

Unit 1: Building Blocks of Algebra

- Number Properties (Distributive, Commutative, Associative, Additive, Multiplicative)
- Distributive Property & DOUBLE Distributing

1. While solving the equation $4(x + 2) = 28$, Jim wrote $4x + 8 = 28$. Which property did he use?

- (1) **Distributive** (2) Associative (3) Commutative (4) Identity
- multiplying by 4 to eliminate ().*

2. When solving the equation $4(3x^2 + 2) - 9 = 8x^2 + 7$, Emily wrote $4(3x^2 + 2) = 8x^2 + 16$ as her first step. Which property justifies Emily's first step?

- (1) **Addition property of equality** (2) Commutative property of addition (3) Multiplicative property of equality (4) Distributive property of multiplication
- $4(3x^2 + 2) - 9 = 8x^2 + 7$
 $\quad \quad \quad +9 \quad \quad \quad +9$
 $4(3x^2 + 2) = 8x^2 + 16$
- ← added 9 to both sides*

3. Jonah was asked to solve the equation: $3x - 5 = 16$. Which of the number properties will he have to apply to find the solution?

- ✓ i. Additive Property of Equality
- ✓ ii. Multiplicative Property of Equality
- iii. Distributive Property
- iv. Commutative Property

$3x - 5 = 16$
 $\quad +5 \quad +5$
 $\hline 3x = 21$
 $\quad \quad \quad \times$
 $\hline x = 7$

← add property of =
← × property of =

- (1) i
 (2) **i and ii**
 (3) i, ii, and iii
 (4) i and iv

4. What is the **product** of $(c + 8)$ and $(c - 5)$?

- (1) **$c^2 + 3c - 40$**
 (2) $c^2 - 3c - 40$
 (3) $c^2 + 13c - 40$
 (4) $c^2 - 40$

multiply

$(c + 8)(c - 5)$
 $c^2 - 5c + 8c - 40$
 $c^2 + 3c - 40$

5. What is the **product** of $(3x + 2)$ and $(x - 7)$?

$(3x + 2)(x - 7)$
 $3x^2 - 21x + 2x - 14 = 3x^2 - 19x - 14$

6. Fred is given a rectangular picture frame as a birthday gift. If the length of the frame is represented by $4x - 2$ and the width of the frame is represented by $2x + 1$, find the **area** of the picture frame in square inches.

$(4x - 2)(2x + 1)$
 $8x^2 + 4x - 4x - 2 = 8x^2 - 2$

multiply

Unit 2: Linear Expressions, Equations, & Inequalities

Don't Call Me After Midnight

7. What is the value of x in the equation

$$\begin{array}{r} 4x - 3 = 5? \\ +3 \quad +3 \\ \hline 4x = 8 \\ \hline \frac{4x}{4} = \frac{8}{4} \end{array}$$

$x = 2$

9. What is the value of x in the equation

$$13x - 2(x + 4) = 8x + 1?$$

$$13x - 2x - 8 = 8x + 1$$

$$\begin{array}{r} 11x - 8 = 8x + 1 \\ -8x \quad -8x \\ \hline 3x - 8 = 1 \\ +8 \quad +8 \\ \hline 3x = 9 \end{array}$$

$$\frac{3x}{3} = \frac{9}{3}$$

$x = 3$

8. What is the value of x in the equation

$$5(2x - 7) = 15x - 10?$$

$$\begin{array}{r} 10x - 35 = 15x - 10 \\ -10x \quad -10x \\ \hline -35 = 5x - 10 \\ +10 \quad +10 \\ \hline -25 = 5x \end{array}$$

$$\frac{-25}{5} = \frac{5x}{5}$$

$$-5 = x$$

$x = -5$

10. Which of the following integers is in the solution set of the inequality $3x - 5 > 16$?

1) 5

2) 6

3) 7

4) 8

$$3x - 5 > 16$$

$$+5 \quad +5$$

$$\frac{3x}{3} > \frac{21}{3}$$

$x > 7$

*choose # greater than 7!

11. Convert each into algebraic equations:

1) Twice a number is eight less than four times that number. $2x = 4x - 8$

2) Four times the sum of a number and two is twenty. $4(n+2) = 20$

3) Nine less than twice a number is four times the sum of the number and five. $2n - 9 = 4(n+5)$

12. Find two consecutive integers such that the sum of the integers equals 21.

1st	n	10
2nd	$n+1$	11

$$(n) + (n+1) = 21$$

$$2n + 1 = 21$$

$$\frac{2n}{2} = \frac{20}{2}$$

The numbers are 10 and 11.

$n = 10$

13. Three consecutive even integers have the property that when the sum of the first integer and twice the second is found, the result is eight more than the third. What is the largest integer?

1st	n	2
2nd	$n+2$	4
3rd	$n+4$	6

$$n + 2(n+2) = 8 + n + 4$$

$$n + 2n + 4 = n + 12$$

$$\frac{3n + 4}{-n} = \frac{n + 12}{-n}$$

$$\frac{2n + 4}{-8} = \frac{12}{-8}$$

$$2n = 4$$

The #'s are 2, 4, 6.

