

Math 1 Formula Sheet

Consecutive integers/consecutive positive/consecutive negative

$x, x+1, x+2, \dots$

Consecutive *odd/even* integers

$x, x+2, x+4, \dots$

Multiplication/division rules

Multiply/divide **same signs is positive**

$$+ \cdot + = +$$

$$- \cdot - = +$$

multiply/divide **different signs is negative**

$$+ \cdot - = -$$

$$- \cdot + = -$$

All Functions

Dependent **do** Main

Range Independent

Y

X

x intercept when $y = 0$ y intercept when $x = 0$

Linear Functions (use L1 and L2 then STAT CALC 4)

Slope (aka rate of change) $\frac{y_2 - y_1}{x_2 - x_1}$ slope = $\frac{\text{rise}}{\text{run}}$ Standard Form $Ax + By = C$ *in standard form

Slope intercept form $y = mx + b$ $m = \text{slope}$ $b = \text{y-intercept}$ slope = $-\frac{A}{B}$

Parallel lines - same slopes

Perpendicular lines- opposite reciprocal slopes (flip slope fraction and switch the sign)

Exponents $b^x \cdot b^y = b^{x+y}$ $\frac{b^x}{b^y} = b^{x-y}$ $(b^x)^y = b^{xy}$

Quadratic Functions (use L1 and L2 then STAT CALC 5)

(solutions, roots, x intercepts, zeros where $y=0$)

Standard Form $y = ax^2 + bx + c = 0$ $a < 0$ opens down $a > 0$ opens up

Exponential Functions $y = a(b)^x$ (use L1 and L2 then STAT CALC 0)

Exponential Growth $y = a(1+r)^t$ Exponential Decay $y = a(1-r)^t$

$a = \text{initial value}$ $r = \text{rate always change \% to decimal by dividing by 100}$ $t = \text{time}$

Geometry

Rectangular solid (box) $V = lwh$ Volume of cylinder $V = \pi r^2 h$ Volume of a sphere $V = \frac{4}{3} \pi r^2 h$

Pythagorean Theorem $a^2 + b^2 = c^2$

Distance- use Pythagorean theorem Midpoint $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$ also add x's divide by 2

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

add y's divide by 2

Statistics Interquartile range (IQR) $Q_3 - Q_1$ Range = max - min

MVP Module 1: Test Review

Name: _____

Multiple Choice: Choose the best answer from the choices provided.

1. ____ Given the first term, $f(1) = 3$ and the common difference of 5, find the first 5 terms.

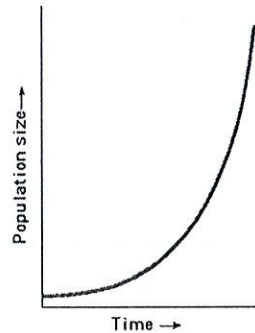
- A. 3, 8, 13, 20, 27
- B. 3, -2, -7, -12, -17
- C. 3, 15, 75, 375, 1875
- D. 3, 8, 13, 18, 23

2. ____ A bacteria colony starts with 5 bacteria and triples every hour. How would you write an explicit equation to model this situation?

- A. $f(x) = 3 \cdot 5^x$
- B. $f(x) = 3x + 5$
- C. $f(x) = 5x + 3$
- D. $f(x) = 5 \cdot 3^x$

3. ____ Which sequence could produce a graph similar to the population model shown?

- A. 1, 5, 25, 125, 625,...
- B. 1, 5, 9, 13, 17,...
- C. 1, -5, 25, -125, 625,...
- D. 1, -4, -9, -14, -19,...



4. ____ A new high school is adding 50 new students each year. This is an example of:

- A. Geometric Growth
- B. Geometric Decay
- C. Arithmetic Growth
- D. Arithmetic Decay

5. ____ Given $f(n) = 10 \cdot \left(\frac{2}{5}\right)^{n-1}$ identify the common ratio (r) and indicate if the function is growing or declining.

- A. $r = 10$, growing
- B. $r = \frac{2}{5}$, growing
- C. $r = 10$, declining
- D. $r = \frac{2}{5}$, declining

6. ____ Given the table below, what is the correct explicit equation?

0	1	2	3	4	5
12	36	108	324	972	2916

- A. $f(n) = f(n - 1) * 3$
- B. $f(n) = 4 \cdot 3^n$
- C. $f(n) = 12 \cdot 3^n$
- D. $f(n) = 12 \cdot 2^n$

7. ____ A single bacterium lands in your mouth and starts growing by a factor of 4 every hour. After how many hours will the number of bacteria exceed 1,000?

- A. One hour
- B. Three hours
- C. Five hours
- D. Seven hours

8. ___ Convert the recursive formula $f_n = f_{n-1} + 9$ with $f(0) = 3$ to an explicit equation.

- A. $f(n) = 3n + 9$ B. $f(n) = 3(9)^n$
 C. $f(n) = 9(3)^n$ D. $f(n) = 9n + 3$

9. ___ Write a recursive formula for the equation: $f(n) = 10(2)^n$

- A. $f(n) = f(n - 1) + 10$ with $f(0) = 2$
 B. $f(n) = f(n - 1) - 2$ with $f(0) = 10$
 C. $f(n) = f(n - 1) \div 2$ with $f(0) = 10$
 D. $f(n) = f(n - 1) \cdot 2$ with $f(0) = 10$

Classify: Classify each function on the left with its description on the right.

10. ___ $t(n) = t(n-1) - 1, t(1) = 2$ a. Arithmetic, Recursive
 11. ___ $h(x) = \frac{3}{2}(4)^x$ b. Arithmetic, Explicit
 12. ___ $g(n) = \frac{3}{2}n - 4$ c. Geometric, Recursive
 13. ___ $f(x) = f(x-1) \cdot 2, f(0) = 2$ d. Geometric, Explicit

From the following two tables, choose A for Arithmetic or B for Geometric or C for Neither.

14. ___

Term Number	Value
12	128
13	64
14	32
15	16

15. ___

Term Number	Value
5	4
6	8
7	12
8	16

Matching: Match each sequence on the left with a formula on the right.

16. ___ 2, 12, 72, 432 a. $f(x) = 6x - 4$
 17. ___ 2, -4, -10, -16 b. $f(x) = 6 \cdot f(x - 1), f(1) = 2$
 18. ___ $2, \frac{1}{3}, \frac{1}{18}, \frac{1}{108}, \frac{1}{648}$ c. $f(x) = 2\left(\frac{1}{6}\right)^{x-1}$
 19. ___ 2, 8, 14, 20 d. $f(x) = f(x - 1) - 6, f(1) = 2$

Open Ended: Show work and explain your reasoning.

