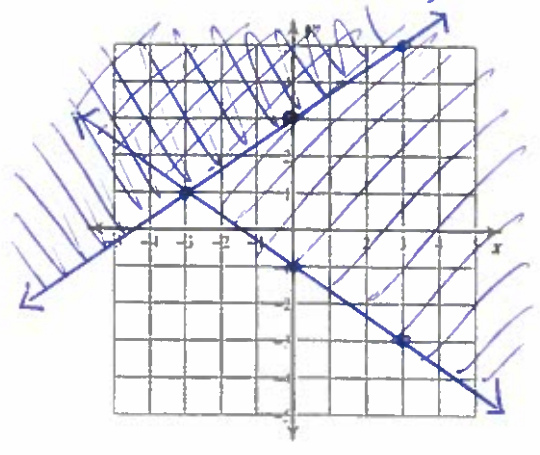


Sketch the solution to each system of inequalities.

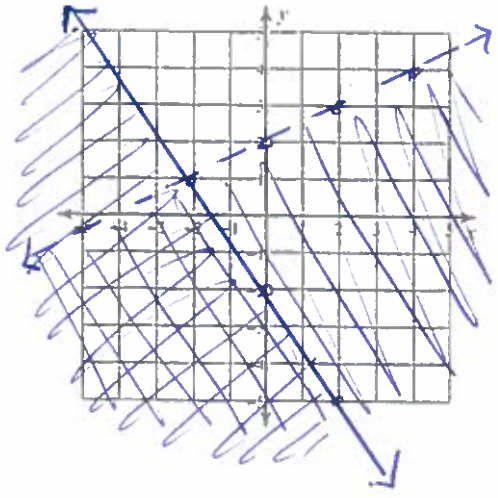
11) $y \geq -\frac{2}{3}x - 1$ $m = -\frac{2}{3}, b = -1$

$y \geq \frac{2}{3}x + 3$ $m = \frac{2}{3}, b = 3$



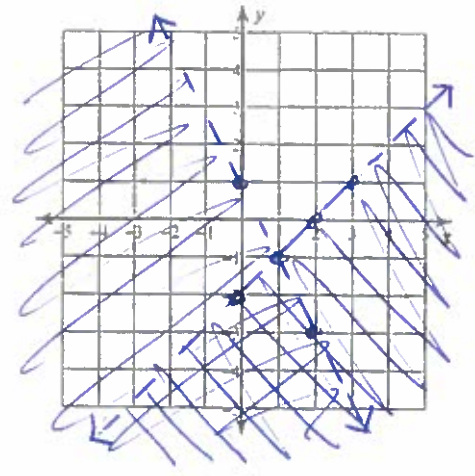
12) $y < \frac{1}{2}x + 2$ $m = \frac{1}{2}, b = 2$

$y \leq -\frac{3}{2}x - 2$ $m = -\frac{3}{2}, b = -2$



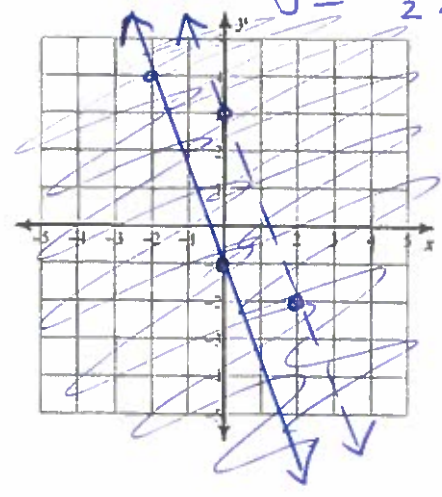
13) $2x + y < 1$ $y < -2x + 1$

$x - y > 2$ $y < x - 2$



14) $5x + 2y < 6$ $y < -\frac{5}{2}x + 3$

$5x + 2y \geq -2$ $y \geq -\frac{5}{2}x - 1$



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GSE Algebra I
Common Unit Pre/Post Assessment
Unit 2: Reasoning with Linear Equations and Inequalities
Student Version

Directions:

Today you will be taking the GSE Algebra I, Unit 2 assessment on Reasoning with Linear Equations and Inequalities.

