

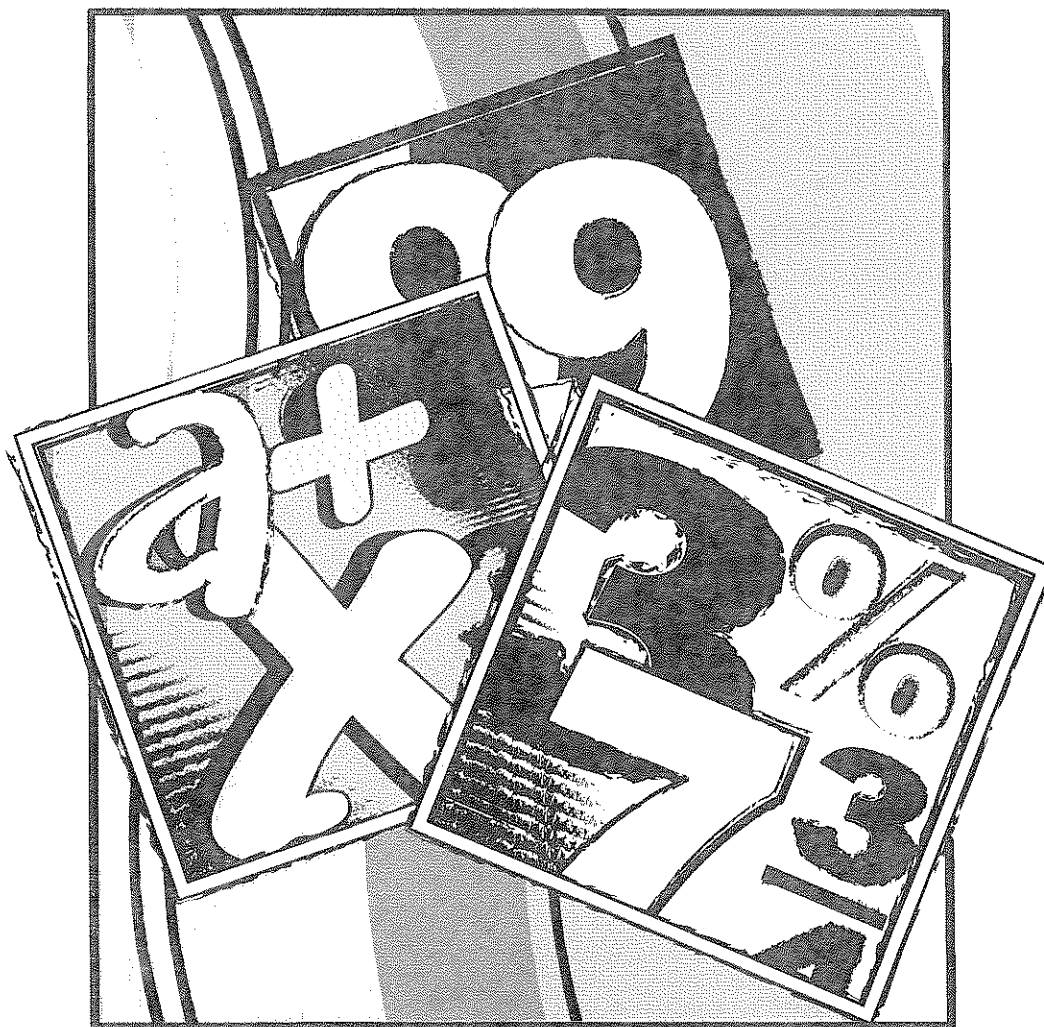
SAMPLE QUESTIONS

Student Name: _____

This booklet is to be used **only** by the student whose name appears at the top of this booklet. Refer to the Directions for Administration for further information.

**This is a practice exam.
The items nor the distribution
reflects the actual exam.**

CHICAGO



High School Algebra for Middle Grade Students



CHICAGO PUBLIC SCHOOLS

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High School Algebra for Middle Grade Students

49 Minutes—27 Questions

Directions: Solve each problem.

