

## Mullen High School Math Placement Test Algebra 1 Study Guide

Solve the equation. Check your solution.

1.  $x - 12 = 9$

2.  $2x + 7 = -5 + x$

Solve the equation.

3.  $8|2 - 9p| - 2 = 14$

4.  $-3(-6x + 6) + 6(4x - 3) = -78$

Write the sentence as an inequality.

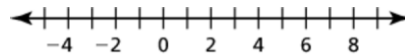
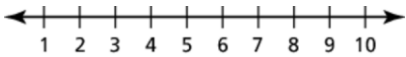
5. A number  $m$  increased by 12 is less than 48.

6. The product of  $x$  and 10 is greater than or equal to 23.

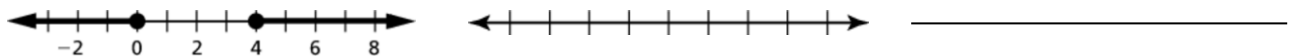
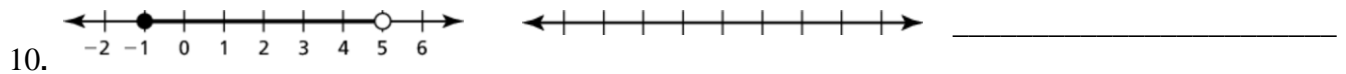
Solve the inequality. Graph the solution.

7.  $-6x - (-7x - 1) \leq 6$

8.  $2|2 - x| + 4 \leq 16$



Write and graph a compound inequality that represents the numbers that are **NOT** solutions of the inequality represented by the graph shown.



Determine whether the relation is a function. If the relation is a function, determine whether the function is *linear* or *nonlinear*. Explain why or why not.

11.

<b>x</b>	1	2	3	4	5
<b>y</b>	1	4	9	16	25

12.  $y = 3x + 1$

Write an equation in point-slope form of the line with the given characteristics.

13. through:  $(5, -3)$ , slope =  $-\frac{1}{5}$  \_\_\_\_\_

14. through:  $(-4, 2)$ , perpendicular to  $y = \frac{2}{3}x - 2$  \_\_\_\_\_

Write an equation in Point-slope form, then in Slope-Intercept form of the line with the given characteristics.

15. through:  $(3, -3)$  and  $(-3, 4)$

a. slope = \_\_\_\_\_ b. Choose a point \_\_\_\_\_ c. Point-slope form: \_\_\_\_\_

d. Change to the slope-intercept form: (show work below)

\_\_\_\_\_

16. through:  $(-3, 5)$ , parallel to  $y = 2x + 2$

a.  $\parallel$  slope = \_\_\_\_\_ b. Choose a point \_\_\_\_\_ c. Point-slope form: \_\_\_\_\_

d. Change to the slope-intercept form: (show work below) \_\_\_\_\_

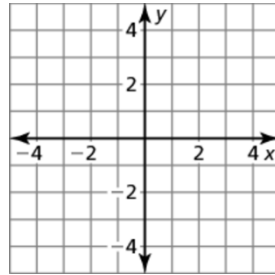
17. through:  $(-3, 5)$ , perpendicular  $y = 2x + 2$

a.  $\perp$  slope = \_\_\_\_\_ b. Choose a point \_\_\_\_\_ c. Point-slope form: \_\_\_\_\_

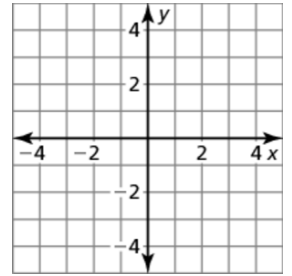
d. Change to the slope-intercept form: (show work below) \_\_\_\_\_

Graph each function and provide the indicate information to help graph the function.

18.  $3x - 4y = 12$   
 $x$  - intercept (\_\_\_\_\_, 0)  
 $y$ - intercept (0, \_\_\_\_\_)

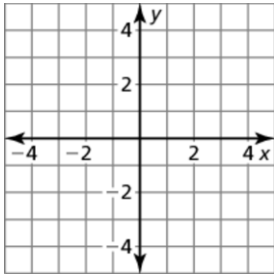


19.  $y = \frac{3}{2}|x + 1| - 3$   
 Vertex (\_\_\_\_\_, \_\_\_\_\_)  
 $a =$  \_\_\_\_\_



Graph  $f$  and  $g$ . Describe the transformations from the graph of  $f(x)$  to the graph of  $g(x)$ .

