Algebra 1 Midterm Review # 1

Expressions

In 1-2, evaluate the expression. Circle your answer.

1. $-m + n - 3p$ if $m = -7, n = 8$ and $p = 5$

2. $b^2 - 4ac$ if $a = -3, b = -5$ and $c = 2$

In 3 – 7, match each example with the property name.

3. _____ $2(x - 5) = 2x - 10$

4. _____ $1x + 0 = x$

5. _____ $0x = 0$

6. _____ $(x + 2) + 5 = x + (2 + 5)$

7. _____ $x(2) = 2x$

- A. Associative
- B. Commutative
- C. Distributive
- D. Identity
- E. Multiplication Property of Zero

In 8-9, simplify the expression. Circle your answer.

8. $4x - 3 + 8x - 2 - 7x$

9. $5(d - 4) + 7d$

Equations

In 10 - 15, solve. Circle your answer.

10. $\frac{3}{4}x - 9 = 3$

11. $3(5m - 6) = 162$

12. $4y - 4 = 6y - 6$
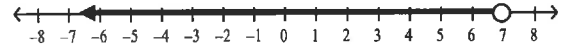
13. $4w + 44 - 17 + 3w = 111$

14. $7x - x - 2x + 8 = 3x$
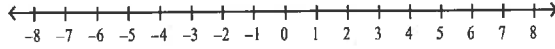
15. $2(3y + 5) = 6y - 10$

Inequalities

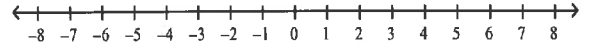16. *Write 5 solutions for the inequality.* $x > -8$

    ___ ___ ___ ___ ___

17. *Write an inequality for the graph.* _____

18. *Solve and graph.* $-7y < 42$

19. *Solve and graph.* $x - 8 \leq -10$

20. *Solve.* $13 + 5w \geq 2(w - 1)$
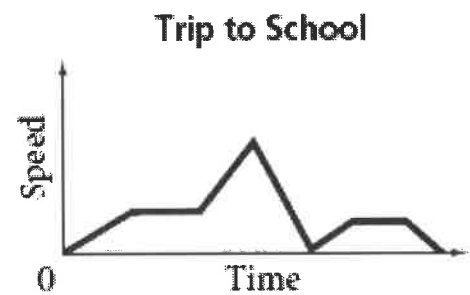
21. *Solve.* $2(4y - 5) > -10$

Functions

In 22 – 25, use the graph to the right.

22. *Highlight the increasing segments with green*

23. *Highlight the decreasing segments with red.*

24. *Highlight the constant speed segments with yellow.*

25. *Circle the points when the traveler came to a complete stop.*

Trip to School

In 26 – 30, glue/tape each graph below its parent function, then name the family and give the domain and range.

26. $y = x$ _____

    *Domain:*_____ *Range:*_____

27. $y = x^2$ _____

    *Domain:*_____ *Range:*_____

28. $y = |x|$ _____

    *Domain:*_____ *Range:*_____

29. $y = \sqrt{x}$ _____

    *Domain:*_____ *Range:*_____

30. $y = 2^x$ _____

    *Domain:*_____ *Range:*_____

In 31 and 32, $f(x) = -4x - 9$ and $g(x) = |x| - 8$.

    31. Find $g(-10)$. _____   32. Find $f(6)$. _____

In 33 – 35, use the table to right.

    33. Rewrite the table as a mapping.

x	y
2	-7
2	-1
2	5
2	11

    34. Domain: _____

         Range: _____

    35. Does the relation represent a function? _____ Explain. _____

Features of Linear Equations

In 36-41, find the slope, y-intercept. Then complete the requested information.

36. $y = 5x + 8$

    $m =$ _____ $b =$ _____

    $m_{//} =$ _____ $m_\perp =$ _____

37. $y = -7$

    $m =$ _____ $b =$ _____

    $m_{//} =$ _____ $m_\perp =$ _____

38. $(20, 18)$ $(-5, -2)$

                $m =$ _____

                $b =$ _____

                $m_{//} =$ _____

                $m_\perp =$ _____

39.

x	y
0	-18
2	-12
4	-6
6	0
8	6

    $m =$ _____

    $b =$ _____
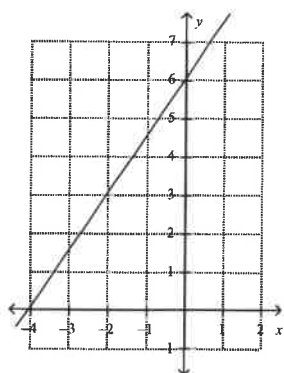
    $m_{//} =$ _____

    $m_\perp =$ _____

    x-intercept = _____

    y-intercept = _____

40.

    $m =$ _____

    $b =$ _____

    $m_{//} =$ _____

    $m_\perp =$ _____

    x-intercept = _____

    y-intercept = _____

41. $8x - 2y = 24$

    $m =$ _____

    $b =$ _____

    $m_{//} =$ _____

    $m_\perp =$ _____

    x-intercept = _____

    y-intercept = _____

Writing Equations

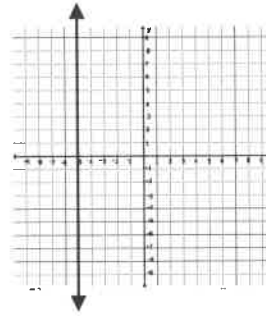*In 42 – 46, use the given information to write the equation in slope-intercept form. Circle your answer.*

42. *Point:* $(4, -7)$ $m = 3$

43. $(-5, 6)$, $(-2, 3)$

44.

x	y
1	7
2	2
3	-3
4	-8

45.

46. *Perpendicular to* $y = \frac{3}{2}x - 9$ *and through* $(15, 7)$.