20. A plumber who charges \$50 for a house call and \$85 per hour can be expressed as the function $y = 85x + 50$. If the hourly rate were raised to \$90 per hour, how would the function change? Write the new function.

21. Arithmetic Sequence: Lauren keeps records of the distances she travels in an Uber and what it costs/Fare (f) in dollars:

Distance (d) in miles	3	4	5	6	7
Fare (f) in dollars	\$8.25				\$17.25

a. What is the hourly fare? (common difference)

b. If you graph the ordered pairs (d, f) from the table, they lie on a straight line. How can this be determined without graphing them?

22. The following table represents a Geometric Sequence. Find the common ratio.

x	1	2	3	4
f(x)	96			-6144

Determine whether the given information represents an arithmetic or geometric sequence. Then write the recursive and the explicit equation for each.

23. Cami invested \$6,000 into an account that earns 10% interest each year. (Hint: Make a table of values to help yourself.)

Arithmetic or geometric?

Recursive: _____

Explicit: _____

24. The population of Hollyville is steadily decreasing by 12% each year. By the end of this year the population will decrease to 58,960 people. (Hint: Make a table of values to help yourself.)

Arithmetic or geometric?

Recursive: _____

Explicit: _____

Module 2 Test Review

For questions 1-13 determine whether the relationships being represented are
 (a) = Linear, (b) = Exponential, (c) = Neither

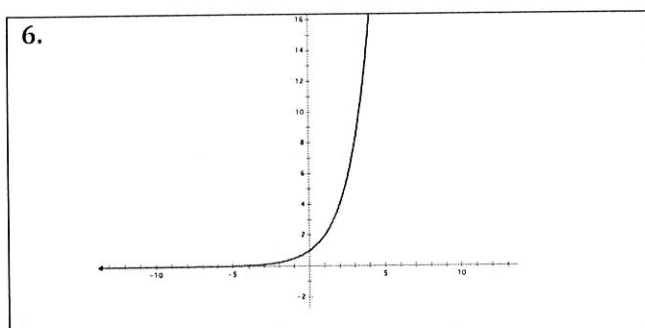
1. $f(x) = \frac{1}{3}x + 2$

2. $f(x) = x^2$

3. $f(0) = 2$ $f(n) = f(n - 1) + 4$

4. $f(x) = 10\left(\frac{1}{2}\right)^x$

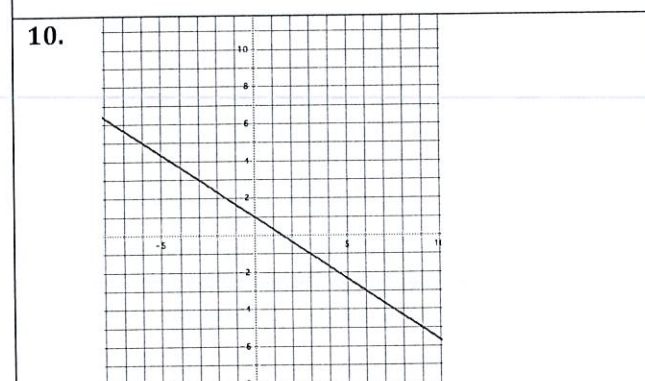
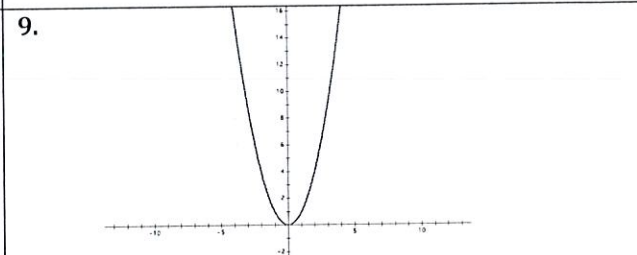
5. $f(x) = \frac{1}{4}(x + 3) + 2$



7.

x	f(x)
4	4
5	10
2	-8
7	22

8. Janet wants to know how many seats are in each row of the theater. Jamal lets her know that each row has 4 seats more than the row in front of it. The first row has 10 seats.



11.

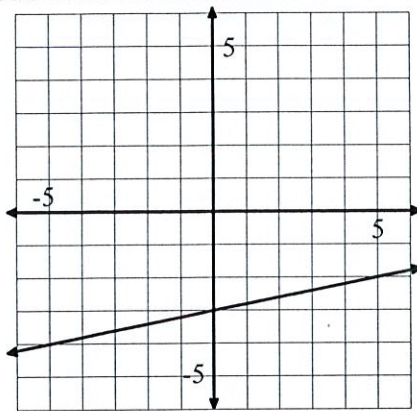
x	f(x)
1.5	3
2.5	9
3.5	27
5.5	243

12.

x	f(x)
2	-2
3	6
4	14
5	22

13. Sally's cookie bakery is so delicious! She started by cooking 3 dozen cookies per day. She starts spreading the word on social media, and she's a hit!! Business begins to multiply. To meet demands, she begins to double the amount of cookies she makes each day.

14. Write the explicit function for the graph shown below using both forms of a linear equation.



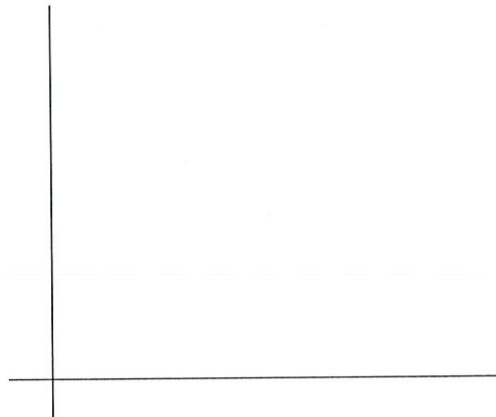
Point Slope Form: _____

Slope Intercept Form: _____

The harbor at Green Top Lake has a lot of green algae at the end of the summer. However, as the weather gets colder, the algae begins to die. At the beginning of fall, the harbor has 150,000 square feet of algae. Suppose half of the algae dies per month...

15. Fill in the table and graph to describe the relationship.

Months	Algae in Harbor
0	
1	
2	
3	



16. Is the relationship **Linear** or **Exponential**?

17. Is the relationship **Discrete** or **Continuous**?

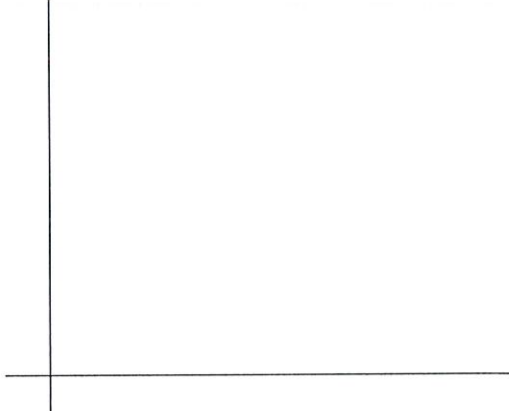
18. Write an explicit function that shows how much algae is in the harbor for x months from the beginning of the fall.