$n = 2$

14. Graph the solution on a number line: $x < 4$



$x \geq -2$ and $x < 2$
→ ←



15. Solve algebraically: $4(3x - 5) + 7 \geq 8x + 3$

$$12x - 20 + 7 \geq 8x + 3$$

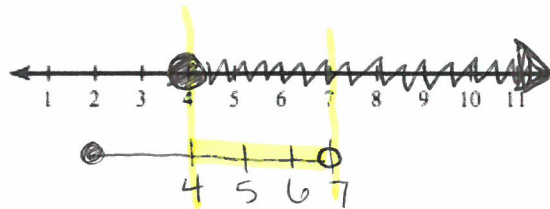
$$\begin{array}{r} 12x - 13 \geq 8x + 3 \\ \underline{-8x} \qquad \underline{-8x} \end{array}$$

$$\begin{array}{r} 4x - 13 \geq 3 \\ \underline{+13} \quad \underline{+13} \end{array}$$

$$\begin{array}{r} 4x \geq 16 \\ \underline{4} \quad \underline{4} \end{array}$$

$x \geq 4$

Graph the solution on the number line below:



Write in Interval Notation: $[4, \infty)$

[included

(not included

If x is a number in the interval $[2, 7)$ state all integers that satisfy the given inequality above.

4, 5, 6

Unit 3: Functions

16. Which relation is **NOT** a function?

- 1) $\{(1, 5), (2, 6), (3, 6), (4, 7)\}$
- 2) $\{(-1, 6), (1, 3), (2, 5), (1, 7)\}$
- 3) $\{(-1, 2), (0, 5), (5, 0), (2, -1)\}$

The input "1" has two outputs.

17. If $f(x) = \frac{x}{x^2-2}$, then what is the value of $f(-2)$?

plug in

$$\frac{(-2)}{(-2)^2-2} = -1$$

$$f(-2) = -1$$

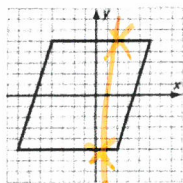
18. If $f(x) = 2x^2 + 3x + 1$ then find the output of $f(-3)$.

$$2(-3)^2 + 3(-3) + 1 = 10$$

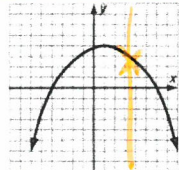
$$f(-3) = 10$$

19. Which of the graphs below represents a function?

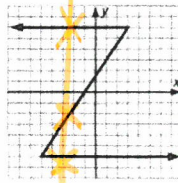
(1)



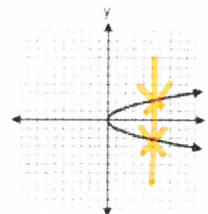
(2)



(3)



(4)



passes
VLT

20. The graph to the right represents the height, y , of the ball from the ground after x seconds. For which interval is the ball's height always decreasing?

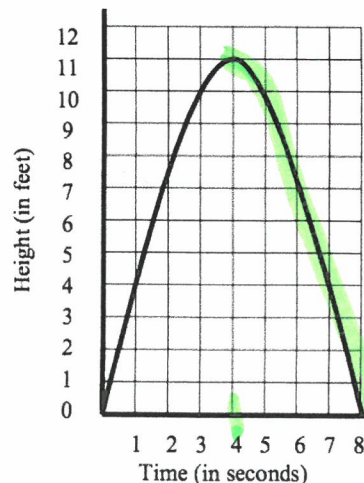
(1) $0 < x < 8$

(2) $4 < x < 8$

~~(3) $0 < x < 4$~~

(4) $0 \leq x \leq 11$

← decreasing between 4 and 8.



Set	Description
Natural	{1, 2, 3, 4, ...} the counting numbers
Whole	{0, 1, 2, 3, 4, ...} the counting numbers plus zero
Integers	{..., -3, -2, -1, 0, 1, 2, 3, ...} positive and negative WHOLE numbers
Rational	All numbers that can be written as a fraction (includes terminating and repeating decimals)
Irrational	Imperfect squares, pi, non-repeating and non-terminating decimals. These numbers cannot be written as a fraction
Real	All numbers included in rational and irrational numbers

21. Which domain would be the *most appropriate* set to use for a function that predicts the number of household online-devices in terms of the number of people in the household?
can't be negative or decimal.

(1) {-2, -1, 0, 1, 2}

(3) {1, 2, 3, 4}

(2) {0, 0.5, 1, 1.5, 2}

(4) {100, 200, 300, 400}

$$\text{average rate of change} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x} = m = \text{SLOPE}$$

22. What is the average rate of change of the line that passes through (4, -8) and (2, 6)?
 SLOPE x_1, y_1 x_2, y_2

$$\frac{6 - (-8)}{2 - 4} = \frac{14}{-2} = -7$$

23. Dan took a summer job, for five weeks, where he received a weekly salary plus tips. His take-home pay is recorded in the table at the right. What was the average rate of change in his weekly take-home pay from week 1 to week 4 of his job?

