

Algebra 1 Fall Semester Exam Review

Unit 1 – Expressions

Unit 1 Grade: _____

I Can Simplify an Expression (both CLT and Distributive Property).

1. Simplify $-8x + 4(7x + 2) - 3(5x - 2)$

$$\begin{aligned} & -8x + 28x + 8 - 15x + 6 \\ & \boxed{5x + 14} \end{aligned}$$

2. Simplify $\frac{24x-18}{6} + 4(-2x + 5) - 7x$

$$\begin{aligned} & \frac{24x}{6} - \frac{18}{6} - 8x + 20 - 7x \\ & 4x - 3 - 8x + 20 - 7x \\ & \boxed{-11x + 17} \end{aligned}$$

I Can Evaluate an Expression.

3. Evaluate $-5x - 8y + 3x - 4 + 2y$ when $x = -3$ and $y = 7$

$$\begin{aligned} & -2x - 6y - 4 \\ & -2(-3) - 6(7) - 4 \\ & 6 - 42 - 4 \\ & \boxed{-40} \end{aligned}$$

4. Evaluate $x^2 - 4x + 7$ when $x = -3$

$$\begin{aligned} & (-3)^2 - 4(-3) + 7 \\ & 9 + 12 + 7 \\ & \boxed{28} \end{aligned}$$

I Can Create an Expression from a Context.

Create an expression for problems 5 and 6.

5. Nathan has \$160 to spend on jeans for school. Each pair of jeans costs \$40. Write an expression that represents the amount of money remaining after Nathan has purchased j pairs of jeans.

$$160 - 40j$$

6. A carpenter charges a \$75 flat fee plus \$50 per hour. Write an expression for the total amount spent after h hours.

$$75 + 50h$$

Unit 2 - Equations

Unit 2 Grade: _____

I Can Solve an Equation.

7. Solve $\frac{x-4}{3} = -6 \cdot 3$

$$x - 4 = -18$$

$$\boxed{x = -14}$$

8. Solve $-5(3+x) + 25 = 15$

$$-15 - 5x + 25 = 15$$

$$10 - 5x = 15$$

$$-5x = 5$$

$$\boxed{x = -1}$$

9. Solve $5(x+2) - 3x = -3(x-5)$

$$5x + 10 - 3x = -3x + 15$$

$$2x + 10 = -3x + 15$$

$$5x = 5$$

$$\boxed{x = 1}$$

I Can Create and Solve an Equation from a Context.

10. Mrs. Jackson earned a \$500 bonus for signing a one year contract to work as a nurse. Her salary is \$22 per hour. If her first week's check including the bonus is \$1204, how many hours did Mrs. Jackson work? Create an equation and then solve it.

$$500 + 22h = 1204$$

$$22h = 704$$

$$h = 32$$

Mrs. Jackson worked 32 hours

11. The Beach Shack rents boats for \$60 for the first three hours and \$30 for each additional hour after that. If you spent \$180, how many hours did you rent a boat? Create an equation and then solve.

$$60 + 30(x-3) = 180$$

$$\frac{30(x-3)}{30} = \frac{120}{30}$$

$$x - 3 = 4$$

$$x = 7$$

They rented a boat for 7 hours.

I Can Solve a Literal Equation.

12. Solve the equation for h:

$$\frac{S}{2\pi r} = \frac{2\pi r h}{2\pi r}$$

$$\boxed{h = \frac{S}{2\pi r}}$$

13. Solve the equation for a:

$$10 \cdot g = \frac{b+2a}{10} - 15$$

$$\frac{10g}{10} = \frac{b+2a}{10} - 15$$

$$\frac{10g - b}{10} = \frac{2a}{10}$$

$$\boxed{a = \frac{10g - b}{2}}$$

I Can Solve and Graph an Inequality.

14. Solve and graph: $4 > -3x + 10$

$$\begin{aligned} -10 & \quad -10 \\ \hline -6 & > -3x \\ -3 & \quad -3 \\ \hline 2 & < x \\ x & > 2 \end{aligned}$$

Is $x = 5$ a solution? Explain why or why not.

Yes because 5 is greater than 2.

15. Solve and graph: $7 - 2x \leq 21$

$$\begin{aligned} -7 & \quad -7 \\ \hline -2x & \leq 14 \\ -2 & \quad -2 \\ \hline x & \geq -7 \end{aligned}$$

Is $x = -7$ a solution? Explain why or why not.