19. Explain what each piece of your explicit function represents.

There was a wonderfully benevolent man, very gracious and interested in providing meals to those in need. He started by giving out 5 meals (dinners) on the first day. Each day, he is able to give out three more meals to those in need.

20. Fill in the table and graph to describe the relationship.

Days	Meals Given
1	
2	
3	
4	



21. Is the relationship **Linear** or **Exponential**?

22. Is the relationship **Discrete** or **Continuous**?

\mathbb{N}	\mathbb{Z}	\mathbb{Q}	\mathbb{R}
<u>Natural Numbers</u>	<u>Integers</u>	<u>Rational Numbers</u>	<u>Real Numbers</u>

23. What is the domain of this function?

- (a) $\{x|x \in \mathbb{Z}\}$
- (b) $\{x|x \in \mathbb{Q}, x < 0\}$
- (c) $\{x|x \in \mathbb{N}\}$
- (d) $\{x|x \in \mathbb{R}\}$

24. Write an explicit function that shows how many meals were given out.

25. Explain what each piece of your explicit function represents.

26. Explain why a sequence is discrete.

27. Use exponent rules to simplify each exponential expression so that it contains only positive exponents.

a. $\frac{b^4}{b^8}$

b. $\frac{24x^4}{8x^{-2}}$

c. $\frac{9x^2}{x^{-2}}$

d. $(2t)^{-3}$

e. $-6xy^{-4}$

f. $(-7x^3)^2$

28. Which of the following is an example of a discrete function?

- A. Time in a race
- B. The number of students in a class
- C. A dog's weight
- D. The length of a growing leaf

29. A movie ticket used to cost \$4.25 back in 1990. Inflation exists because products increase in value over time. The inflation rate is about 3.5% per year. **In what year** can we expect the price of a movie ticket to exceed \$5.50? Use a table to help organize your thinking. You can use $x = 0$ for 1990.

30. Find the equation of a line that goes through the points (8, -4) and (-4, 10).

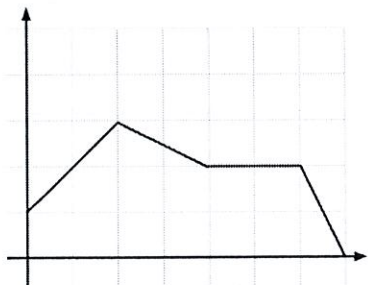
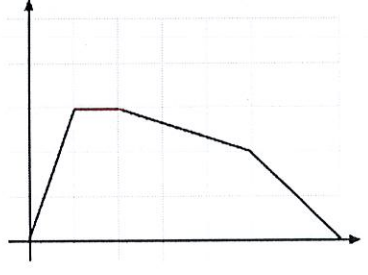
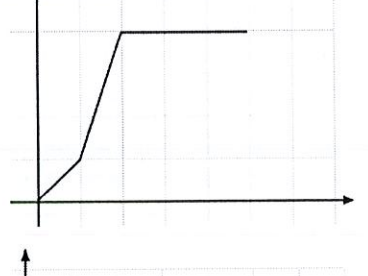
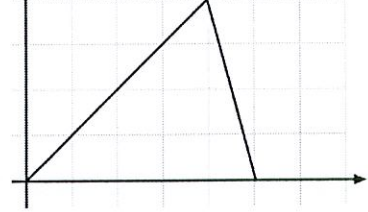
A. $y = -\frac{7}{6}(x + 4) + 10$ B. $y = \frac{7}{6}(x - 8) - 4$