You will have 60 minutes to complete the assessment.

Do your best work. Read each question carefully. For each selected-response item, indicate the best answer. For each constructed-response item, provide the most detailed and accurate response possible. Be sure to record your responses, legibly, on the answer document provided. The standard for each assessment item is referenced above the item.

You may use scratch paper to complete your work. The use of a scientific or graphing calculator may be necessary to solve some assessment items.

A.CED.2

1. What is the equation of the line that passes through the point (4,1) and has a y-intercept of -5?

- a. $y = \frac{3}{2}x$
- b. $y = \frac{3}{2}x - 5$
- c. $y = \frac{1}{9}x - 5$
- d. $y = \frac{1}{9}x + \frac{5}{9}$

$(4, 1) (0, -5)$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-5 - 1}{0 - 4} = \frac{-6}{-4} = \frac{3}{2}$$

A.REI.5

2. Look at the system of equations.

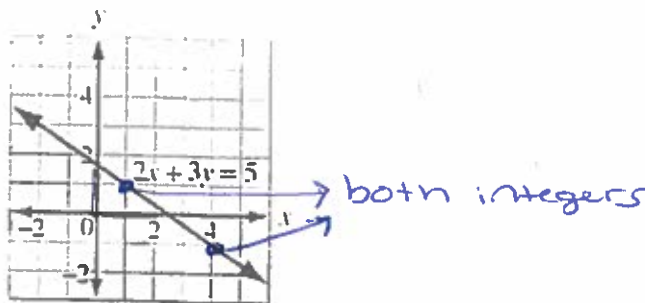
$$\begin{aligned} ax + by &= c \\ dx + ey &= f \end{aligned}$$

The system has a unique solution, (x, y) . Which system of equations has the same solution?

- a. $ax + by = c$
 $dx - ey = f$
- b. $ax + by = c$
 $(a + e)x + (b + d)y = c + f$
- c. $ax + by = c$
 $(a + d)x + (b - e)y = c + f$
- d. $ax + by = c$
 $(a + 2d)x + (b + 2e)y = c + 2f$

A.REI.10

3. The coordinate plane, seen below, shows the graph of an equation.



Which statement about the solutions of the equation must be true?

- a. There is no solution for which both the x -value and the y -value are integers.
- b. There is only one solution for which both the x -value and the y -value are integers.
- c. If the x -value of a solution is positive, then the corresponding y -value is negative.
- d. If the x -value of a solution is negative, then the corresponding y -value is positive.

A.REI.6

4. What is the x -value of the solution to this system of equations?

- a. $x = 2$
- b. $x = 4$
- c. $x = \frac{10}{7}$
- d. $x = -2$

$$\begin{array}{r} 3x + 2y = 6 \\ -2(2x + y = 2) \\ \hline -4x - 2y = -4 \\ 3x + 2y = 6 \\ \hline -x = 2 \\ \hline x = -2 \end{array}$$

A.CED.1

5. An artist paints designs on T-shirts. It takes 15 minutes to set up the equipment and 40 minutes to clean the equipment and put it away. Once everything is set up, it takes the artist about 12 minutes to paint the design on each T-shirt.

Which equation best models the number of shirts, s , the artist can make in 127 minutes?