Week	Pay
1	\$140
2	\$145
3	\$152
4	\$158

$$\frac{158 - 140}{4 - 1} = \frac{18}{3} = \$6 \text{ per week}$$

24. A car is traveling along a straight road. After one hour, the car is 72 miles from New York. After three hours, the car is 188 miles from New York. Determine the average rate the car is traveling.

(1, 72)
(3, 188)

$$\frac{188 - 72}{3 - 1} = \frac{116}{2} = 58 \text{ miles per hour}$$

Unit 4: Linear Functions

25. Rearrange each of the following equations into $y=mx+b$ form & identify the slope & y-intercept.

(a) $3y - 3x = 15$ Slope: $\frac{1}{1}$
 $\quad \quad \quad +3x \quad +3x$

$\frac{3y}{3} = \frac{3x+15}{3}$ Y-int: 5

$y = x + 5$

(b) $6x - 4y = -20$ Slope: $\frac{3}{2}$
 $\quad \quad \quad -6x \quad \quad -6x$

$-4y = -6x - 20$ Y-int: 5
 $\quad \quad \quad -4 \quad \quad -4 \quad \quad -4$

$y = \frac{3}{2}x + 5$

Steps to Writing Equations in Slope-Intercept Form

Step 1: Take two points and find the slope

Step 2: Pick one of the given coordinates

Step 3: Substitute the slope (m), x, and y into $y = mx + b$

Step 4: Solve for the y-intercept (b)

Step 5: Substitute the slope (m) and the y-intercept (b) into $y = mx + b$

26. Water is draining out of a bathtub such that the volume still left, g-gallons, is shown as a function of the number of minutes, m, it has been draining.

m, minutes	1	2	3	4	5
g(m), gallons	24	21	18	15	12

Assuming that the relationship is linear, create an equation that represents the table above.

$(1, 24)$

$(2, 21)$

$m = \frac{24-21}{2-1} = \frac{3}{1}$

$m = 3$

$y = mx + b$

$y = 3x - 3$

$m = 4$

$b = 6$

27. Amanda is walking away from a light pole at a rate of 4 feet per second. If she starts at a distance of 6 feet from the light pole, which of the following gives her distance, d, from the light pole after walking for t-seconds?

(1) $d = 4t + 6$

(3) $d = 6t + 4$

(2) $d = \frac{3}{2}t$

(4) $d = -6t + 4$

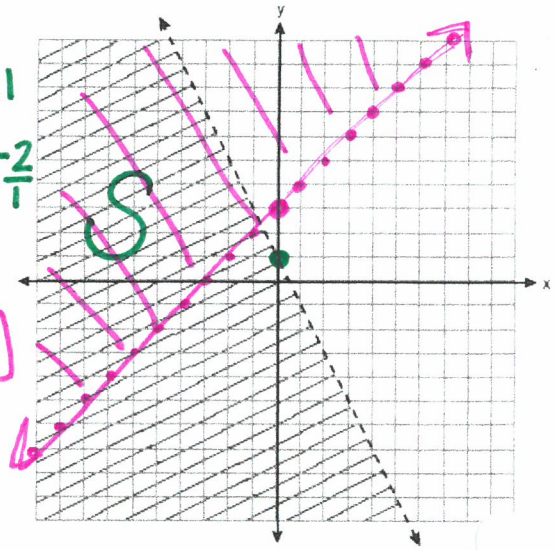
28. A television company charges a *one-time* installation fee and a monthly service charge. The total cost is modeled by the function $y = 40 + 90x$. Which statement represents the meaning of each part of the function?

- 1) y is the total cost, x is the number of months of service, \$90 is the installation fee, and \$40 is the service charge per month
- 2) y is the total cost, x is the number of months of service, \$40 is the installation fee, and \$90 is the service charge per month.
- 3) x is the total cost, y is the number of months of service, \$40 is the installation fee, and \$90 is the service charge per month.
- 4) x is the total cost, y is the number of months of service, \$90 is the installation fee, and \$40 is the service charge per month.

29.(A) Write the inequality represented in the graph shown. \rightarrow

$y < -2x + 1$

$b = 1$
 $m = -\frac{2}{1}$



(B) On the same set of axes, graph the inequality $-x + y \geq 3$.