C. $y = -\frac{6}{7}(x + 4) + 10$ D. $y = -\frac{7}{6}(x + 8) - 4$

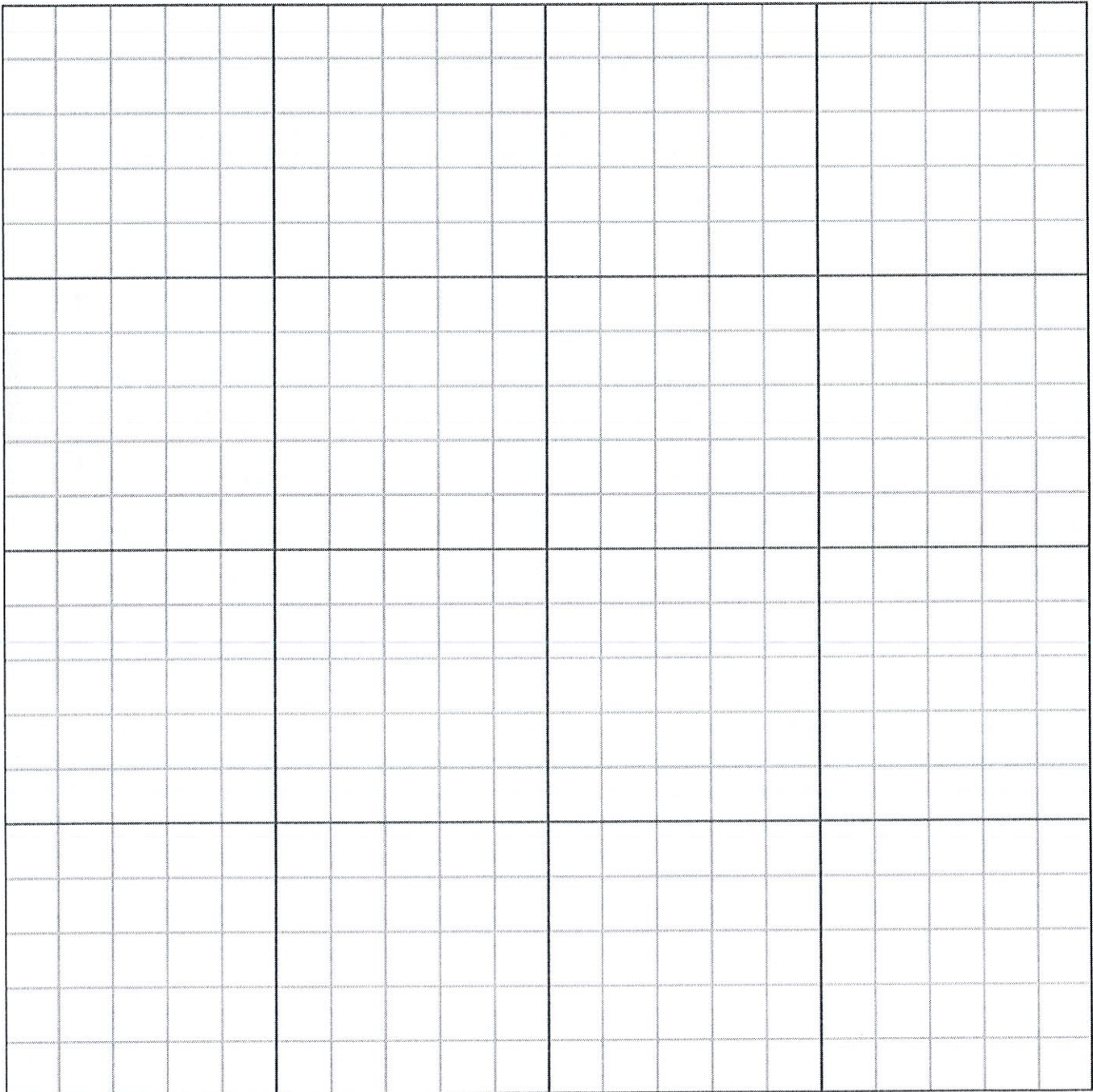
Module 3 Test Review

1. What key features do you look for in a function?
2. What is a function? Provide a verbal description as well as examples and non-examples of functions.

3. Match the story to the graph:

<p>1.</p> 	<p>A. Larry leaves from home in his dad's car going to school. He stays there for a bit and then heads home on foot. Then he gets to his friends house and rides their bike the rest of the way home.</p>
<p>2.</p> 	<p>B. Bob rides his bike to his mom's work for fun. Then when he gets there, he puts the bike in her car and rides home with her from work.</p>
<p>3.</p> 	<p>C. Marcos starts at his neighbor's house and rides with them to the elementary school. Then he walks to the high school which is closer to his house. Then he stays at school for the day and then rides the bus back home.</p>
<p>4.</p> 	<p>D. Buttercup walks to the bus stop and then rides the bus to school and stays for the day.</p>

4. Below you are given some key features of a function. Based on these given features, sketch a graph of what the function could possibly look like.
- The function has three intervals on which it is increasing
 - The function has two intervals on which it is decreasing
 - The domain of the function is $[-5, 7)$
 - The function has a minimum value of 0
 - The function has a maximum value of 2.



5.

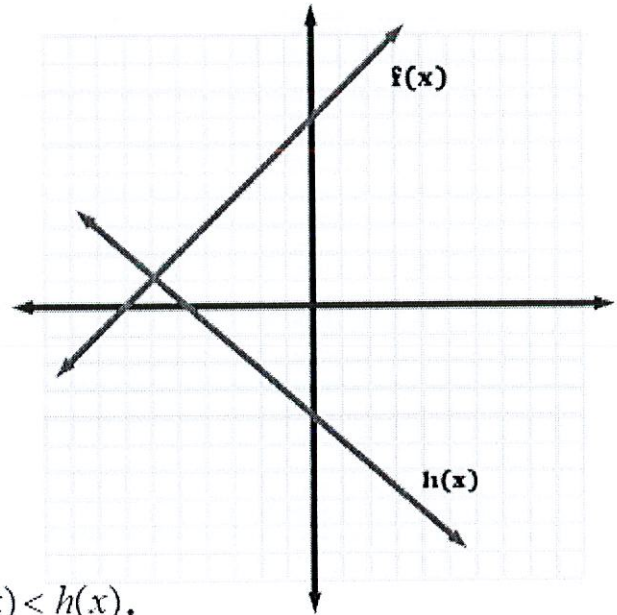
The scale along each axis is 1.

a. Where does $f(x) = h(x)$?

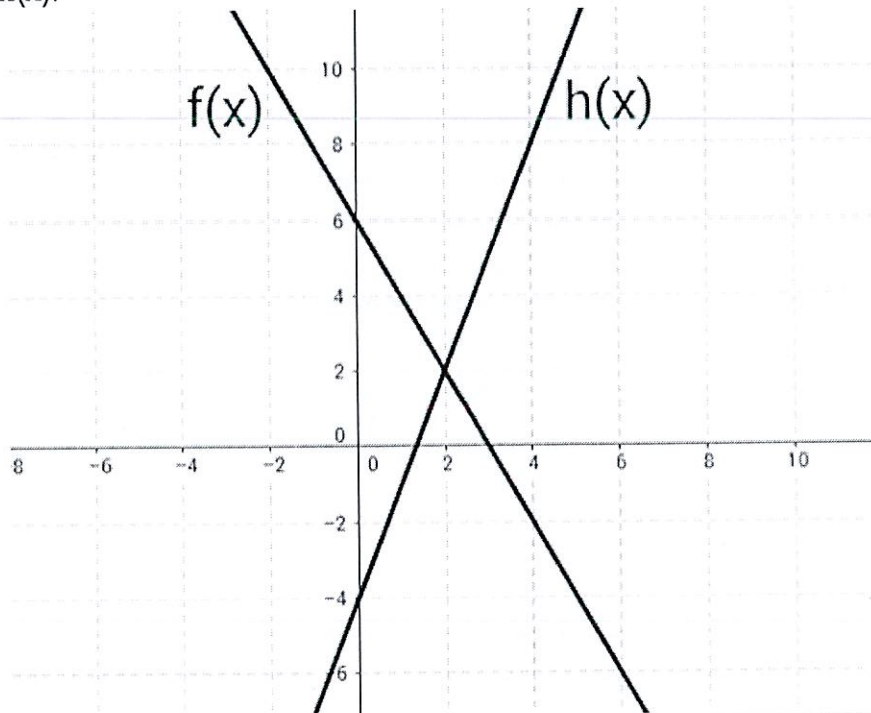
b. What is $f(-1) + h(-1)$?

c. What is $h(2) - f(2)$?

d. State the interval where $f(x) < h(x)$.



6. Two functions are graphed. Graph a new function on the given graph by adding the two functions together, $g(x) = f(x) + h(x)$.