Choose the best answer and fill in your answer document accordingly. For questions requiring a written response, write your answer neatly in the answer document provided.

Do not use too much time on any one question. Solve as many as you can; then return to the others in the time you have left for this assessment.

You **may** use your calculator for any problems you choose, but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

-
1. The total cost, T , for a plumbing job is determined by a one-time fee of \$145 plus \$65 per hour, h , worked plus the cost of parts, p .

Which algebraic rule can be used to find the total cost, T ?

A. $T = 145h + 65 + p$

B. $T = 145 + 65h + p$

C. $T = 145 + \frac{65}{h} + p$

D. $T = \frac{145}{h} + 65 + p$



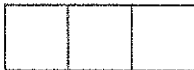

2. A linear function is represented in the table below.

x	-2	-1	0	1	2
y	-3	-1	1	3	5

Which statement describes why this function is linear?

- F. The x -values increase by a constant amount.
- G. The y -values increase by a constant amount.
- H. The y -values increase by 2 as the x -values increase by 1.
- J. The y -values increase by 2 as the x -values decrease by 1.

3. A construction company sells tiles in one size. The table below shows the perimeter when one, two, three, and four tiles are fit together.

Number of tiles	Picture of tile	Perimeter of tile
1		4
2		6
3		8
4		10

Using this table, what would you predict is the perimeter of a border with eight tiles?

- A. 10
- B. 16
- C. 18
- D. 24

Write your answers to question 4 in your answer document.

4. A company sells candy bars. The table below shows the total weight of a box with 1, 2, 3, and 4 candy bars.

Number of candy bars in box	Total weight (ounces)
1	9.5
2	15.5
3	21.5
4	27.5

- a. Write an algebraic rule that can be used to determine the total weight of the box for any number of candy bars. Show or explain your work.
- b. Describe what each number and variable represents in your algebraic rule.
(2 points)

5. The cost of a long-distance call is a function of the length of the call. The table below shows the costs of four calls.

Long-distance calls

Call minutes (x)	Cost (y)
5	\$0.65
10	\$1.30
15	\$1.95
20	\$2.60

If the data in the table are graphed, what does the slope of the graph represent?

- F. The cost per minute
- G. The cost per call
- H. The average time between calls
- J. The cost per hour

6. A function $g(x)$ is defined below:

$$g(x) = -\frac{1}{x} - 1$$

For which value of x will $g(x) = 0$?

- A. $x = -1$
- B. $x = 0$
- C. $x = 1$
- D. $x = 2$

7. The table below shows the number of pencils Mr. Porter had at the end of each day.

Day (x)	Pencils remaining (y)
1	253
2	250
3	247
4	244

Which algebraic rule represents the data in Mr. Porter's table?

- F. $y = 3x + 256$
- G. $y = 3x + 253$
- H. $y = -3x + 253$
- J. $y = -3x + 256$

Write your answers to question 8 in your answer document.

8. Nina starts with a rectangular sheet of paper. She folds it in half and sees that the fold divides the paper into two rectangular regions. She then folds the paper in half again. When she opens it, four rectangular regions are outlined by the folds.
- Create a table to record the number of folds and the number of rectangles that Nina will get for 2, 3, 4, and 5 folds.
 - Use your table to explain whether or not this function is linear.
 - Nina folds the paper 8 times. Determine the number of rectangles there will be when the paper is unfolded. Show or explain your answer.
- (4 points)

