Name: _____

2019-2020 (entering) Grade 8/Algebra Summer Math Packet

Dear Students and Parents:

The purpose of this packet is to review 7th grade concepts as you look forward to 8th Grade. All concepts in this packet have been previously covered in 7th grade. While this packet is optional for completion and will not be handed in for a grade, students are encouraged to complete for success in the upcoming year. Students are expected to have mastered these topics, and they will not be retaught in the subsequent year. Students will have an opportunity to come ask questions during the first few weeks of school. See you in September! Have a wonderful summer!

Simplify each expression. Be sure to show your work.

Use the order of operations to evaluate numerical expressions.
1. Do all operations within grouping symbols first.
2. Evaluate all powers before other operations.
3. Multiply and divide in order from left to right.
4. Add and subtract in order from left to right.

Example 1: Evaluate $14 + 3(7 - 2) - 2 \cdot 5$

$14 + 3(7 - 2) - 2 \cdot 5$
$= 14 + 3(5) - 2 \cdot 5$ Subtract first since 7 – 2 is in parentheses
$= 14 + 15 - 2 \cdot 5$ Multiply left to right, 3 • 5 = 15
$= 14 + 15 - 10$ Multiply left to right, 2 • 5 = 10
$= 29 - 10$ Add left to right, 14 + 15 = 29
$= 19$ Subtract 10 from 29

Example 2: $8 + (1 + 5)^2 \div 4$

$8 + (1 + 5)^2 \div 4$
$= 8 + (6)^2 \div 4$ Add first since 1 + 5 is in parentheses
$= 8 + 36 \div 4$ Find the value of 6^2
$= 8 + 9$ Divide 36 by 4
$= 17$ Add 8 and 9

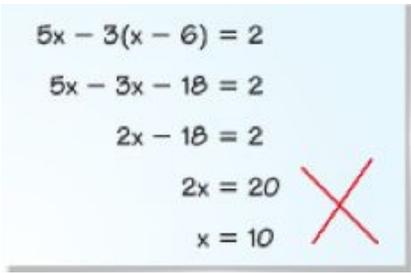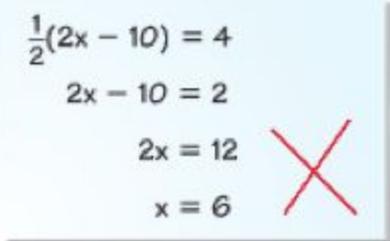|		
1) $-8 - (-3) - (-2)$	2) $-5^2 - (12 + 2 \cdot 3)$	3) $7 - (1 - 3)^3 \div 4$
4) $\frac{2}{5} \cdot 2\frac{4}{5} \div \frac{7}{8}$	5) $(5 - 5)^2 + 12 \div -3$	6) $-4 \cdot 8\frac{2}{9} \div \frac{4}{-3}$

Solve each equation. Be sure to show your work.

7) $\frac{1}{4}d + 2 = 3$	8) $\frac{2a}{7} = \frac{2}{3}$	9) $4(x - 15) + 2 = x + 13$
10) $\frac{y}{12} - 5 = 11$	11) $3.2x + 2.6 = -23$	12) $\frac{4x}{6} = \frac{-5}{4}$
13) $5x - \frac{2}{3} = \frac{1}{2}$	14) $-2(x - 3) = 8x + 48$	15) $12 + 3(8 - 4x) = 14 + 2x$

Evaluate the following expressions using the given values for a, b, and c. Show each step!

16) Evaluate $6 + 3b$ if b = 7	17) Evaluate $6a^2$ if a = 4	18) Evaluate $5(6) - c$ if c = -7
19) Evaluate $\frac{b^4}{2}$ if b = -2	20) Evaluate $3(a)^a$ if a = 2	21) Evaluate $\frac{(-a)^3}{3}$ if a = 3

22) Below are two student's work when solving equations. Circle the error. Then describe the mistake and correctly solve each equation.

Original Problem (Circle Error)	Describe Error	Correct Work
$5x - 3(x - 6) = 2$ $5x - 3x - 18 = 2$ $2x - 18 = 2$ $2x = 20$ $x = 10$		$5x - 3(x - 6) = 2$
$\frac{1}{2}(2x - 10) = 4$ $2x - 10 = 2$ $2x = 12$ $x = 6$		$\frac{1}{2}(2x - 10) = 4$

*Set up an **inequality** to model each relation. You **do not** need to solve.*

An inequality is a mathematical sentence that contains the symbols < , > , ≤ , or ≥ .