$y \geq x + 3$

(C) State one point that is in the solution set. $(-3, 3)$

30. On the set of axes below, graph $f(x) = \begin{cases} x^2 - 1 & \text{if } x \leq 2 \\ 2x - 3 & \text{if } x > 2 \end{cases}$

$x^2 - 1$	y
2	3
1	0
0	-1
-1	0
-2	3

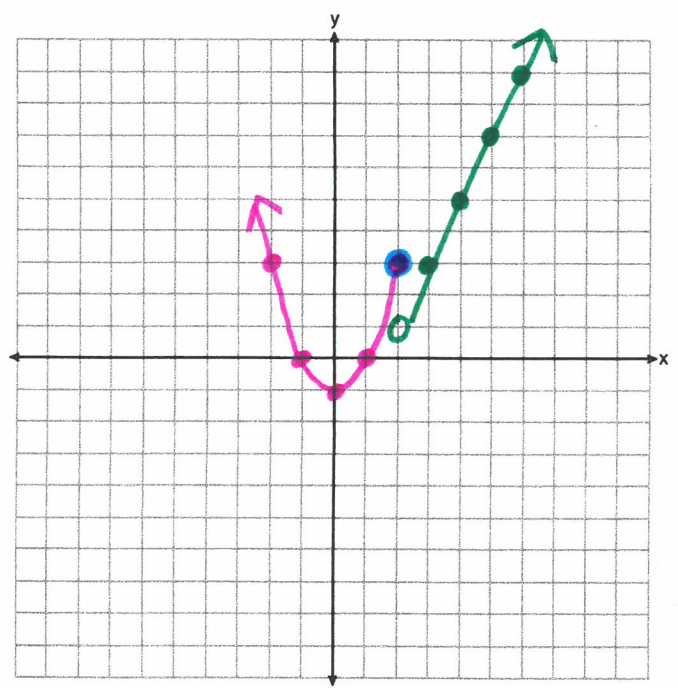
included

$2x - 3$	y
2	1
3	3
4	5
5	7

not included

Determine the output value for $f(2)$.

$f(2) = 3$



Unit 5: Systems of Equations & Inequalities

31. Solve Algebraically **Substitution**

$$y = x + 1$$

$$x + y = 9$$

$$x + x + 1 = 9$$

$$2x + 1 = 9$$

$$\frac{2x}{2} = \frac{8}{2}$$

$$x = 4$$

$$y = x + 1$$

$$y = 4 + 1$$

$$y = 5$$

$$(4, 5)$$

32. Solve Algebraically

$$-3(2x + 3y = 6)$$

$$2(3x + 5y = 15)$$

$$-6x - 9y = -18$$

$$6x + 10y = 30$$

$$2x + 3(12) = 6$$

$$2x + 36 = 6$$

$$2x = -30$$

$$x = -15$$

Elimination.

$$-6x - 9y = -18$$

$$6x + 10y = 30$$

$$y = 12$$

$$2x + 3(12) = 6$$

$$2x + 36 = 6$$

$$2x = -30$$

$$x = -15$$

$$(-15, 12)$$

33. Which system of equations will yield the same solution as the system below? ***Matrix!**

$$x - y = 3$$

$$2x - 3y = -1$$

A) $-2x - 2y = -6$

$$2x - 3y = -1$$

B) $-2x + 2y = 3$

$$2x - 3y = -1$$

C) $2x - 2y = 6$

$$2x - 3y = -1$$

D) $3x + 3y = 9$

$$2x - 3y = -1$$

34. Gavin works for a restaurant during the weekends. He is paid \$9 per hour for bussing and \$10 per hour for hosting. He can work a **maximum** of 20 hours per week and he wants to earn **at least** \$200 this weekend. If b represents the hours spent bussing and h represents the hours spent hosting, write a system of inequalities can be used to represent these conditions.

$$b + h \leq 20$$

$$9b + 10h \geq 200$$

[hours]

[\$]

35. Christian and Shannon are selling candles for a school fundraiser. Customers can buy small candles and large candles. After the first week, Christian sold 2 small candles and 3 large candles for \$24. Shannon, on the other hand, sold 1 small candle and 1 large candle for \$9.50.

(A) Write a system of equations that describes the given situation. Let x represent the cost of each small candle and y represent the cost of each large candle.

$$2x + 3y = 24$$

$$1x + 1y = 9.50$$

(B) On the set of axes below, graph the system of equations.

$$2x + 3y = 24$$

$$3y = -\frac{2x}{3} + \frac{24}{3}$$

$$y = -\frac{2}{3}x + 8$$

$$x + y = 9.50$$

$$y = -x + 9.50$$

(C) Determine the cost of one small candle and the cost of one large candle.

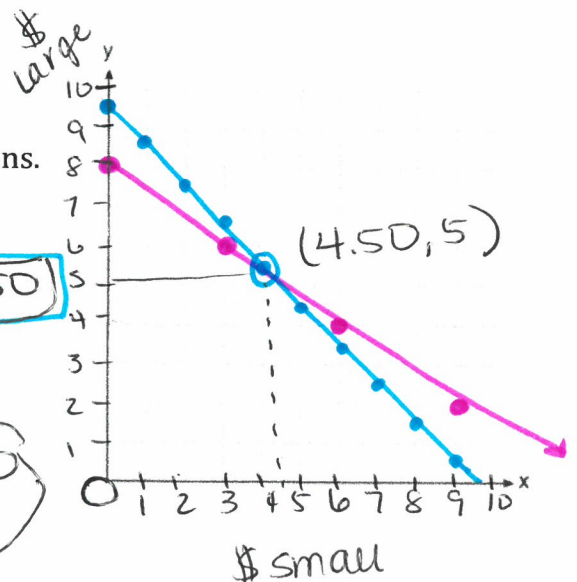
$$2x + 3y = 24$$

$$-2x - 2y = -19$$

$$y = 5$$

small = \$4.50

large = \$5



Directions: Choose the best answer. Answer ALL questions. Show ALL work in column 2. If there is no mathematical work to be shown, write an explanation or definition to support your answer!