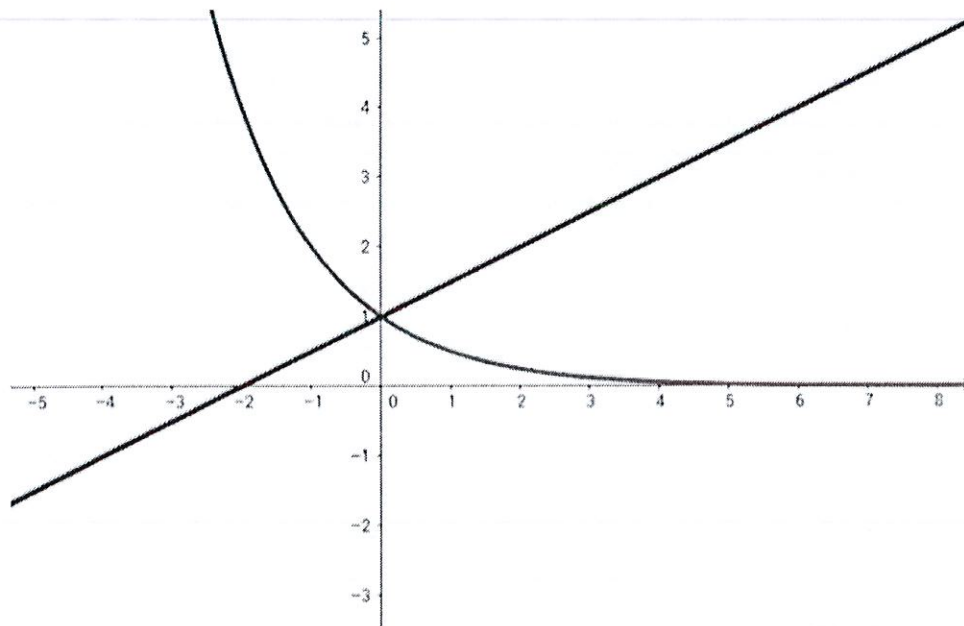


7. A scuba diver is exploring a coral reef. This graph models their exploration along the reef. What is the range of the depth of the coral reef?



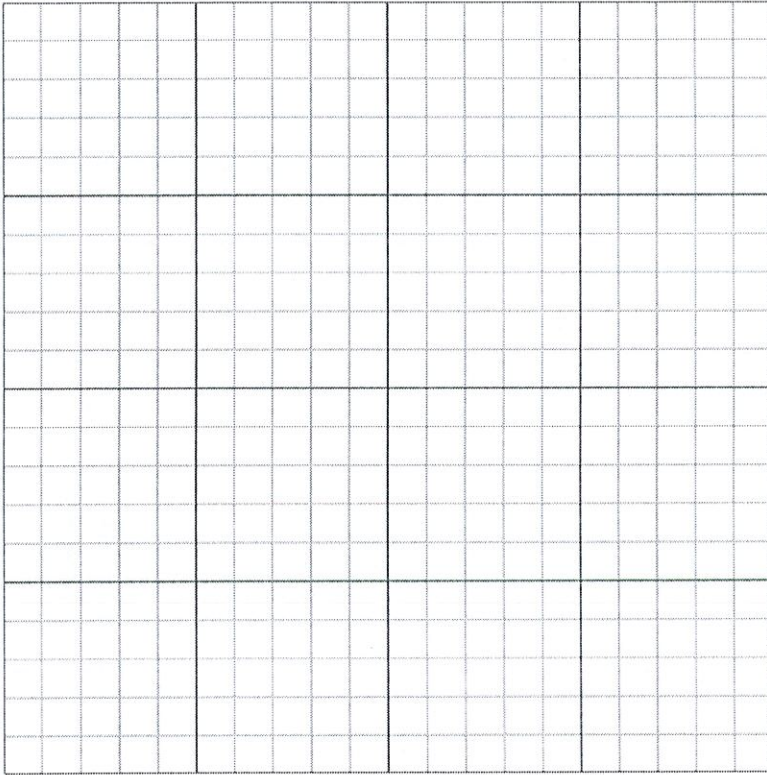
- a. $[0, 7.2]$
- b. $[0, -4.3]$
- c. $[7.2, 0]$
- d. $[-4.3, 0]$

8. List the similarities and differences of the two graphs. (Consider attributes like continuous, discrete, increasing, decreasing, linear, exponential, domain and range.)

