrs. Thompson has $30 to buy hamburgers and drinks for herself and 4 family members.

    - Each hamburger costs $4.00 and each drink costs $2.50.
    - Each person will get a drink.

    What is the maximum number of hamburgers that Mrs. Thompson can buy?

    A. 4

    B. 5

    C. 6

    D. 7

60. An amusement park charges $17 for each adult ticket and $6 for each child ticket. One day, the park earned $3,640 in ticket sales. Let x represent the number of adult tickets sold. Let y represent the number of child tickets sold. If 400 tickets were sold on this day, which system of equations can be used to find the number of each type of ticket sold?

A. $x + y = 400$
$6x + 17y = 3,640$

B. $x + y = 400$
$17x + 6y = 3,640$

C. $x + y = 3,640$
$6x + 17y = 400$

D. $x + y = 3,640$
$17x + 6y = 400$

61. A store sells two types of speakers, A and B; x represents the number of type A speakers sold daily, and y represents the number of type B speakers sold daily. The system of inequalities below represents the possible values of x and y for this situation.

$x \geq 0$

$y \geq 0$

$x \geq 1.5y$

$x + y \leq 200$

If the store's daily profit is represented by the function $f(x,y) = 3.5x + 4y$, what is the maximum daily profit for the store?

A. $700

B. $740

C. $760

D. $800

62. A senior class of 30 students needs to raise $19,000 to pay for their end-of-year trip. They are hosting a dinner at a banquet hall that can seat up to 2,500 people. A child's dinner will cost $8 and an adult's dinner will cost $12. Which solution would **not** be viable in order to meet or exceed their goal?

   A. 500 children, 2,000 adults

   B. 750 children, 1,600 adults

   C. 1,000 children, 900 adults

   D. 1,250 children, 800 adults

63. An electronics store sells monitors and scanners. The store estimates that at least 30 monitors and scanners will be sold each month and that the number of monitors sold will be at least 20% more than the number of scanners. The monitors cost the store $1000 each and are sold for $1050. The scanners cost $300 each and are sold for $350. If the store can spend only $30,000 on both monitors and scanners, what is the store's maximum monthly profit given the constraints listed?

   A. The store can earn a maximum profit of $1500.

   B. The store can earn a maximum profit of $2200.

   C. The store can earn a maximum profit of $30,000.

   D. The store can earn a maximum profit of $32,200.

64. A system of inequalities is shown below.

$$3x - y > {}^-1$$
$$x - 2y > 4$$

Which is a solution to the system?

   A. $({}^-2, {}^-4)$

   B. $({}^-2, {}^-1)$

   C. $(1, 2)$

   D. $(2, {}^-4)$

65. A school is collecting canned food as a service project. There are 30 classes participating in the project. The goal is to collect more than 1,000 canned food items. If each class collects the same number of cans, what is the least number of cans each class must collect to meet the goal?

    A. 30

    B. 33

    C. 34

    D. 40

66. Zach wants to earn money by selling baked goods. He wants to sell at least 15 dozen baked goods each week. He can make at most 10 dozen cupcakes and at most 12 dozen cookies each week. Which inequalities **best** model this situation?

    A.
$$x \geq 10$$
$$y \geq 12$$
$$x + y \geq 15$$

    B.
$$x < 10$$
$$y < 12$$
$$x + y > 15$$

    C.
$$0 \leq x \leq 10$$
$$0 \leq y \leq 12$$
$$x + y \geq 15$$

    D.
$$0 < x < 10$$
$$0 < y < 12$$
$$x + y > 15$$

67. Ramon collected a combination of $5 and $10 bills from parking fees in a parking lot. He had a total of 28 bills all together with no coins. The system of equations shown can be used to find x, the number of $5 bills, and y, the number of $10 bills.

$$\begin{cases} 5x + 10y = 175 \\ x + y = 28 \end{cases}$$

Which constraint is true about the value of x?

A. x is a real number and $x \le 0$ or $x \ge 28$.

B. x is a real number and $5 \le x \le 10$.

C. x is a positive integer and $28 \le x \le 175$.

D. x is a positive integer and $0 \le x \le 28$.

68. Elena spent $6.50 to buy 7 pounds of apples and bananas. The apples cost $1.50 per pound and the bananas cost $0.50 per pound. The system of equations shown can be used to determine how many pounds of each fruit she could buy.

$$1.5x + 0.5y = 6.50$$
$$x + y = 7$$

Which inequalities are true about x or y?

A. $x < 0$ and $y > 7$

B. $x > 1.5$ and $y < 0.5$

C. $0 < x < 1.5$ and $0 < y < 0.5$

D. $0 < x < 7$ and $0 < y < 7$

69. Marco has two summer jobs: tutoring, *x*, and working as a lifeguard, *y*.

- He would like to tutor for at least 10 hours per week, but no more than 30 hours per week.
- He also must work as a lifeguard at least 15 hours per week, but no more than 25 hours per week.
- He can spend at most 40 hours per week total working both jobs.

When this information is graphed, it forms a figure showing his options for working either job that meet his constraints. What is the shape of the figure?

A. parallelogram

B. rectangle

C. trapezoid

D. triangle

70. Michael was given the constraints below.

- $y \le \dfrac{^-3}{4}x + 3$
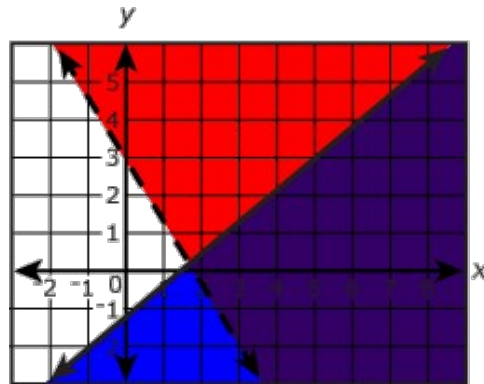
- $y \le \dfrac{3}{2}x + 3$

- $y \ge 0$

- $W = 2x + y$

What is the maximum value of *W*?

A. 10

B. 8

C. 6

D. 4

71. The students of Lincoln High School are raising money to support the sports teams. A local organization donated boxes of popcorn and candy for the students to sell. The freshmen are selling boxes of popcorn for $2 each, and the sophomores are selling boxes of candy for $4 each. The students' target is to raise **more than** $800. The sophomores expect to sell **at most** 100 boxes of candy. Let x represent the number of boxes of popcorn sold and y represent the number of boxes of candy sold. Which system of inequalities models the given situation?

A. $\begin{cases} y < 100 \\ 2x + 4y > 800 \end{cases}$

B. $\begin{cases} y \leq 100 \\ 2x + 4y > 800 \end{cases}$

C. $\begin{cases} y < 100 \\ 4x + 2y > 800 \end{cases}$

D. $\begin{cases} y \leq 100 \\ 4x + 2y > 800 \end{cases}$

72. Look at the graphs of the system of inequalities.

Which ordered pair is a solution to the system of inequalities shown in the graph?

A. $(4, -1)$

B. $(1, -1)$

C. $(1, 4)$

D. $(0, 4)$