Words	Symbols
m is greater than 7.	$m > 7$
r is less than -4.	$r < -4$
t is greater than or equal to 6.	$t \geq 6$
y is less than or equal to 1.	$y \leq 1$

| 23) Five times a number is greater than 25.	24) The sum of a number and 6 is at least 15.	25) In Ohio, you can get your license when you turn 16. Write an inequality to show the age of all drivers in Ohio.
26) Suppose a DVD costs $19 and a CD costs $14. Write an inequality to find how many CDs you can buy along with one DVD if you have $65 to spend.	27) Five dollars less than two times Chris' pay is at most $124.	28) 24 divided by some number is less than 7.

Find the slope of each relation

$$\text{Slope} = \frac{y_2 - y_2}{x_2 - x_1} \text{ or } \frac{change\ in\ y}{change\ in\ x} \text{ or } \frac{rise}{run}$$

29) (-1, 2) and (-5,10)	30)	31) (-7, 10) and (1, 10)

30)

x	y
-2	-8
-1	-5
0	-2

32)	33) (3, 5) and (-2, 6)	34)

32)

34)

x	5	10	15
y	23	43	63

Graph each line below on the provided coordinate plane

35) y = 3x + 2	36) $y = \frac{-3}{4}x - 2$	37) $y = \frac{1}{3}x$

slope: _____   slope: _____   slope: _____
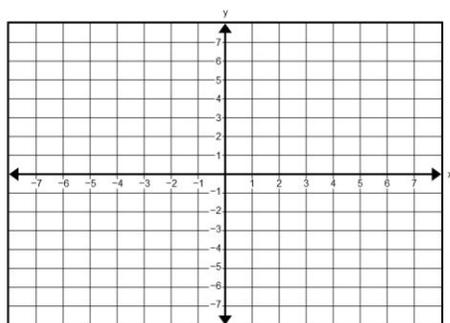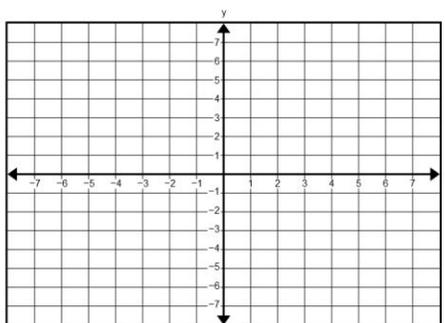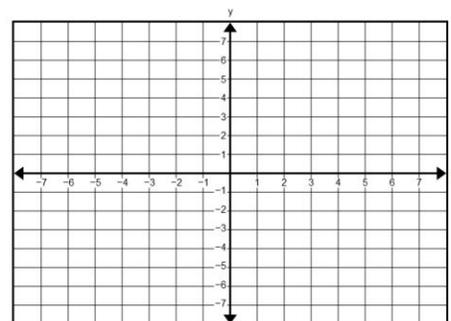
y-intercept: _____   y-intercept: _____   y-intercept: _____

Writing Linear Equations:

38) Write the equation of the line that has the same y-intercept as $y = \frac{1}{2}x - 2$, and has a slope of 5 .

y = _____

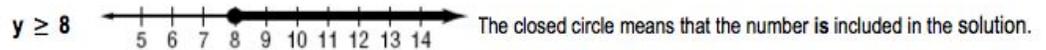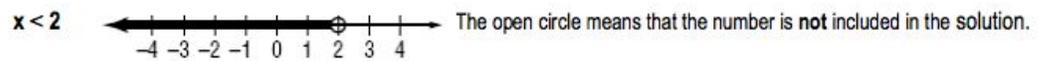39) Write the equation of a line that goes through the points (4, 5) and (0, 8).

y = _____

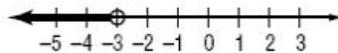40) Write the equation of a line that goes through the points (0, 4) and (-2, -4)

y = _____

Graphing Inequalities:

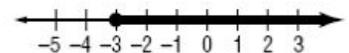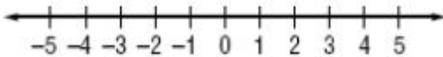**Examples:** Graph each inequality on a number line.

$x < 2$ The open circle means that the number is **not** included in the solution.

$y \geq 8$ The closed circle means that the number **is** included in the solution.