9. What type of relationship is shown in the table below?

x	y
1	1
2	4
3	7
4	10
5	13

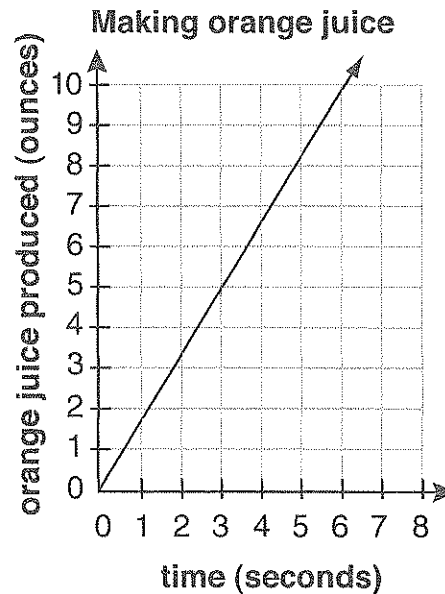
- Inverse variation
- Exponential
- Linear
- Quadratic

10. The table below shows data values for a function.

x	-2	-1	0	1	2	3
y	5	4	3	2	3	4

Which type of function can be used to model the data in the table?

- F. A linear function
 - G. A quadratic function
 - H. An exponential function
 - J. An absolute value function
11. The Juice Company has a new machine that produces fresh orange juice. The graph below shows the amount of orange juice produced over time.



How many ounces of orange juice are produced each second?

- A. $\frac{3}{5}$
- B. 1
- C. $\frac{5}{3}$
- D. 2

12. Four points on a line are shown in the table below.

x	y
0	2
2	1
4	0
6	-1

What is the slope of this line?