Yes because -7 is equal to -7

I Can Create and Solve an Inequality from a Context.

16. Create an inequality for the following scenarios:

a. You must be a minimum of 18 years old in order to vote. $x \geq 18$

b. Children under 3 years old get into the park for free. $x < 3$

c. In order to qualify for free shipping, you must spend at least \$25. $x \geq 25$

d. Your essay must be over 300 words. $x > 300$

17. Cecilia has \$30 dollars to spend at a carnival. Admission costs \$5 and each ride ticket costs \$1.50. What is the maximum amount of tickets she can purchase? Create an inequality to represent the scenario and then solve.

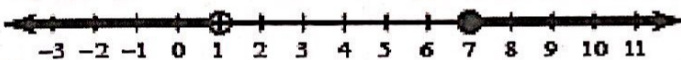
$$\begin{aligned} 5 + 1.50x & \leq 30 \\ 1.50x & \leq 25 \\ x & \leq 16.67 \end{aligned}$$

Cecilia can purchase a max of 16 tickets.

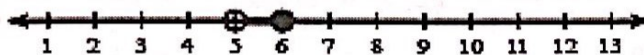
I Can Create and Graph Compound Inequalities.

18. Name the compound inequalities:

a. $x < 1$ OR $x \geq 7$



b. $5 < x \leq 6$



19. Graph the following compound inequalities:

a. $-2 < x \leq 3$

b. $x < 0$ OR $x \geq 3$

20. An iguana needs an environment between 70 degrees and 95 degrees. Write a compound inequality.

$$70 < x < 95$$

21. Water is not a liquid when it is less than 0 degrees Celsius or above 100 degrees Celsius. Write a compound inequality.

$$x < 0 \text{ OR } x > 100$$

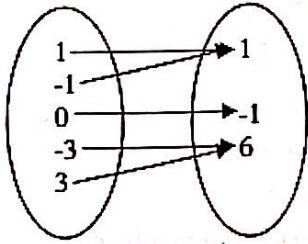
Unit 4 – Functions

Unit 4 Grade: _____

I Can Determine if a Representation is a Function.

22. Determine if the following representations are functions. Explain why or why not.

a. Function



Each input goes to 1 output

b. Not a Function

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

1 goes to 6 and 7

c. Not a Function

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

-2 goes to -1 and 1

I Can Evaluate a Functions in Multiple Representations.

23. Evaluate $f(4)$ for the function $f(x) = x^2 + 3x - 1$.

$$f(4) = (4)^2 + 3(4) - 1$$

$$f(4) = 27$$

24. Find the value of x if $f(x) = 3$ for the function $f(x) = 6x - 15$.

$$y = 3$$

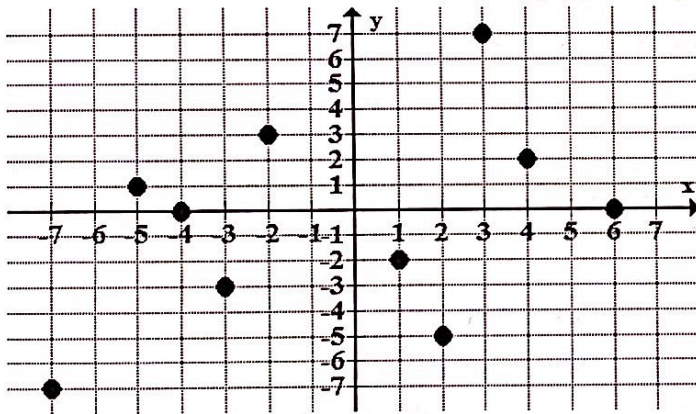
$$3 = 6x - 15$$

$$18 = 6x$$

$$x = 3$$

$$f(3) = 3$$

25. Evaluate using the graph:



a. $f(-2) = 3$

b. $f(x) = 7 = 3$

c. $f(1) = -2$

d. $f(x) = 1 = -5$

e. $f(-4) = 0$

f. $f(x) = -5 = 2$

g. Is this graph a function. Explain why or why not.

yes - passes Vertical Line Test

I Can Create a Function from a Context and Use it to Solve Problems.