- a. $12s - 55 = 127$
- b. $55 - 12s = 127$
- c. $12s + 25 = 127$
- d. $12s + 55 = 127$

$$\begin{array}{r} 15 + 40 + 12s = 127 \\ 12s + 55 = 127 \end{array}$$

A.APR.1

6. What is the solution to the system of equations below?

- a. (4,1)
- b. (16,5)
- c. (-2,-1)
- d. (-4,-5)

$$\begin{array}{r} x - 3y = 1 \\ -1(x - 2y = 6) \\ \hline x + 2y = -6 \\ x - 3y = 1 \\ \hline -y = -5 \\ \hline y = 5 \end{array}$$

$$\begin{array}{r} x - 3(5) = 1 \\ x - 15 = 1 \\ +15 \quad +15 \\ \hline x = 16 \end{array}$$

A.REI.12

7. Which graph shows the solution set for the inequality $x > 3y - 2$?

$$\begin{array}{r} +2 \quad +2 \\ x + 2 > 3y \\ \hline \frac{x+2}{3} > \frac{3y}{3} \end{array}$$

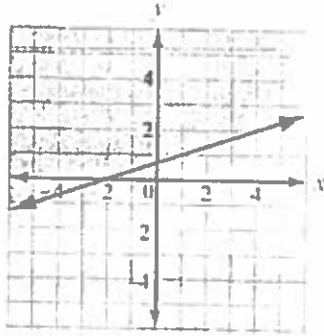
$$y < \frac{1}{3}x + \frac{2}{3}$$

$$y < \frac{1}{3}x + \frac{2}{3}$$

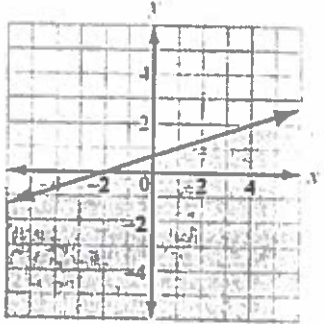
$$m = \frac{1}{3} \quad b = \frac{2}{3}$$

dashed line

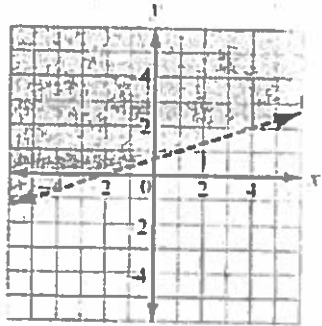
shaded under



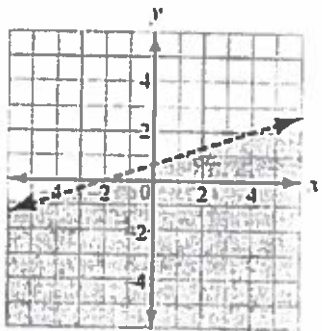
a.



b.



c.



d.

F.IF.9

8. Two linear functions are defined below.

Function 1: $y = 2x + 3$

Function 2:

$$m = 2$$

x	$f(x)$
1	-1
2	2
3	5
4	8

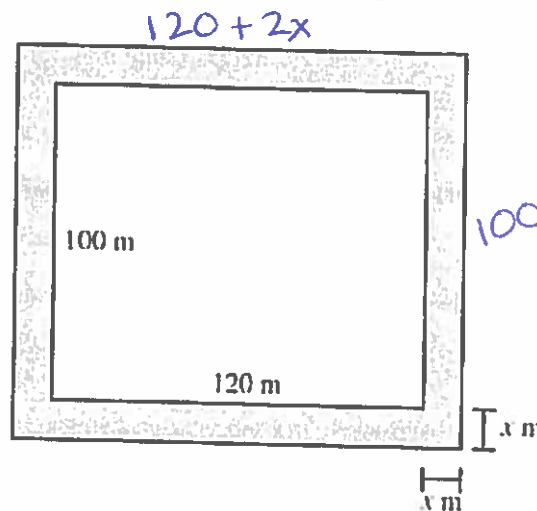
$$m=3$$

Which of these linear functions has a slope greater than the slope for Function 1 and less than the slope of Function 2?

- a. $f(x) = 3x + 2$ $m=3$
 b. $f(x) = 2.5x - 6$ $m=2.5$
 c. $f(x) = 2x + 2.5$ $m=2$ $2 \leq 2.5 \leq 3$
 d. $f(x) = 1.5x + 1$ $m=1.5$

F.BF.1

9. A rectangular field is 100 meters in width and 120 meters in length. The dimensions of the field will be expanded by x meters in each direction, as shown in the diagram below.