1. If $A = \frac{2}{3}(B + 8)$, then B is equivalent to

- (1) $\frac{3}{2}A + 8$ (2) $\frac{3}{2}A - 8$
 (3) $\frac{2}{3}A + 8$ (4) $\frac{2}{3}A - 8$

Show steps to get B alone:

$$A = \frac{2}{3}(B+8)$$

$$\frac{3}{2} \cdot A = \frac{3}{2} \cdot \frac{2}{3}(B+8) \cdot \frac{3}{2}$$

multiply by
reciprocal

$$\frac{3}{2}A = B+8$$

$$\frac{3}{2}A - 8 = B$$

2. If the domain of $f(x) = 2x + 1$ is $-2 \leq x \leq 3$, state the range of this function.

Range = $-3 \leq y \leq 7$

$x = \text{input (domain)}$ $y = \text{output (range)}$

Support with a table: put $f(x) = 2x + 1$ into the calculator ($y=$)

x	y
-2	-3
-1	-1
0	1
1	3
2	5
3	7

Fill out table for the x values given

3. If $f(x) = 3^x$ and $g(x) = 2x + 4$, at which value of x is $f(x) \leq g(x)$?

- (1) 4
 (2) 3
 (3) 2
 (4) 1

$f(x) = 3^x$		$g(x) = 2x + 4$
$x y$		$x y$
4 81	$81 \leq 12$	4 12
3 27	$27 \leq 10$	3 10
2 9	$9 \leq 8$	2 8
1 3	$3 \leq 6$	1 6

When x is 1, $3 \leq 6$


4. Which expression can be used to change 75 kilometers per hour to meters per minute?

- 1) $\frac{75 \text{ km}}{1 \text{ hr}} \times \frac{1 \text{ km}}{1,000 \text{ m}} \times \frac{1 \text{ hr}}{60 \text{ min}}$ (3) $\frac{75 \text{ km}}{1 \text{ hr}} \times \frac{1,000 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ hr}}{60 \text{ min}}$
 2) $\frac{75 \text{ km}}{1 \text{ hr}} \times \frac{1 \text{ km}}{1,000 \text{ m}} \times \frac{60 \text{ min}}{1 \text{ hr}}$ 4) $\frac{75 \text{ km}}{1 \text{ hr}} \times \frac{1,000 \text{ m}}{1 \text{ km}} \times \frac{60 \text{ min}}{1 \text{ hr}}$

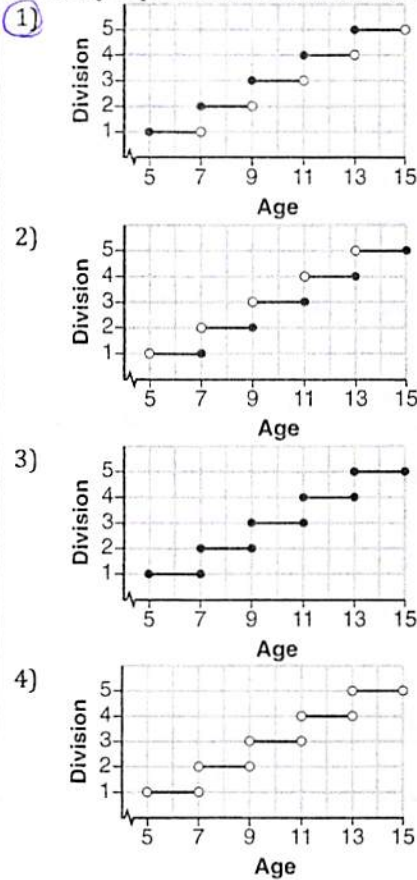
Look for units that are the same diagonally that you can cross out.