26. A hot air balloon cruising at 1000 feet begins to ascend. It ascends at a rate of 200 feet per minute. Create a function f to represent the height of the balloon for m minutes. How many minutes does it take to reach 3800 feet?

$$f(m) = 1000 + 200m$$

$$3800 = 1000 + 200m$$

$$2800 = 200m$$

$$14 = m \rightarrow f(14) = 3800$$

It takes 14 minutes to reach 3800 feet

27. A fish tank filled with 12 gallons of water is drained. The water drains at a rate of 1.5 gallons per minute. Create a function f to represent the number of gallons remaining after m minutes. How many gallons are remaining after 4 minutes?

$$f(m) = 12 - 1.5m$$

$$f(4) = 12 - 1.5(4)$$

$$f(4) = 6$$

At 4 minutes, 6 gallons will remain

28. Determine the slope and y-intercepts:

a.

x	0	1	2	5	6	8	10
y	-1	1	3	9	11	15	19

Handwritten annotations: $-1 -1 +3$ above the x-axis; $-2 -2 +6$ below the x-axis; arrows indicating differences between points.

Slope: $\frac{6}{3} = \frac{2}{1} = 2$

y-int: $(0, -1)$

I Can Put an Equation into Slope Intercept Form.

b.

$(0, -4)$ & $(-3, 11)$

$$m = \frac{11 - (-4)}{-3 - 0} = \frac{15}{-3} = -5$$

y-int: $(0, -4)$

29. Solve for y: $4x + 2y = 8$

$$\begin{array}{r} 4x + 2y = 8 \\ -4x \quad -4x \\ \hline 2y = -4x + 8 \\ \frac{2y}{2} = \frac{-4x + 8}{2} \end{array}$$

$$y = -2x + 4$$

30. Determine the slope and y-intercept: $3x - 6y = -12$

$$\begin{array}{r} 3x - 6y = -12 \\ -3x \quad -3x \\ \hline -6y = -3x - 12 \\ \frac{-6y}{-6} = \frac{-3x - 12}{-6} \end{array}$$

Slope: $1/2$

y-int: $(0, 2)$

$$y = \frac{1}{2}x + 2$$

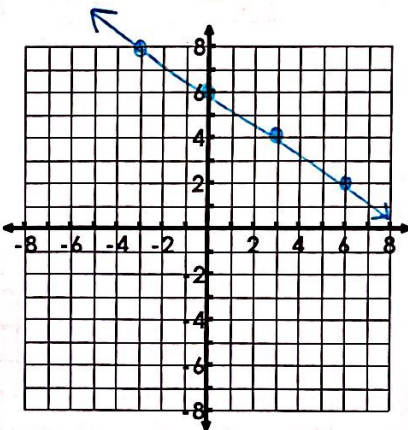
I Can Graph a Function (both slope and standard).

Name the slope and y-intercept for the following functions. Then graph them.