Modeling Situation with Algebra

47. *Suppose Movie-Rent charges **nonmembers** $4.00 to rent a movie. A one-year membership costs $20.00 and **members** pay $2.00 to rent a movie. Let x represent the number of movies rented.*
    a. *Write an equation that can be used to determine when the cost will be the same.* _____
    b. *How many movies do nonmembers and members need to rent for the cost to be the same?* _____

48. *Ian is shopping for Christmas gifts. He can spend at most $100.00. Ian spent $25.00 on his brother, $13.00 on his sister, and $50.00 on his parents. Let x represent the money remaining.*
    a. *Write an inequality that represents the situation.* _____
    b. *Can Ian afford to purchase a $10 gift for his teacher?* _____ *Use the solution to the inequality to explain your reasoning.* _____
    _____

49. *Charlie wants to begin a new workout program. When training, Charlie can bench press 56 pounds. Each week the weight increases by 5 pounds. Write an equation that represents this situation.* _____

Simplifying/Evaluating Expressions

Parentheses
Exponents
Multiplication **or** Division (left to right)
Addition   or Subtraction (left to right)

Absolute Value: Distance from zero on a number line
(Makes the number positive)

Inequalities

○ **>**
Greater than
More than

○ **<**
Less than

◉ **≥**
Greater than or equal to
At least

◉ **≤**
less than or equal to
not more than

Steps for Solving Equations & Inequalities

Step 1: Simplify both sides
    a) Distribute
    b) Combine like terms **(same side)**

Step 2: Variable to one side (If there is a variable term on each side.)

Step 3: Solve by doing PEMDAS backwards "SADMEP"
    a) Add/ subtract the constant on both sides
    b) Multiply/Divide by the coefficient

Step 4: Substitute the solution into the original equation to check it.

    *When you solve an equation and end up with…
        a <u>true</u> statement, the equation has infinite solutions
        a <u>false</u> statement, the equation has no solutions

    When solving **inequalities if you multiply or divide by a negative you FLIP the sign

Functions: Every input has exactly one output
- X can't repeat with a different y
- Y can be repeated
- A vertical line cannot touch the graph at more than one point.

Domain – set of all possible inputs x
Range – set of all possible outputs y

Function Notation
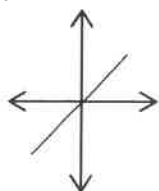$f(x)$ is read "f of x"
- you can replace $f(x)$ with y

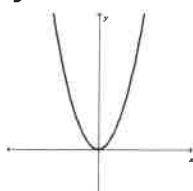Find the value of the function for the given x value
…Just Plug it in!

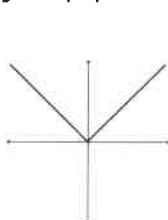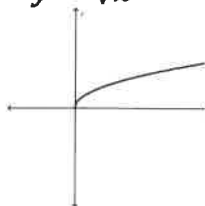| Linear	Quadratic	Absolute Value	Square Root	Exponential
$y = x$	$y = x^2$	$y = |x|$	$y = \sqrt{x}$	$y = a \cdot b^x$
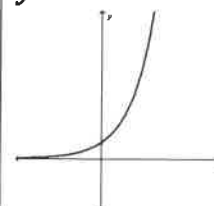
Writing Slope-Intercept Form

Step 1: Find m

$$slope = \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{change\ in\ y}{change\ in\ x}$$

Step 2: Find b

- Substitute m, x and y. Solve for b.
- Find $(0, b)$ on a graph or table.

Step 3: Substitute m and b into $y = mx + b$

Graphing Slope-Intercept Form

Step 1: Begin by putting b on y-axis

Step 2: Use m to move along the graph to find more points.

Special Cases

HOY	V
	U
	X

Parallel lines have the same slope
$$\frac{a}{b} \quad and \quad \frac{a}{b}$$

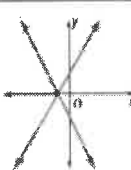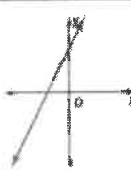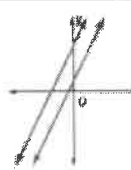**Perpendicular lines** have opposite reciprocal slopes (Flip and change)

$$\frac{a}{b} \quad and \quad -\frac{b}{a}$$

Standard Form of a linear $Ax + By = C$

x-intercept (value of x when $y = 0$)
y-intercept (value of y when $x = 0$)....$(0, b)$

Systems of Equations

ConceptSummary Characteristics of Linear Systems

Consistent and Independent — intersecting lines, one solution

Consistent and Dependent — same line; infinitely many solutions

Inconsistent — parallel lines; no solution

To rewrite $Ax + By = C$ as $y = mx + b$... solve for y

Step 1: Move the x term to the other side and change the sign

Step 2: Divide by the coefficient of y

Graphing to Solve Systems:

Step 1: Make sure both equations are solved for y.

Step 2: Graph both equations

Step 3: Find the point of intersection

Substitution to Solve Systems:

Step 1: Substitute one of the given equations to write an equation with only 1 variable.

Step 2: Solve the equation for **X**.

Step 3: Substitute the X that you found and solve for **Y**.

Step 4: Write the final answer as an ordered pair, (x, y)

Elimination to Solve Systems:

Step 1: Be sure all variable terms and constants line up.

Step 2: If needed, multiply one or both equations to create a pair of opposite terms.

Step 3: Add the equations. (If at least one variable isn't eliminated go back and revise step 2)

Step 4: Solve the resulting equation.

Step 5: Substitute the X you found and solve for Y.

Step 6: Write the solution as an ordered pair.

*Note: Steps $4 - 6$ are the same final steps as the substitution method.