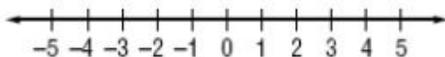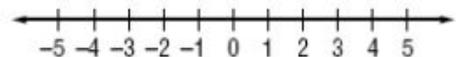| 41) Write an inequality for the given graph:	42) Write an inequality for the given graph:
43) Graph the inequality: $x > -1$ 	44) Graph the inequality: $x \leq 3$
45) Solve the inequality, then graph it on the number line. $y + 9 \leq 13$ 	46) Solve the inequality, then graph it on the number line. $4x - 6 > -10$
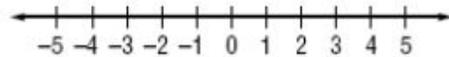
47) Match a table (A–D) with a graph (E–H) and an equation (I–L). List your results below in four groups. For example, on the line for group 1 you should put 3 letters, one for a table, one for a graph and one for an equation which all represent the same linear pattern.

Group 1	Group 2	Group 3	Group 4
Table: _____	Table: _____	Table: _____	Table: _____
Graph: _____	Graph: _____	Graph: _____	Graph: _____
Equation: _____	Equation: _____	Equation: _____	Equation: _____

A.

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

B.

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

C.

x	y
-2	1.5
-1	1.5
0	1.5
1	1.5
2	1.5

D.

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

E. **F.** **G.** **H.**
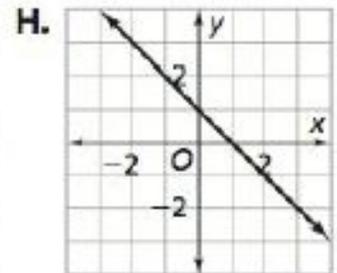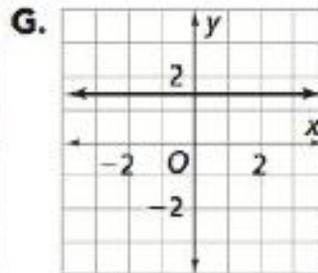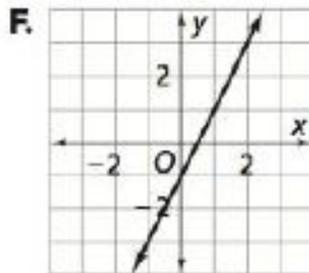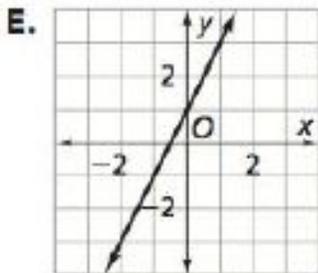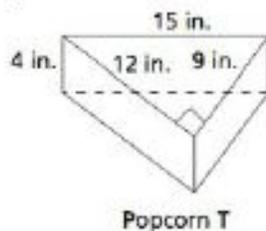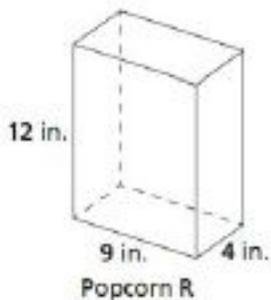
J. $y = 1.5$ **K.** $y = 2x - 1$ **L.** $y = 2x + 1$ **M.** $y = -x + 1$

Word Problems

48) A movie theater sells two sizes of popcorn. One box has the shape of a triangular prism (Popcorn T) and the other box has the shape of a rectangular prism (Popcorn R). The boxes do not have tops. Which container holds more popcorn?

15 in.
4 in. 12 in. 9 in.
12 in.
9 in. 4 in.
Popcorn R

Popcorn T

49) A box of cereal has a volume of 384 cubic inches. If the width of the box is 4 inches and the length is 8 inches, what is the height of the box?

_____ inches

50) Annie wanted to paint her living room walls blue. The room is 26 feet by 22 feet by 8 feet high. How many cans of paint will she need if each gallon covers 88 square feet (ignore doors and windows)?

_____ cans of paint

51) Tatenda has a chocolate chip cookie recipe that uses 2 cups of sugar for 6 dozen cookies. How much sugar will he need if he only wants to make 36 cookies?

_____ cup(s) of sugar

52) A building 50 height ft high casts a 75 ft shadow. Sarah casts a 6-ft shadow. The triangle formed by the building and its shadow is similar to the triangle formed by Sarah and her shadow. How tall is Sarah?

_____ feet

53) One can of Mountain Dew costs $1.25 in a vending machine. A 12-pack of Mountain Dew costs $10.99 at the grocery store. How much money would you save by purchasing a dozen cans of Mountain Dew at the grocery store instead of a dozen at the vending machine?