<p>5. What is the average rate of change of the line that passes through the points (4,-8) and (2,6)?</p> <p>(1) $-\frac{1}{7}$ (2) $\frac{1}{7}$ (3) 7 (4) -7</p>	<p>Label points with (x,y) Average rate of change (slope) $\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$</p> <p>$\frac{-8 - 6}{4 - 2} = -7$</p>
<p>6. If h represents a number, which equation is a correct translation of "Sixty more than 9 times a number is 375"?</p> <p>variable = h + 60 * turn around</p> <p>(1) $9h = 375$ (2) $9h + 60 = 375$ (3) $9h - 60 = 375$ (4) $60h + 9 = 375$</p>	<p>Choice 1 never mentions 60. Choice 3 subtracts, more than means add Choice 4 multiplies 60 and h.</p>
<p>7. If $f(x) = \frac{x}{x^3-2}$, what is the value of $f(-2)$?</p> <p>(1) $-\frac{1}{5}$ (2) $-\frac{1}{3}$ (3) $\frac{1}{3}$ (4) $\frac{1}{5}$</p>	<p>put function into calculator (y=) look for output of (-2)</p> <p>$\frac{-2}{-8-2} = \frac{1}{5}$</p>
<p>8. What is the slope of a line represented by the equation $2y = x - 4$</p> <p>(1) 1 (2) $\frac{1}{2}$ (3) -1 (4) $-\frac{1}{2}$</p>	<p>Is it in slope-intercept form ($y = mx + b$)? *No it isn't y is not alone!</p> <p>$\frac{2y}{2} = \frac{x}{2} - \frac{4}{2}$ $y = \frac{x}{2} - 2$ put in your sneaky ninja. $y = \frac{1}{2}x - 2$ ↑ slope ↙ y-intercept</p>
<p>9. What is a solution to the inequality $-6x - 17 \geq 8x + 25$?</p> <p>(1) -3 (2) 3 (3) -4 (4) 4</p>	<p>$\begin{array}{r} -6x - 17 \geq 8x + 25 \\ +17 \quad +17 \\ \hline -6x \geq 8x + 42 \\ -8x \quad -8x \\ \hline -14x \geq 42 \\ -14 \quad -14 \\ \hline x \leq -3 \end{array}$</p> <p>The sign reverses because you divide by a negative</p> <p>$x \leq -3$</p>
<p>10. Which relation is <u>not</u> a function?</p> <p>(1) $\{(1,5), (2,6), (3,6), (4,7)\}$ (2) $\{(4,7), (2,1), (-3,6), (3,4)\}$ (3) $\{(-1,6), (1,3), (2,5), (1,7)\}$ (4) $\{(-1,2), (0,5), (5,0), (2,-1)\}$</p>	<p>x's can not repeat Label your points with (x,y)</p>

Directions: Choose the best answer. Answer ALL questions. Show ALL work in column 2. If there is no mathematical work to be shown, write an explanation or definition to support your answer!

<p>1) When solving the equation $4(3x^2 + 2) - 9 = 8x^2 + 7$, Emily wrote $4(3x^2 + 2) = 8x^2 + 16$ as her first step. Which property justifies Emily's first step?</p> <p>① addition property of equality 2) commutative property of addition 3) multiplication property of equality 4) distributive property of multiplication over addition</p>	<p>addition property of equality add opposite or inverse to cancel. commutative property - order changes without outcome changing multiplicative property of equality - multiply by reciprocal to cancel. distribution property: multiply by number outside parentheses.</p>												
<p>2) The ages of three brothers are consecutive even integers. Three times the age of the youngest brother exceeds the oldest brother's age by 48 years. What is the age of the youngest brother?</p> <p>1) 14 2) 18 3) 22 ④ 26</p> <p style="text-align: center;">Your answer must be <u>even</u>!</p>	<p>Make a table Write your Let statement & Equation here</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td style="padding: 2px;">x</td> <td style="padding: 2px;">1st cons. even#</td> <td style="padding: 2px;">(26)</td> <td style="padding: 2px;">$3(\text{youngest}) = \text{oldest} + 48$</td> </tr> <tr> <td style="padding: 2px;">$x+2$</td> <td style="padding: 2px;">2nd cons. even#</td> <td style="padding: 2px;">(28)</td> <td style="padding: 2px;">$3x = x + 4 + 48$</td> </tr> <tr> <td style="padding: 2px;">$x+4$</td> <td style="padding: 2px;">3rd cons. even#</td> <td style="padding: 2px;">(30)</td> <td style="padding: 2px;">$3x = x + 52$</td> </tr> </tbody> </table> <p style="margin-left: 20px;"> $\begin{array}{r} -x \quad -x \\ \hline \frac{2x}{2} = \frac{52}{2} \quad x = 26 \end{array}$ The youngest brother is 26 </p>	x	1 st cons. even#	(26)	$3(\text{youngest}) = \text{oldest} + 48$	$x+2$	2 nd cons. even#	(28)	$3x = x + 4 + 48$	$x+4$	3 rd cons. even#	(30)	$3x = x + 52$
x	1 st cons. even#	(26)	$3(\text{youngest}) = \text{oldest} + 48$										
$x+2$	2 nd cons. even#	(28)	$3x = x + 4 + 48$										
$x+4$	3 rd cons. even#	(30)	$3x = x + 52$										
<p>3) Write the three ways to express the inequality represented in the accompanying graph?</p> 	<p>Interval Notation: <u>$(-3, 4]$</u> Single Inequality: <u>$-3 < x \leq 4$</u> Compound Inequality <u>$x > -3$ and $x \leq 4$</u> (Connect with and or or)</p>												
<p>4) Julia went to the movies and bought <u>one jumbo popcorn</u> and <u>two chocolate chip cookies</u> for \$5.00. Marvin went to the same movie and bought <u>one jumbo popcorn</u> and <u>four chocolate chip cookies</u> for \$6.00. Write the system of equations. Do Not Solve.</p> <p style="text-align: right;">↑ means more than one equation</p>	<p>Let p = cost of popcorn C = cost of choc. cookies</p> <p style="margin-left: 20px;"> $\begin{aligned} 1p + 2c &= 5.00 \\ 1p + 4c &= 6.00 \end{aligned}$ </p>												
<p>5) Ryan can sell <u>no more than 400 raffle tickets</u> for a school fundraiser. His goal is to make <u>at least of \$1200</u> in sales. To win Beats headphones, you must purchase a <u>15 red ticket</u>. To win an Kindle, you must purchase a <u>\$2 blue ticket</u>. If r represents the number of red tickets and b represents the number of blue tickets, which system of inequalities represents this situation?</p> <p>Annotate to justify you answer choice. no more than \leq at least \geq</p>	<p>(1) $r + b \geq 400$ and $5r + 2b \leq 1200$ ② $r + b \leq 400$ and $5r + 2b \geq 1200$ (3) $r + b \geq 400$ and $5r + 2b \geq 1200$ (4) $r + b \leq 400$ and $5r + 2b \leq 1200$</p>												