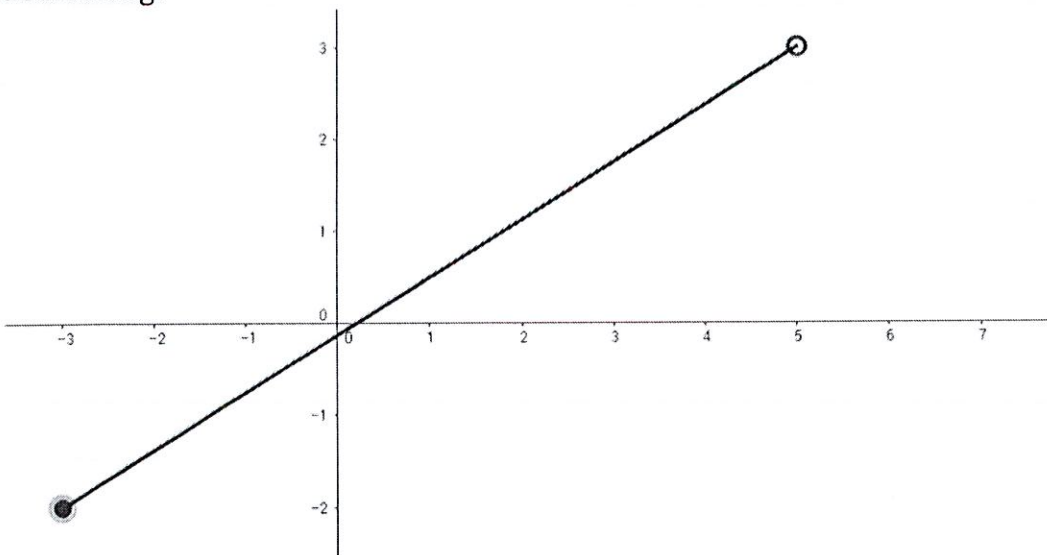


9. Given $f(x) = -x + 3$, when $x \geq 0$

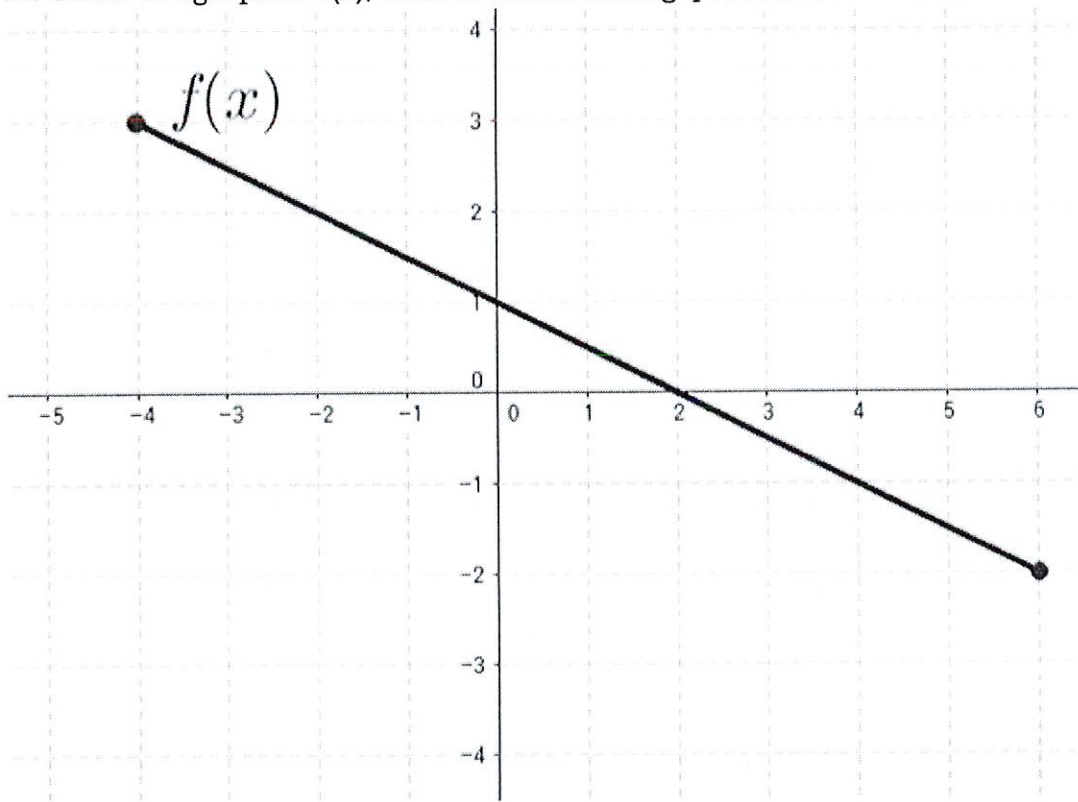
- What does x represent?
- What does $f(x)$ represent?
- Graph the function.
- Describe key features of the graph (linear or exponential, x - and y - intercepts, domain, range, minimum, maximum)



10. Using interval notation, identify the domain, range and whether the function is increasing or decreasing.



11. Given the graph of $f(x)$, answer the following questions:



What is $f(-2)$?	What is $f(0)$?	What is $f(4)$?
For what value does $f(x) = -2$?	What is the x-intercept?	What is the y-intercept?
On what interval is $f(x) < 0$?	On what interval is $f(x) > 0$?	Is $f(x)$ increasing or decreasing?
State the domain of $f(x)$.	State the range of $f(x)$.	Is $f(x)$ continuous or discrete? Why?

MVP Module 4 Test Review

Name: _____

Multiple Choice: Choose the best answer from the choices provided.

1. Which justification should be used for Step 2?

	$4(x - 5) = -12$	Justification
Step 1	$4x - 20 = -12$	- Distributive Property
Step 2	\downarrow $4x = 8$	- _____
Step 3	\downarrow $x = 2$	- Division Property of Equality

- | | |
|--|-------------------------------------|
| a. Addition Property of Equality | b. Subtraction Property of Equality |
| c. Multiplication Property of Equality | d. Division Property of Equality |

2. Which inequality is best represented by the following number line?



- | | |
|-----------------------|-----------------------|
| a. $-3x + 10 \geq 22$ | b. $-3x + 10 \leq 22$ |
| c. $-3x + 10 > 22$ | d. $-3x + 10 < 22$ |

3. A plumber charges a one-time service fee of \$20 in addition to his hourly rate of \$25 per hour. If the plumber went to your house to work on your bathtub and toilet and the bill came to \$282.50, how many hours did it take him to complete the job?

- a. $20 + 25x = 282.50$, $x = 15$ hours
- b. $25 + 20x = 282.50$, $x = 10.5$ hours
- c. $20 + 25x = 282.50$, $x = 10.5$ hours
- d. $45x = 282.50$, $x = 6.3$ hours

4. Solve $y - 5 = -(4 - y)$

- A. $y = 2$
- B. $y = \text{all real numbers}$
- C. $y = \frac{1}{2}$
- D. *No solution*

5. Which inequality represents all of the possible solutions for $2(x - 8) \leq x - 12$

- a. $x \geq 4$
- b. $x \leq -4$
- c. $x \leq 4$
- d. $x \leq -28$

6. Solve. $6x - 4(x + 1) = 4(x - 3) + 8$

- a. $x = 4$
- b. $x = 0$
- c. No Solution
- d. All Real Solutions

7. What is the correct step to simplify the expression $-4j + 8 - j$

- | | |
|--|--|
| A. Combine the $-4j$ and the $-j$ to get $-3j$ | C. Combine the $8 - j$ to get 7 |
| B. Combine the $-4j$ and the $-j$ to get $-5j$ | D. Combine the $-4j$ and the 8 to get $4j$ |

8. Solve: $-4x - 5 < x$

- a. a possible answer would be $x = -10$
- b. a possible answer would be $x = -5$
- c. a possible answer would be $x = -1$
- d. a possible answer could be $x = 1$

9. Which of the following is the definition of a **coefficient**? Give an example of a **coefficient**: _____

- | | |
|--|--|
| A. A number that is multiplied by a variable | B. A value that does not change (a number) |
| C. Terms that contain the same variables | D. A symbol representing an unknown quantity |

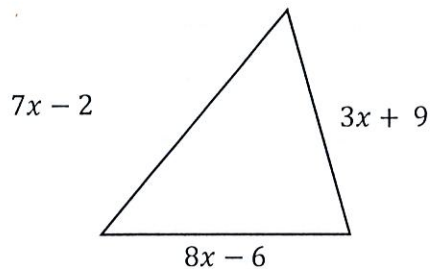
10. Which of the following is the definition of a **constant**? Give an example of a **constant**: _____

- A. A number that is multiplied by a variable
C. Terms that contain the same variables

- B. A value that does not change (a number)
D. A symbol representing an unknown quantity

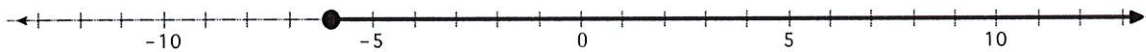
Short Answer: Show work that supports all solutions.

11. Each side of the triangle is represented by an expression. Find the value of x if the triangle has a perimeter of 73.



12. You are starting a lawn mowing business to earn enough money to buy a new video game system, which costs \$500. You already have \$150 from last summer. You charge \$9.50 per hour. Write an inequality that shows how many hours you need to work to earn *more than* \$500, so you can afford controllers, games, and such.

13. Write the inequality represented by this number line:



14. Are the following expressions equivalent? Why or why not?

$$\frac{4x + 6}{2} + 3$$

$$4x + 9$$

15. Mary and Jeff both have jobs at a baseball park selling bags of peanuts. They get paid \$12 per game and \$1.75 for each bag of peanuts they sell. Create equations or inequalities, that when solved, would answer the following questions:

- How many bags of peanuts does Jeff need to sell to earn \$54?
- How many bags of peanuts does Mary need to sell to earn at least \$68?