Which function describes the perimeter of the new field in terms of x ?

- a. $f(x) = 220 + 4x$
 b. $f(x) = 220 + 8x$
 c. $f(x) = 440 + 4x$
 d. $f(x) = 440 + 8x$

A.CED.3

10. Jose wants to spend no more than \$30 on apples and grapes for the month. Apples cost \$1.50 per pound and grapes cost \$2.00 per pound. Jose also wants his monthly caloric intake from apples and grapes to be greater than 2000 calories. He determines that 1 pound of apples has 200 calories and 1 pound of grapes has 300 calories. Let a represent the number of pounds of apples and g represent the number of pounds of grapes.

$$1.50a + 2g \leq 30$$

$$200a + 300g > 2000$$

Which system of inequalities can be used to determine the number of pounds of apples and grapes that Jose can buy for a month?

~~a.~~ $\begin{cases} 1.5a + 2g \geq 30 \\ 200a + 300g > 2000 \end{cases}$

b. $\begin{cases} 1.5a + 2g \leq 30 \\ 200a + 300g > 2000 \end{cases}$

~~c.~~ $\begin{cases} 2a + 1.5g \leq 30 \\ 300a + 200g > 2000 \end{cases}$

~~d.~~ $\begin{cases} 2a + 1.5g \geq 30 \\ 200a + 300g < 2000 \end{cases}$

F.IF.3

11. The first term in an arithmetic sequence is 5. The fourth term in the sequence is -4. The tenth term is -22. Which function can be used to find the n th term of the arithmetic sequence?

~~a.~~ $f(n) = -n$

~~b.~~ $f(n) = n + 4$

c. $f(n) = -3n + 8$

~~d.~~ $f(n) = \frac{1}{2}(n + 5) + 2$

1	4	10
5	-4	-22

$f(1) = -3 + 8 = 5$

$f(4) = -12 + 8 = -4$

$f(10) = -30 + 8 = -22$

F.IF.2

12. Julian is planning a birthday party and wants to make sure that he has enough sandwiches for all of his guests. He wants to have 1 sandwich per invited guest and 5 extra sandwiches to put aside for lunch next week. He uses the function $g(x) = x + 5$. Which is the best interpretation of the function that Julian used?

~~a.~~ If x represents the total number of sandwiches, $g(x)$ represents the number of guests who would be able to eat sandwiches.

~~b.~~ If x represents the total number of sandwiches, $g(x)$ represents the number of sandwiches that would be left over at the end of the party.

c. If x represents the number of invited guests, $g(x)$ represents the number of sandwiches needed so that each guest gets 1 sandwich and there are 5 left over.

~~d.~~ If x represents the number of invited guests, $g(x)$ represents the number of sandwiches needed so that each guest gets 5 sandwiches and there is 1 left over.

A.APR.1

13. The table below represents ordered pairs of a relation.

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

Each input can only have one output

Which change could be made so that the relation becomes a function?

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- a. Replace $(-1,1)$ with $(1,4)$.
- b. Replace $(-2,5)$ with $(3,8)$.
- c. Replace $(-1,1)$ with $(-3,6)$.
- d. Replace $(-2,2)$ with $(-2,3)$.

F.IF.4

14. The function table below shows the air temperature in degrees Celsius over the course of 10 days.

Day	Temperature ($^{\circ}\text{C}$)
1	23
2	25
3	27
4	26
5	24
6	28
7	30
8	32
9	29
10	28

- a. Increasing from day 1 to day 8; decreasing from day 8 to day 10
- b. Increasing from day 1 to day 3; decreasing from day 3 to day 10
- c. Increasing from day 1 to day 3; day 5 to day 8; decreasing from day 3 to day 5, day 8 to day 10
- d. Increasing from day 3 to day 5; day 8 to day 10; decreasing from day 1 to day 3, day 5 to day 8

F.IF.6

15. For Spring Break, Jenny and her friends are planning a road trip from Houston, Texas, to Los Angeles, California. With almost the entire trip on Interstate 10, the total distance will be 1,255 miles, one-way. If they average 55 miles per hour on the trip, to the nearest half hour, how long will it take Jenny and her friends to get there?