F. $-\frac{1}{2}$

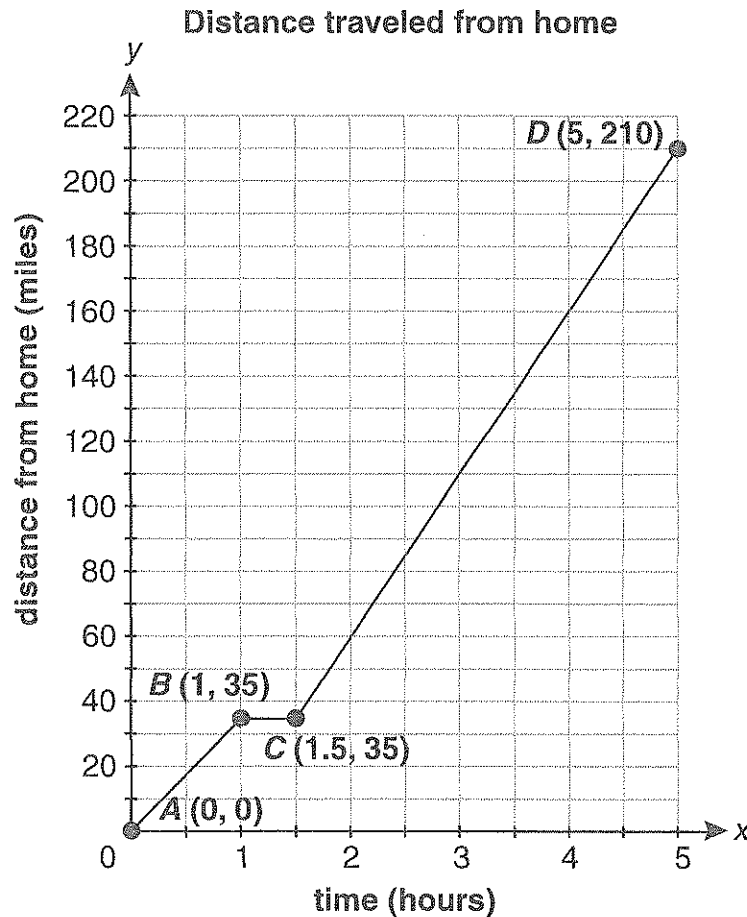
G. $\frac{1}{2}$

H. 1

J. 2

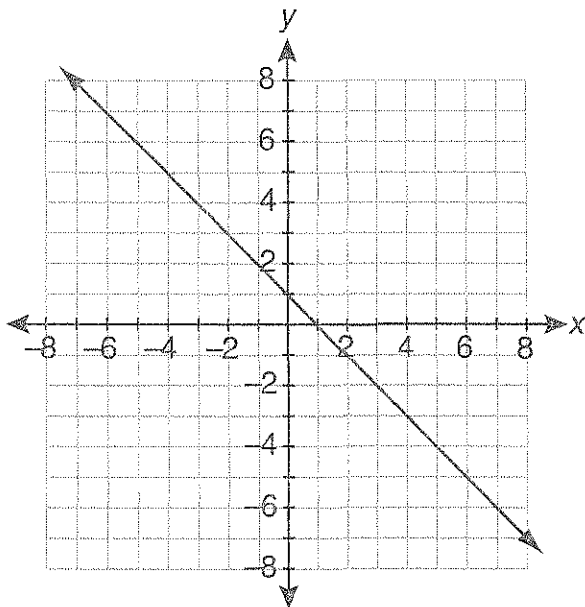
Write your answers to question 13 in your answer document.

13. Paula traveled from her home to visit her friend who lives 210 miles away. The graph below represents her distance from home over the course of the trip.



- What is Paula's average speed during the first hour of her trip?
 - What is Paula's average speed for the entire trip?
 - Paula stopped to get gas and a snack. What part of the graph represents the break in her trip?
 - If Paula had averaged 60 miles per hour for her trip, how long would the trip have taken?
- (4 points)

14. The graph of the line $y = -x + 1$ is shown below.



How will the graph of the line change if the y-intercept is changed to -3 ?

- A. The line will shift 4 units up.
- B. The line will shift 4 units down.
- C. The line will increase 3 times as fast.
- D. The line will decrease 3 times as fast.

Write your answer to question 15 in your answer document.

15. Dave graphs the functions $y = x^2 - 3$ and $y = 4x^2$ on the same set of coordinate axes.

State two ways the graphs are different. Explain the reason for each difference.

(2 points)

16. The algebraic rule shown below expresses the profit, p , for a school dance in terms of the number of tickets sold, t .

$$p = 5(2t - 20)$$

Which is an equivalent form of this rule?