31. $f(x) = -\frac{2}{3}x + 6$

Slope: $-\frac{2}{3}$

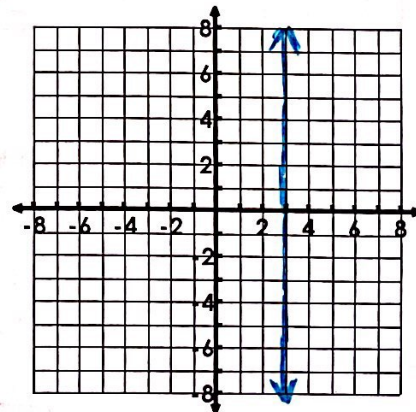
Y-int: $(0, 6)$



32. $x = 3$

Slope: undefined

Y-int: none



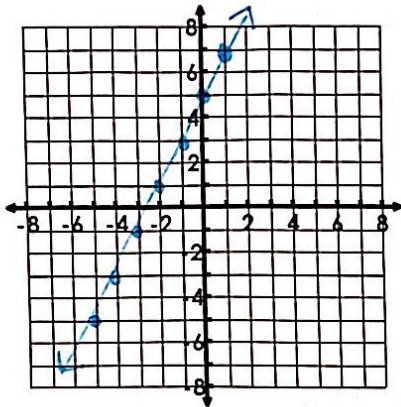
33. $-4x + 2y = 10$

Slope: $\frac{2}{2}$
 Y-int: $(0, 5)$

$$\begin{array}{r} -4x + 2y = 10 \\ +4x \quad +4x \\ \hline \end{array}$$

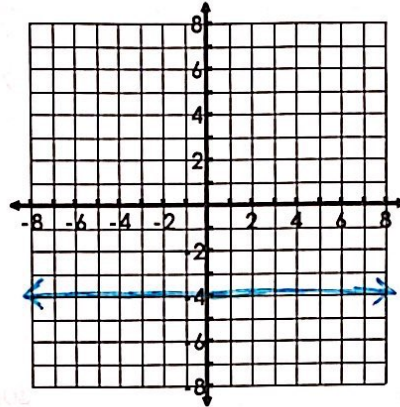
$$\frac{2y}{2} = \frac{4x + 10}{2}$$

$$y = 2x + 5$$



34. $y = -4$

Slope: $\frac{0}{1}$
 Y-int: $(0, -4)$



I Can Write Equations of Lines (Table, Graph, Points)

35. Write the equation of the line that contains the points $(-2, 2)$ and $(2, -6)$.

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

$$\begin{aligned} y &= mx + b \\ -6 &= -2(2) + b \\ -6 &= -4 + b \\ -2 &= b \end{aligned}$$

$$y = -2x - 2$$

36. Write the equation of the line that has a slope of $-\frac{1}{2}$ and contains the point $(4, 6)$.

$$\begin{aligned} y &= mx + b \\ b &= -\frac{1}{2}(4) + b \\ b &= -2 + b \\ 8 &= b \end{aligned}$$

$$y = -\frac{1}{2}x + 8$$

37. Write the equation of the line the corresponds to the following table and graphs:

a.

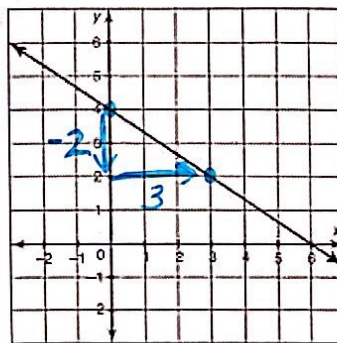
x	0	2	4	6	8
y	-8	-6	-4	-2	0

Handwritten annotations: -2 (between x=0 and x=2), $+2$ (between x=2 and x=4), $+2$ (between x=4 and x=6). -2 (between y=-8 and y=-6), $+2$ (between y=-6 and y=-4).

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

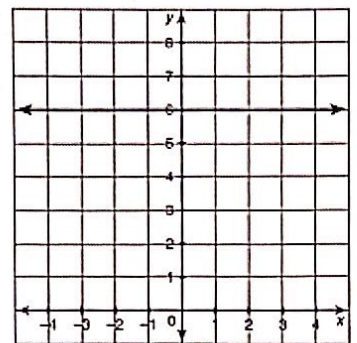
$$y = x - 8$$

b.



$$y = -\frac{2}{3}x + 4$$

c.



$$y = 6$$

Unit 6 – Applications

Unit 6 Grade: _____

I Can Find and Apply Characteristics of Linear Functions to Real World Scenarios.

38. What are the x and y intercepts of the equation $3x - 6y = 24$?

$$\begin{array}{l}
 \text{x-int (y=0)} \quad 3x - 6(0) = 24 \\
 \quad \quad \quad 3x = 24 \\
 \quad \quad \quad x = 8 \\
 \quad \quad \quad (8, 0)
 \end{array}
 \qquad
 \begin{array}{l}
 \text{y-int (x=0)} \quad 3(0) - 6y = 24 \\
 \quad \quad \quad -6y = 24 \\
 \quad \quad \quad y = -4 \\
 \quad \quad \quad (0, -4)
 \end{array}$$

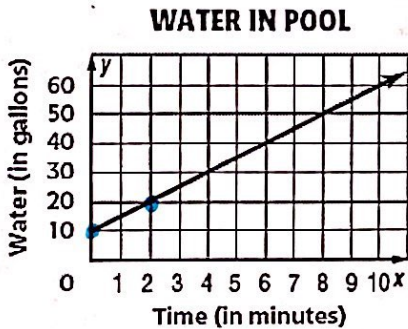
39. How many vitamins does Ethan take per day? How many vitamins were in the contain to start with?