- a. 23 hours
- b. 25 hours
- c. 24.5 hours
- d. 11.5 hours

$$1255 \div 55 = 22.8 \approx 23 \text{ hours}$$

A.REI.3

16. Desmond wants to take guitar lessons. The one-time registration fee is \$60.00 and each lesson costs \$40.00. Which of the following inequalities can Desmond use to determine x , the number of lesson he can take if he wants to spend no more than c dollars?

- a. $60 + 40x \leq c$
- b. $60 + 40x \geq c$
- c. $60x + 40x \leq c$
- d. $60x + 40x \geq c$

F.BF.1

17. Which function represents the data in the table?

x	3	6	10	15
y	2.5	4	6	8.5

- ~~A~~ $f(x) = 2x + 1$
- ~~B~~ $f(x) = \frac{1}{2}x - 1$
- ~~C~~ $f(x) = 2x - 1$
- D** $f(x) = \frac{1}{2}x + 1$

Slope: $\frac{6-4}{10-6} = \frac{2}{4} = \frac{1}{2} (m)$

$y = mx + b$ $y = mx + b$

$4 = \frac{1}{2}(6) + b$ $y = \frac{1}{2}x + 1$

$4 = 3 + b$

$1 = b$

A.CED.1

18. Information about the costs of three catering companies is shown in the table below.

Catering Company Costs		
Acme Catering Company	Best Foods Company	Creative Catering Company
\$6 per person plus a flat \$100 time and equipment charge	\$8 per person plus a flat \$40 time and equipment charge	\$10 per person charge with no other fees

Garvin can spend no more than \$300 on catering. What is the greatest number of people he can invite using one of the three caterers?

<p>a. 30</p> <p>b. 32</p> <p>c. 33</p> <p>d. 37</p>	<p>$100 + 6x = 300$</p> <p>$6x = 200$</p> <p>$x = 33$</p> <p style="text-align: center;">★</p>	<p>$40 + 8x = 300$</p> <p>$8x = 260$</p> <p>$x = 32$</p>	<p>$10x = 300$</p> <p>$x = 30$</p>
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F.IF.7

19. Constructed-Response: Two functions are given below.

$g(x) = x - 4$

$h(x) = x - 2$

Part A. Write a new function k in terms of x such that $k(x) = g(x) + h(x)$.

$x - 4 + x - 2 = 2x - 6$

$k(x) = 2x - 6$

Part B. Sketch a graph of function k and state what type of function it is.

linear function

Part C: Does function k have any minimum or maximum values? Explain your answer.

no, continuous function

A.REI.11

20. Constructed-Response: Brianna wants to buy some trees for her yard. A local garden store charges \$25.00 to plant each tree plus a delivery fee of \$50.00 for all trees purchased. A lawn service charges \$35 to plant each tree with free delivery.

Part A. Write the system of equations that could be graphed to represent this situation, where y is the total charge for delivery and planting x trees.

$y = 50 + 25x$

$y = 35x$

Part B. Explain how the graph could be used to determine the solution of the system of equations you wrote.

find intersection point between the two lines

Part C. Determine the solution to the system of equation algebraically. Show your work and explain what the solution means in this context

substitution \rightarrow

$35x = 50 + 25x$ $y = 35(5)$

$10x = 50$ $y = 175$ **(5, 175)**

$x = 5$

Part D. Brianna wants to plant 8 or more trees in her yard. Which service provider would be the most economical? Explain your answer.

garden store: $y = 50 + 25(8)$ lawn service: $35(8)$

$y = 450$ $y = 280$

★