F. $p = 10t - 100$

G. $p = -10t$

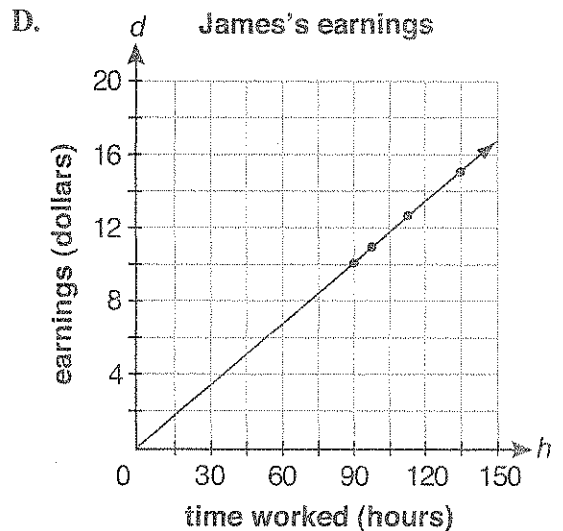
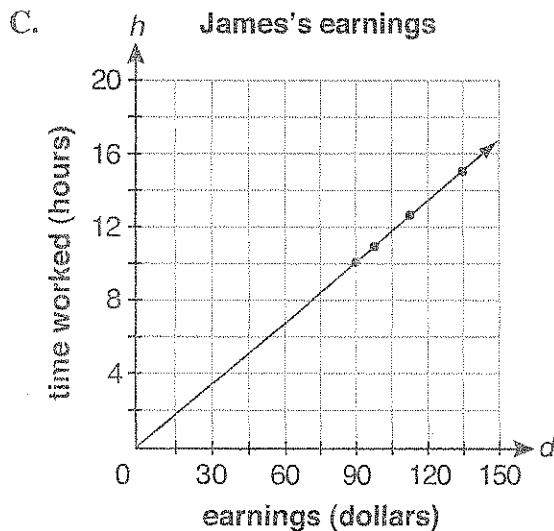
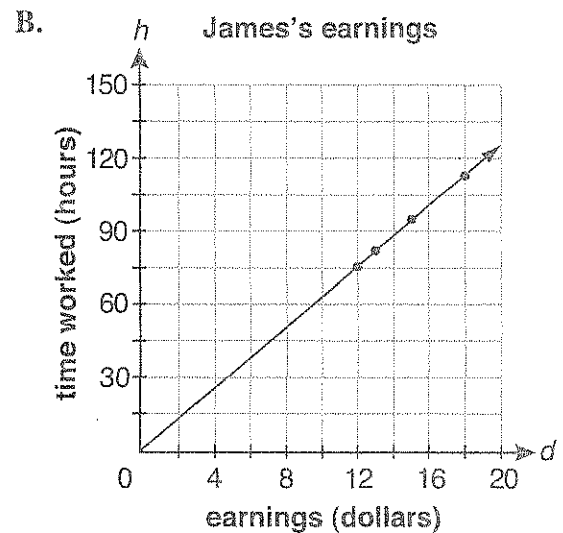
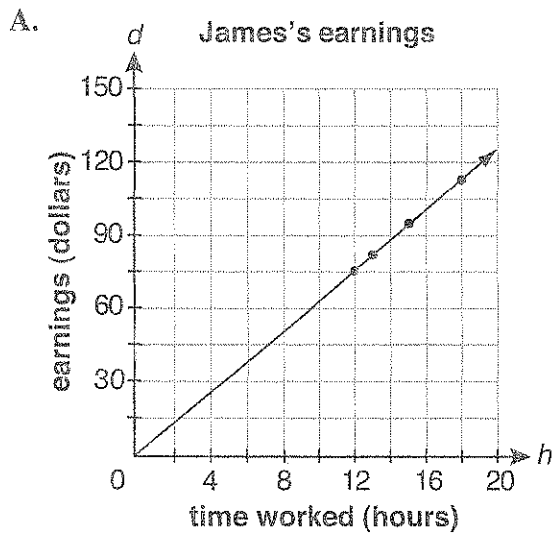
H. $p = 7t - 15$

J. $p = 10t - 20$

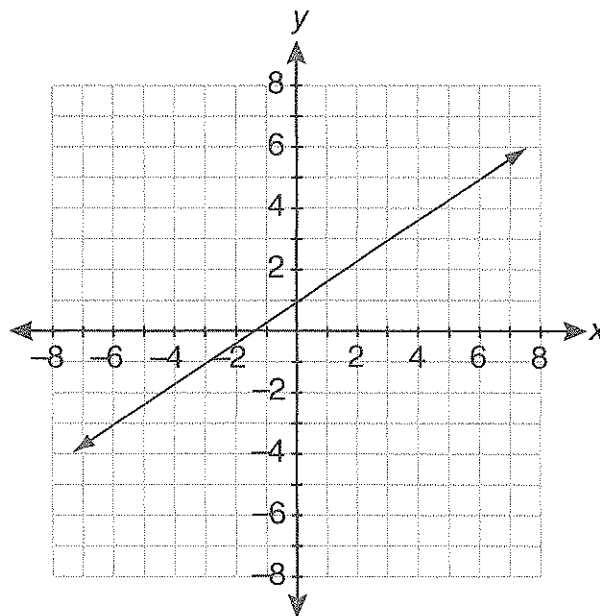
17. James earns \$6.25 an hour at work. The table below shows his hours and earnings for each week in one month.

Time worked (hours)	Earnings (dollars)
15	93.75
18	112.50
12	75.00
13	81.25

Which graph correctly displays the relationship between the time worked and earnings?