16. Jay is saving money and has two different jobs he can pick to do on Monday. The dog walking job would earn him \$10 plus \$3 per hour. The ice cream truck driver job would earn him a rate of \$8 per hour. Write an equation that represents when he would make the same amount of money from whichever job he chooses to do if he works for x hours.

17. In each of the equations below, rewrite the equation, solving for the indicated variable.

a) If F denotes a temperature in degrees Fahrenheit and C is the same temperature measured in degrees Celsius, then F and C are related by this equation. Rewrite this expression to solve for C in terms of F .

$$F = 95C + 32.$$

b) The volume V of a cylinder of radius r is given below. Solve for r .

$$V = \pi r^2 h$$

Solve each inequality below for x

18. $2y + 4x \leq 48$

19. $\frac{x}{-3} > -\frac{10}{9}$

20. $\frac{2}{3}x - \frac{1}{2}(4x - 1) \geq x + 2(x - 3)$

Name: _____

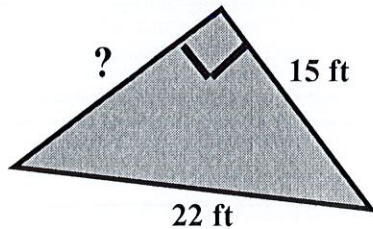
Period: _____

Module 6 Test Review Sheet

**Know all bold/underlined theorems & formulas*

1. What is **Pythagorean Theorem**? Explain each part of this theorem.

2. Find the missing side of the right triangle to the nearest hundredth.



3. What is the **Distance Formula**? Explain each part of this formula.

4. Find the distance between the following coordinates: $(37, 27)$ & $(-8, -33)$

5. What do you know about the slopes of lines that are parallel?

6. What do you know about the slopes of lines that are perpendicular?

7. Write the slope-intercept form of a line that passes through the point $(-8, 4)$ and is perpendicular to the line $y = 4x - 12$.

8. Use the **Midpoint Formula** to find the midpoint of the line segment between:

$$(-1, -1) \text{ \& } (-5, -5)$$

9. Find the other endpoint of the line segment with the given endpoint and midpoint:

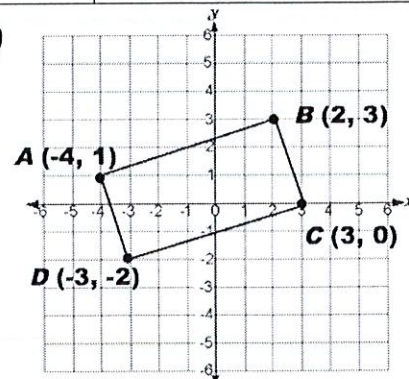
Endpoint: $(5, 2)$, Midpoint: $(-10, -2)$

10. Calculate the length, and slope of each side of the quadrilateral below: **SHOW WORK!!!**

	AB	BC	CD	DA
Length:				
Slope:				

Use your work to **justify** the type of quadrilateral (Use complete sentences!)

The quadrilateral above is a _____ because...



Name: _____

Period: _____

Module 5 Test Review

1. What is the y-intercept of the equation:

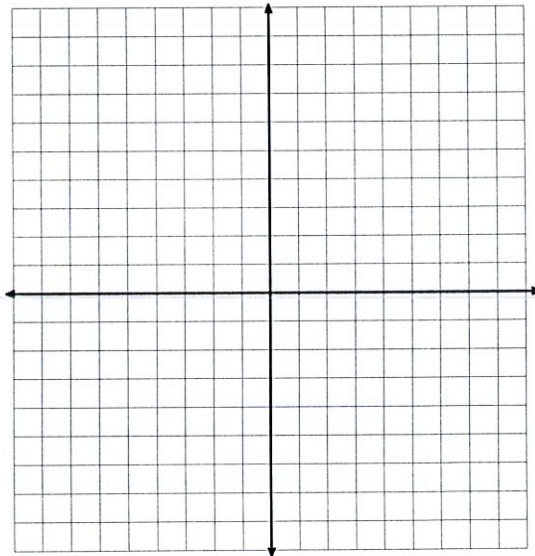
$$-3y + x = 18$$

2. What is the x-intercept of the equation:

$$-3y + x = 18$$

3. Which of the following is a solution to the inequality: $y > 3x - 9$?
(Choose all that apply)

- a. (-1, -13) b. (0, -9) c. (1, -6) d. (3, -4) e. (0, 0)

4. Graph the solutions to the inequality $4x - 2y \leq 14$ 5. Without graphing this system of equations, explain the solution.
$$\begin{cases} y = -x + 1 \\ y = -x - 2 \end{cases}$$

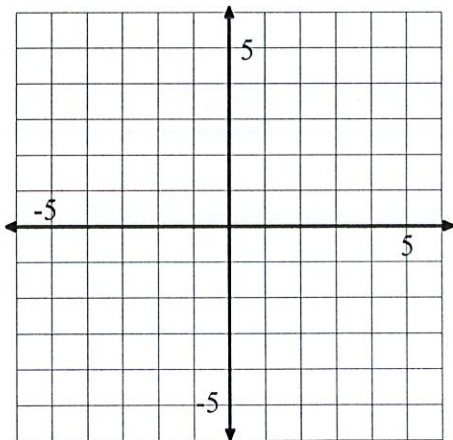
6. Solve the following system of equations using substitution. Show works that supports this method.

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

7. Solve the following system of equations using elimination. Show works that supports this method.

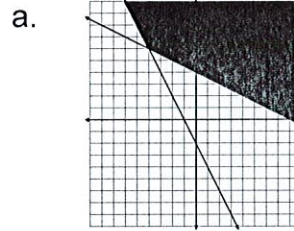
$$\begin{cases} 2x + 5y = 20 \\ 3x - 10y = 37 \end{cases}$$

8. Show all possible solutions to the system of inequalities $\begin{cases} -x + 2y > 2 \\ -2x + y \leq -5 \end{cases}$ on the graph below.

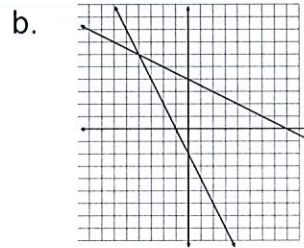


Match each system on the left with the corresponding graph on the right.