6) Vince can start wrestling at age 5 in Division 1. He remains in that division until his next odd birthday when he is required to move up to the next division level. Which graph correctly represents this information?



Step Functions

○ circle, not included allows us to pass through

● circle, included you can not pass through

7) Harry has a data plan that costs \$10.95 per month plus \$.25 per gigabyte he uses. Nicole has a data plan that costs \$12.45 per month plus \$.15 per gigabyte she uses. For what number of gigabytes do the two plans cost the same?

$g = \#$ of gigabytes ↙ means to set equal to each other.

Harry $10.95 + .25g$

Nicole $12.45 + .15g$

$$10.95 + .25g = 12.45 + .15g$$

$$-10.95 \quad -10.95$$

$$.25g = 1.50 + .15g$$

$$-.15g \quad -.15g$$

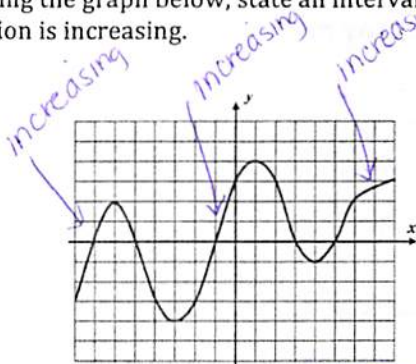
$$.10g = 1.50$$

$$.10 \quad .10$$

$g = 15$

At 15 gigabytes the plans will cost the same.

8) Using the graph below, state an interval at which the function is increasing.

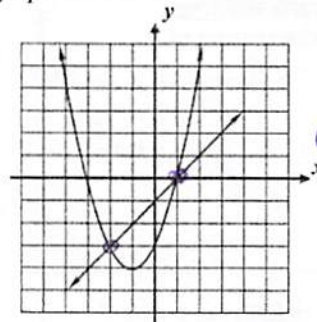


$8 \leq x < 6$ or $-3 < x < 1$ or $4 < x \leq 8$

#'s come from domain or x-axis

Inequality symbols always go in the same direction

9) The quadratic function, $f(x)$ and the linear function $g(x)$ are graphed below. For what values of x does $f(x)=g(x)$?



$(1, 0)$ and $(-2, -3)$

$x = 1$

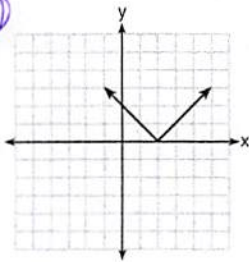
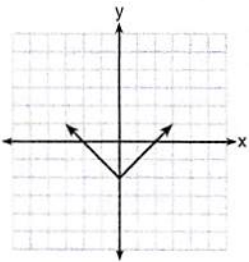
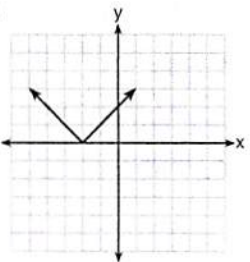
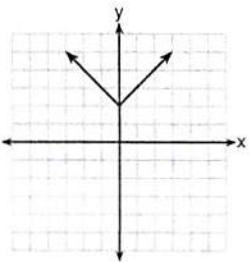
$x = -2$

or $\{-2, 1\}$

Look for where the functions intersect each other.

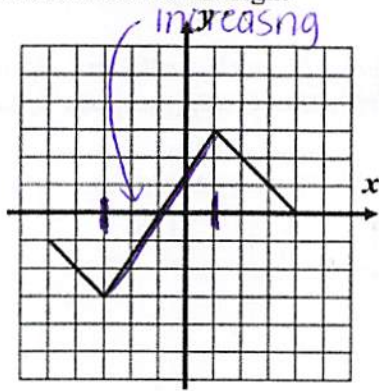
Algebra 1 CC Midterm Review Homework #3

Directions: Choose the best answer. Answer ALL questions. Show ALL work in column 2. If there is no mathematical work to be shown, write an explanation or definition to support your answer!