18. A line is shown on the graph below.



What is the equation of this line?

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

G. $y = \frac{2}{3}x + 1$

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

J. $y = \frac{3}{2}x + 1$

Write your answers to questions 19 and 20 in your answer document.

19. Emma has \$250. She spends \$40 a week on piano lessons.
- Create a graph that shows how much money Emma has left after 1, 2, 3, 4, and 5 weeks.
 - Determine the total number of weeks that Emma will be able to pay for her piano lessons. (2 points)
20. Wendy is training to run a marathon. Right now, her weekly training run is 7 miles. She plans to increase her training run by 1.5 miles each week.
- Write an equation to find the number of miles she will run, M , in terms of the week, w , of her training run.
 - Wendy's goal for her 12th-week training run is 26 miles. Will she reach that goal? Explain your answer. (2 points)
21. A growing T-pattern made of small square tiles is shown below.

Figure 1

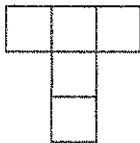


Figure 2

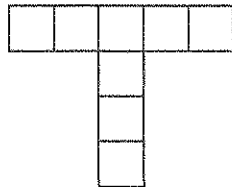
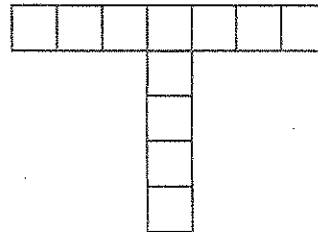


Figure 3



Which represents the total number of tiles, T , in terms of the figure number, n ?

- $T = n + 4$
- $T = n + 8$
- $T = 2n + 4$
- $T = 3n + 2$

Write your answer to question 22 in your answer document.

22. A system of equations is shown below.

$$5x + 6y = -14$$

$$2x - y = -9$$

Solve this system of equations. Show or explain your work.

(2 points)

23. An equation is shown below.

$$6x - (2x - 1) = 9x + 2(2 - x)$$

What is the solution to the equation?

F. $x = -\frac{5}{3}$

G. $x = -1$

H. $x = -\frac{3}{7}$

J. $x = -\frac{5}{7}$

Write your answers to question 24 in your answer document.

24. Bruce needs to rent a truck for a day to move some furniture. The table below shows the rates of the two truck-rental companies near his home.

Company	Daily rate	Per mile charge
A	\$29.95	\$0.87
B	\$72.00	\$0.00

- a. Write an inequality that Bruce can use to find the maximum number of miles that he can drive and spend less with Company A than Company B. Be sure to identify your variable or variables.
- b. Find the maximum number of miles that Bruce can drive so that he spends less than he would for a truck rented from Company B.
- (2 points)

25. Which equation will create a system of equations with $y = 4x - 3$ that has no solution?

A. $y = -4x + 3$

B. $y = \frac{1}{4}x - \frac{1}{3}$

C. $y = 3x - 4$

D. $y = 4x + 3$

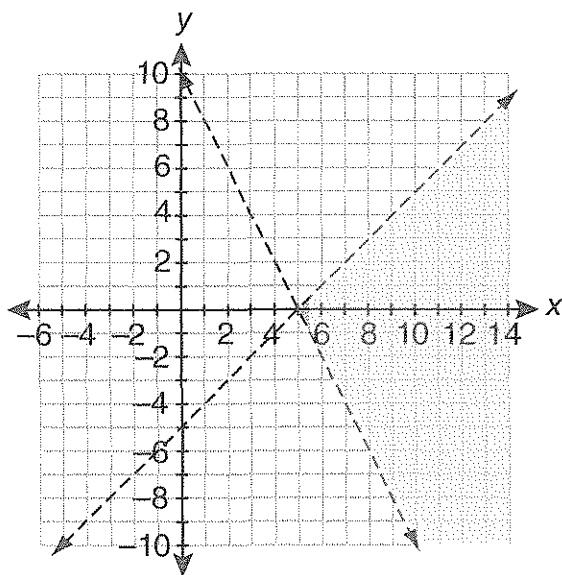
26. A system of inequalities is shown below.