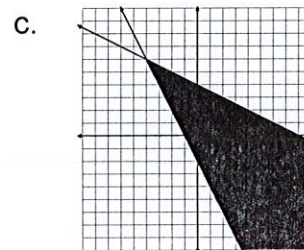
_____ 9. $\begin{cases} x + 2y = 8 \\ -4x - 2y = 4 \end{cases}$



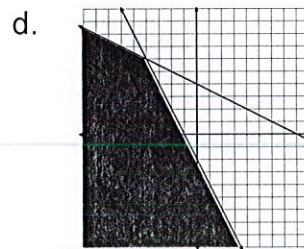
_____ 10. $\begin{cases} x + 2y \leq 8 \\ -4x - 2y \leq 4 \end{cases}$



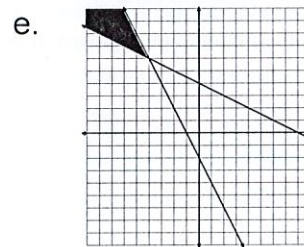
_____ 11. $\begin{cases} x + 2y \leq 8 \\ -4x - 2y \geq 4 \end{cases}$



_____ 12. $\begin{cases} x + 2y \geq 8 \\ -4x - 2y \leq 4 \end{cases}$



_____ 13. $\begin{cases} x + 2y \geq 8 \\ -4x - 2y \geq 4 \end{cases}$



14. Two angles are complementary.

The measure of one angle is five more than four times the other.

Find the measure of each angle by solving a system of equations.

Show works that supports your method of solving this system.

15. The length of Sally's garden is 4 meters greater than 3 times the width.

The perimeter of her garden is 72 meters.

Solve a system of equations to find the dimensions of Sally's garden.

Show works that supports your method of solving this system.

Module 7a Test Review Sheet

***Review the Problems on Module 7a Quiz 1 and 2

Additional Review Problems:

1. Simplify

a. $(3x + 2) - (7x + 3) + (4x)$

b. $(4x^2) + (x - 5)(x + 10)$

c. $4x - (2x)(x + 5) + x^2$

d. $(7x^2)(x + 3) + 5x(4x)$

2. Sam is outlining his pool with tiles. Each tile is t inches long. He used 50 tiles along the width of the pool. The length of his pool is ten inches less than twice the width. Write an expression for the length of the pool, and use it to help you write a simplified expression for the Area of the pool in square inches. Draw a picture to help organize your work.

Length: _____

Area: _____

3. Jon is fencing in a pen along an outside wall of his house for his dog. He has 140 feet of fencing and wants to give his dog the greatest possible area. What are the dimensions of the pen that create the maximum area possible for Jon's dog pen and what is this maximum area?

Quadratic Equation for Area: _____

Dimensions of the Pen: _____

Maximum Area: _____

4. Backyard Project: Martin wants to build a patio around his rectangular fire pit. The fire pit measures 4 feet by 5 feet. Write an expression for the area of the entire project if the patio is to be x feet wide.

5. A rectangular chicken pen is to be built along the wall of a barn from 22 yards of fencing. Find the maximum area that can be enclosed and the dimensions of the pen.

Quadratic Equation for Area: _____

Dimensions of the Pen: _____

Maximum Area: _____

6. Complete the table below on the classification of polynomials.

<u>Polynomial</u>	<u>Standard Form</u>	<u>Degree</u>	<u>Terms</u>
$2x^2$			
$7y^2 + 2y^3 + 4$			
$-8 + 3b$			

7. Graph: $y = -(x - 5)(x - 1)$ and identify the features of the function.

Vertex _____

Y-intercept _____

X-intercepts _____

Domain _____

Range _____

Increasing Interval _____

Decreasing Interval _____

Axis of Symmetry _____

Find vertex, axis of symmetry, roots, determine whether the graph has a min/max, and draw the graph for the quadratic equations below.

1. $y = -x^2 - 4x + 12$

AOS: _____

Vertex: _____

Max/Min: _____

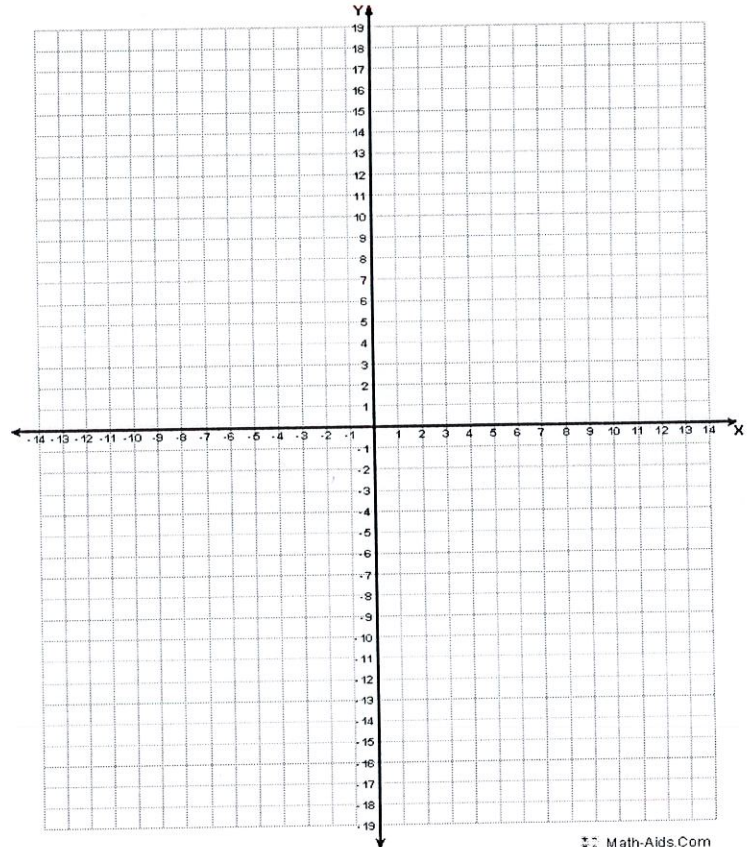
y-intercept: _____

solutions/roots: _____

increasing interval: _____

decreasing interval: _____

domain: _____ / range: _____



2. Factor completely: $7x^2 + 31x + 12$

3. Jon throws a baseball. The height of the function can be determined by $H(t) = -16t^2 + 40t + 5$

- a. What is the maximum height of the ball?
- b. When will the ball be at its maximum height?

4. Suppose you throw a ball into the air. The ball is 6 feet high when it leaves your hand. The equation $-16t^2 + 20t = -6$ models the path of the ball. How many seconds is the ball in the air?

5. An electronics company has a new line of portable radios with CD players. Their research suggests that the daily sales s for the new product can be modeled by $s = -p^2 + 120p + 1400$ -where p is the price of each unit.
- What are the maximum daily sales?
 - What price will result in that maximum?
6. The product of two consecutive numbers is 5 less than 7 times the smaller number. Find each number.
7. You are building a rectangular swimming pool. You want the area of the bottom of the pool to be 90 ft^2 . You want the length of the pool to be 3 feet longer than twice the width. What are the dimensions of the pool?
8. You are trying to dunk a basketball. You need to jump 2.5 ft in the air to dunk the ball. The height that your feet are above the ground is given by the function $h = -16t^2 + 12t$. Will you be able to dunk the basketball?