Days Passed	Vitamins Remaining in Bottle
7	25
8	23
9	21
10	19

- 0 39
- 1 37
- 2 35
- 3 33
- 4 31
- 5 29
- 6 27

Ethan takes 2 per day. He started with 39 vitamins.

40. The graph below show the amount of water in a pool over time. Calculate and explain what the slope and y-intercept mean in terms of the graph below.



There were 10 gallons in the pool to start.
The pool is gaining 5 gallons every minute.

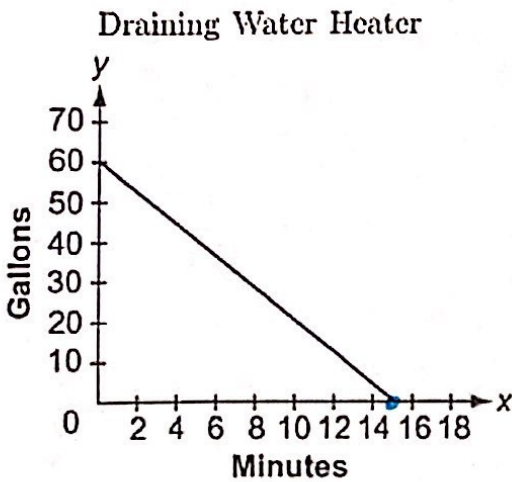
41. Julia received a gift card to the local movie theater. After going to 2 movies, the balance of her gift card dropped to \$64. After going to 3 more movies, the balance of her gift card dropped to \$40 remaining. What was her original gift card balance? Calculate the slope and y-intercept and explain what they mean in terms of the problem scenario.

	0	80	
	1	72	↖ -8
	2	64	↖ -8
+3	{	3	-24
		4	
		5	
		40	

$$\frac{\$ -24}{3 \text{ movies}} = \frac{-8}{1 \text{ movie}}$$

Julia pays \$8 per movie. Her giftcard started with an \$80 balance.

42. Water is draining from a hot water heater:



a. What is the domain?

$$0 \leq x \leq 15 \text{ minutes}$$

b. What is the range?

$$0 \leq y \leq 60 \text{ gallons}$$

c. What is the slope (simplified and labeled)?

$$\frac{-60}{15} = \frac{-4 \text{ gallons}}{1 \text{ minute}} \quad \text{Water Heater loses 4 gallons every minute}$$

d. What are the x and y intercepts? Interpret this in terms of the problem scenario.

x-int (15, 0): It takes 15 minutes to drain all water out of tank

y-int (0, 60) Water heater started with 60 gallons

e. Create an equation to represent the graph.

$$y = -4x + 60$$

I Can Compare Linear Functions.

43. Using the scenario below, answer the following questions:

Bombinoes' Pizza is offering \$56 per shift and \$2.50 in commission for each pizza delivered.

Little Squeezer's showed Tony a table of salaries.

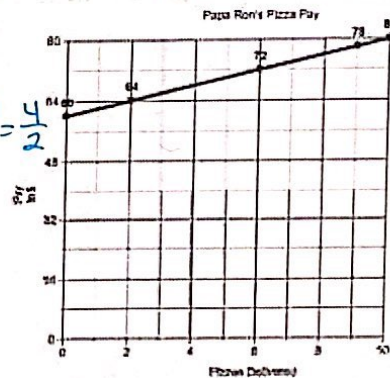
Pizzas	0	2	4	10
Salary	48	54	60	78

+2
+6

Pizza Tent has given Tony his pay options in the following function. S represents Tony's salary, and p represents the number of pizzas he delivers.

$$S = 2.75p + 52$$

Papa Ron's made their offer in the form of this graph.



$$\frac{64-60}{2-0} = \frac{4}{2}$$

a. How much does each pizza place give a delivery worker for working one shift? Who pays the least?

- Bombinoes: \$56
- Squeezer's: \$48
- Pizza Tent: \$52
- Papa Ron: \$60

Little Squeezer's at \$48

b. How much does each pizza place give a delivery worker for delivering a pizza? Who pays the least?

- Bombinoes: \$2.50
- Squeezers: \$3.00
- Pizza Tent: \$2.75
- Papa Ron: \$2.00

Papa Ron at \$2.00