<p>1. A system of equations are given below.</p> $\begin{aligned} x + 2y &= 5 \\ 2x + y &= 4 \end{aligned}$ <p>Which system of equations does <u>not</u> have the same solution?</p> <p> <input checked="" type="checkbox"/> (1) $\begin{cases} 3x + 6y = 15 \\ 2x + y = 4 \end{cases}$ <input checked="" type="checkbox"/> (2) $\begin{cases} 4x + 8y = 20 \\ 2x + y = 4 \end{cases}$ </p> <p> <input checked="" type="checkbox"/> (3) $\begin{cases} x + 2y = 5 \\ 6x + 3y = 12 \end{cases}$ <input checked="" type="checkbox"/> (4) $\begin{cases} x + 2y = 5 \\ 4x + 2y = 12 \end{cases}$ </p>	<p>Use elimination method or MATRIX</p> $\begin{bmatrix} 1 & 2 & 5 \\ 2 & 1 & 4 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 2 \end{bmatrix} \quad (1, 2)$														
<p>2. Which graph represents the equation $y = x - 2$?</p> <p>(1) </p> <p>(2) </p>	<p>$y =$ <input type="text" value="2nd"/> <input type="text" value="0"/> <input type="text" value="enter"/> <input type="text" value="Graph"/></p> <p>(3) </p> <p>(4) </p>														
<p>3. Consider the function given by $f(x) = 2x + 7$. Find its range over the domain interval $-2 \leq x \leq 3$.</p> <p>$3 \leq y \leq 13$</p>	<p>$f(x) = 2x + 7 \leftarrow$ put in calculator + get a table</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>-2</td> <td>3</td> </tr> <tr> <td>-1</td> <td>5</td> </tr> <tr> <td>0</td> <td>7</td> </tr> <tr> <td>1</td> <td>9</td> </tr> <tr> <td>2</td> <td>11</td> </tr> <tr> <td>3</td> <td>13</td> </tr> </tbody> </table> <p>} range</p>	x	y	-2	3	-1	5	0	7	1	9	2	11	3	13
x	y														
-2	3														
-1	5														
0	7														
1	9														
2	11														
3	13														
<p>4. Officials in a town use a function, C, to analyze traffic patterns. $C(n)$ represents the rate of traffic through an intersection where n is the number of observed vehicles in a specified time interval. What would be the most appropriate domain for the function?</p> <p> (1) $\{\dots -2, -1, 0, 1, 2, 3, \dots\}$ (3) $\{0, \frac{1}{2}, 1, 1\frac{1}{2}, 2, 2\frac{1}{2}\}$ </p> <p> (2) $\{-2, -1, 0, 1, 2, 3\}$ (4) $\{0, 1, 2, 3, \dots\}$ </p>	<p>If n represents the number observed vehicles going through an intersection the only domain would be #4. You can not have negative vehicles or fractions of vehicles.</p>														

5. Over which interval is the function to the right increasing?

- (1) $-1 < x < 4$
- (2) $-3 < x < 3$
- (3) $-3 < x < 1$
- (4) $1 < x < 4$

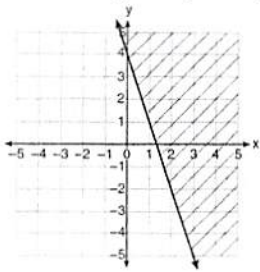


6. A water tank is being drained by a pump at a constant rate. The volume in the tank, V , in gallons, is given by the equation: $V(t) = -4t + 280$, where t is the time, in minutes, the pump has been on. Based on this equation, which statement is true?

- (1) The tank lost 280 gallons after 4 minutes of draining.
- (2) The water tank started with 280 gallons and is draining at a rate of 4 gallons per minute.
- (3) The water tank is being filled at a rate of 4 gallons per minute until it reaches 280 gallons.
- (4) The water tank started with 280 gallons and is filling at a rate of 4 gallons per minute.

rate of change (slope) $\rightarrow y = mx + b$ \leftarrow start, beginning (y-intercept)

7. Which inequality is represented in the graph below?



- (1) $y \geq -3x + 4$
- (2) $y \leq -3x + 4$
- (3) $y \geq -4x - 3$
- (4) $y \leq -4x - 3$

Solid line indicates
Symbol must be \leq or \geq

y-intercept is 4 which rules out choice 3 and 4.

The inequality is shaded upwards indicating \geq

8. Which value of x is in the solution set to the system of equations below?

- (1) 2
 - (2) 3
 - (3) 4
 - (4) 8
- $$9x + 6y = 36$$
- $$10x - 4y = 8$$

Use elimination method or matrix

$$\begin{bmatrix} 9 & 6 & 36 \\ 10 & -4 & 8 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 3 \end{bmatrix} (2, 3)$$

Because it is asking for the value of x , the answer is 2

9. Create an algebraic equation for the following statement, then determine the value of the number.

Three times the sum of a number and six is equal to twelve less than that number.

12 - n
turnaround

$$3(n+6) = n-12$$

Annotate

2 operations ($\circ +$) means you need parentheses.

less than is a turnaround word.