20.  $f(x) = |x|$ ;  $g(x) = 2|x + 3| - 1$  Vertex of  $f(x) =$  (\_\_\_\_, \_\_\_\_ )  $a =$  \_\_\_\_\_  $h =$  \_\_\_\_\_  $k =$  \_\_\_\_\_



Vertex of  $g(x) =$  (\_\_\_\_, \_\_\_\_ )  $a =$  \_\_\_\_\_  $h =$  \_\_\_\_\_  $k =$  \_\_\_\_\_

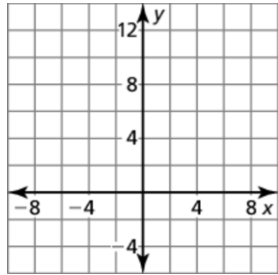
Horizontal shift: \_\_\_\_\_

Vertical shift: \_\_\_\_\_

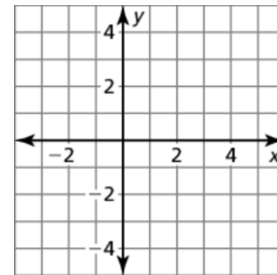
Stretch factor (shape): normal, wider or thinner \_\_\_\_\_

Graph each piecewise function.

21.  $f(x) = \begin{cases} -x + 4, & \text{if } x < -2 \\ \frac{1}{2}x - 3, & \text{if } x \geq -2 \end{cases}$



22.  $y = \begin{cases} -\frac{3}{2}x - 2, & \text{if } x \leq 0 \\ -2, & \text{if } 0 < x < 3 \\ x - 5, & \text{if } x \geq 3 \end{cases}$



Solve the system of linear equations using any method.

23.  $-6x - 7y = 12$   
 $6x + 10y = 6$

24.  $7x + 2y = 29$   
 $y = 2x - 2$

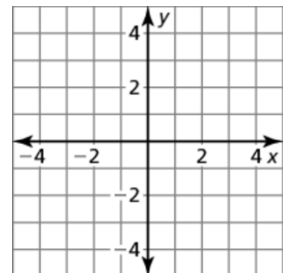
Solve by graphing.

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

Sol: \_\_\_\_\_

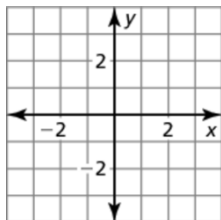
Sol: \_\_\_\_\_

Sol: \_\_\_\_\_

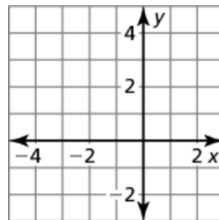


**Graph the system of linear inequalities.**

26.  $y \geq 2x - 3$   
 $x + y < 3$



27.  $x - 2y < -6$   
 $x + 2y < 2$



28. The table shows the time  $x$  (in hours) students spent studying for a science exam and the grade they received.

<b>Time (hours), <math>x</math></b>	3	2	5	1	0	4	3
<b>Grade, <math>y</math></b>	84	77	92	70	60	90	75

a. Use a graphing calculator to find an equation of the line of best fit. Write an equation that models the grade as a function of the hours spent studying.

\_\_\_\_\_

b. Identify and interpret the correlation coefficient.  
 Choose the best answer from the options below.

$r =$  \_\_\_\_\_

\_\_\_\_\_ Strong positive \_\_\_\_\_ Moderately positive \_\_\_\_\_ Weak positive \_\_\_\_\_

\_\_\_\_\_ Strong negative \_\_\_\_\_ Moderately negative \_\_\_\_\_ Weak negative \_\_\_\_\_

c. Identify and interpret the **meaning** of the slope and the meaning of the  $y$ -intercept of the line of best fit.

Slope = \_\_\_\_\_ Represents:

$y$ -intercept = \_\_\_\_\_ Represents:

d. Use the linear regression equation to predict the grade of a student who studied for 3.5 hours. Show your work below.

e. If a student wants to earn a grade of 98 on this test, use the equation to determine about how long the student needs to study. Show your work below.