$$2x + y < 10$$

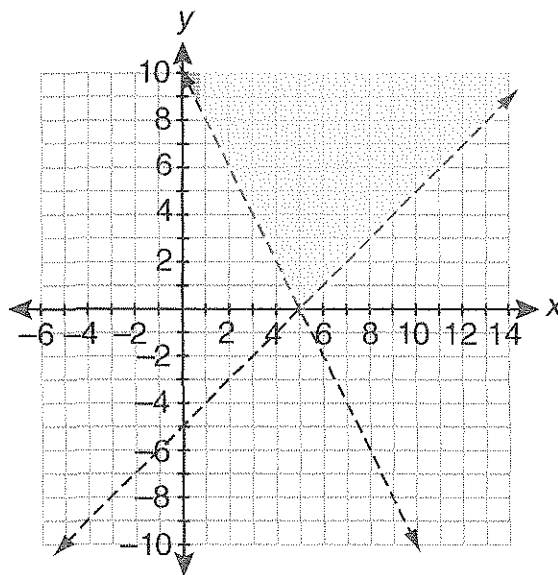
$$x - y > 5$$

Which graph represents the solution to the system of inequalities?

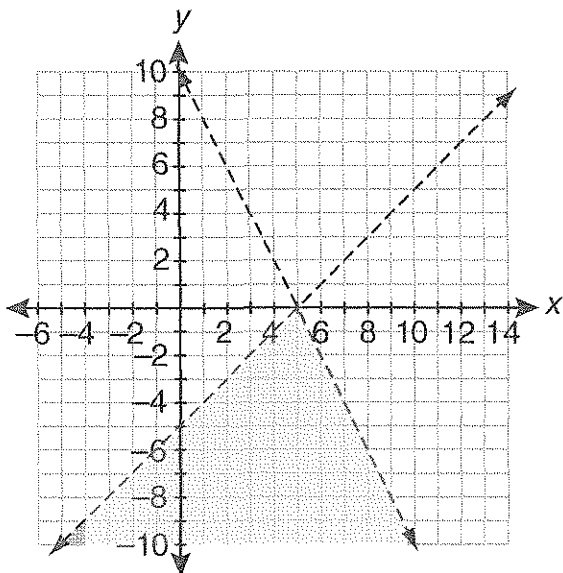
F.



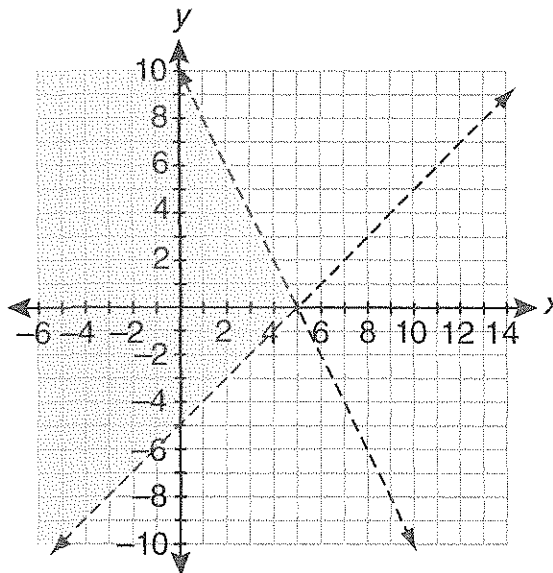
G.



H.



J.



Write your answer to question 27 in your answer document.

27. A function is shown below.

$$f(x) = 2x^2 - 4x - 70$$

Find all zeros for the function. Show or explain your work.

(2 points)



END OF ALGEBRA EXAM