Evaluate the expression. No calculator allowed.

29.  $\sqrt[2]{49}$

30.  $-(125)^{1/3}$

31.  $(81)^{1/2}$

Simplify the expression. Write your answer using only positive exponents.

32.  $m^5 \cdot m^{-4} \cdot m^0$

33.  $\frac{ab^{-2}}{b^{-4}b^3}$

34.  $\left(\frac{2}{3}\right)^{-2}$

Solve the equation. Check your solution.

35.  $3^x = \frac{1}{27}$

36.  $25^{2x-1} = 125^x$

Determine whether the function represents *exponential growth* or *exponential decay*. Circle your choice. Identify the percent rate of change for each.

37.  $y = 2(1.5)^t$

38.  $y = 16(0.5)^x$

Growth or Decay  $r =$  \_\_\_\_\_

Growth or Decay  $r =$  \_\_\_\_\_

Find the sum or difference. Then identify the degree of the sum or difference and classify the polynomial by the number of terms.

39.  $(8 + 2x^2 + 7x^3) - (x^2 + 2 - 5x^3)$

40.  $(5x^2 - 6x^4) + (7x^2 + 3x^4)$

Find the product.

41.  $(m + 6)(m - 4)$

42.  $(3x - 6)(4x + 6)$

43.  $(x - 7)(x + 7)$

44.  $(x + 3)^2$

Factor the polynomial completely.

45.  $x^3 - 2x^2 - 2x + 4$

46.  $x^2 - 4x + 3$

47.  $2x^2 - 11x + 5$

Solve the equation. (Factor if necessary, then set each factor = 0)

48.  $x(x - 4)(2x + 1) = 0$

49.  $x^2 - 3x = 10$

Solve the quadratic equation using any method (factoring or quadratic formula).

50.  $2x^2 - 98 = 0$

51.  $x^2 - 10x + 2 = 0$

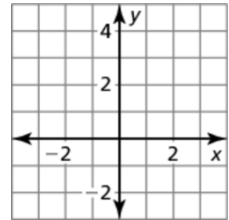
52.  $2x^2 + 3x - 1 = 0$

53. Graph  $f(x) = x^2$ ; Identify the vertex, and the values for  $a$ ,  $h$ , and  $k$ .

$x$	$y$
-2	
-1	
0	0
2	
2	

Vertex of  $f(x) = (\underline{\quad}, \underline{\quad})$

$a = \underline{\quad}$   $h = \underline{\quad}$   $k = \underline{\quad}$

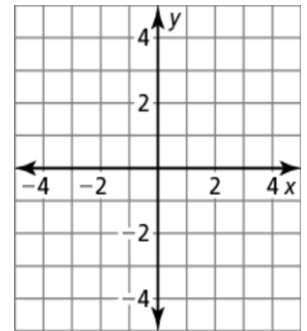


54. Complete the table for  $g(x) = 2(x + 1)^2 - 3$ . Graph the function. Identify the vertex, and the values for  $a$ ,  $h$ , and  $k$

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

Vertex of  $g(x) = (\underline{\quad}, \underline{\quad})$

$a = \underline{\quad}$   $h = \underline{\quad}$   $k = \underline{\quad}$



55. Describe the transformation from  $f(x)$  to  $g(x)$

Horizontal shift: \_\_\_\_\_

Vertical shift: \_\_\_\_\_

Stretch factor (shape): normal, wider or thinner \_\_\_\_\_

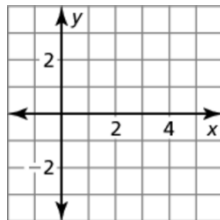
Find the equation for the inverse of each function.

56.  $y = -2x - 5$

57.  $y = (x - 4)^2 + 1, x \geq 4$

58. Complete the table and graph the function  $f(x) = \sqrt{x}$ . Describe the domain and range.

$x$	$y$
-1	
0	
1	
4	



Domain: \_\_\_\_\_ Range: \_\_\_\_\_

Solve each equation. Check your solutions.

59.  $10 + \sqrt{x - 3} = 12$

60.  $x + 2 = \sqrt{6x + 3}$