$ _____

54) Which size Dairy Queen Blizzard gives you the best price per ounce? Show your work and explain.

- Small 6 oz. cup for $2.49
- Medium 10 oz. cup for $3.49
- Large 16 oz. cup for $4.99
- Super Size 24 oz. cup for $7.69

55) Samantha and four friends are going to dinner. The bill is $60. If they plan to leave a 15% tip on the bill, how much will each person have to pay?

$_____ per person

56) A real estate agent receives a 3% commission for selling a house. Find the commission that the agent earned for selling 3 houses, each for $131,000.

$ _____

57) Sam has $25 in his savings account. He needs $200 to buy a new bicycle. He plans to deposit $12.50 per week into the account until he has enough money to buy the bicycle. How many weeks will it take him to reach the necessary amount?

_____ weeks

58) For each of the shapes below, find the unknown angle measure without using your angle ruler.

a.
65°
x
80°

b.
x
78°
78°
x

c.
94°
x
x
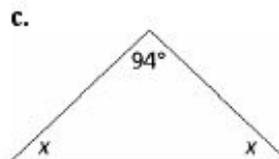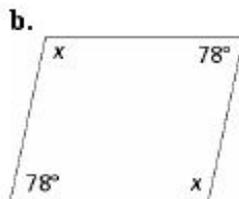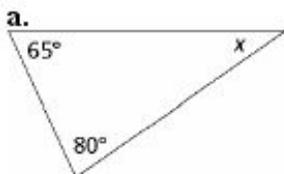
59) Bob has sketched an equilateral triangle. The sum of the lengths of the sides is 10.5. What is the length of each side of Bob's triangle? Explain your reasoning.

60) Can a parallelogram have two 45° angles and two 75° angles? Why or why not?

61) Rewrite these numbers in order from least to greatest.

$$-\frac{5}{4} \qquad -2\frac{1}{4} \qquad -\frac{1}{3} \qquad -\frac{13}{3}$$

62) A quiche recipe calls for $2\frac{3}{4}$ cups of grated cheese. A recipe for quesadillas requires $1\frac{1}{3}$ cups of grated cheese. What is the total amount of grated cheese needed for both recipes?
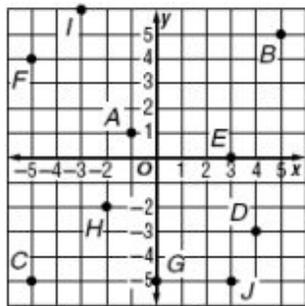
_____ cups of grated cheese

63) Lois has $3\frac{1}{3}$ pounds of butter. She uses $\frac{3}{4}$ pound in a recipe. How much does she have left?

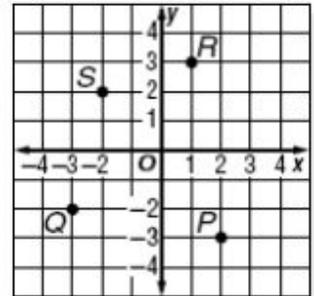_____ pounds of butter

Graphing Points on the Coordinate Plane:

63) Name the ordered pair for each point graphed at the right. Then identify the quadrant in which each point lies.

Coordinates   Quadrant

A (___, ___)   ___
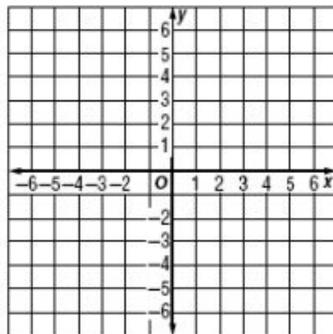
J (___, ___)   ___

B (___, ___)   ___

H (___, ___)   ___

64) Name the ordered pair for each point graphed at the right. Then identify the quadrant in which each point lies.

Coordinates   Quadrant

P (___, ___)   ___

Q (___, ___)   ___

R (___, ___)   ___
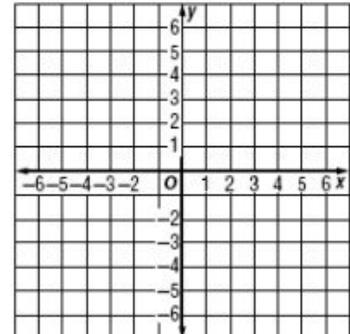
S (___, ___)   ___

65) Graph and label each point on the coordinate plane.

D   (0, 4)

E   (5, 5)

G   (-3, 0)

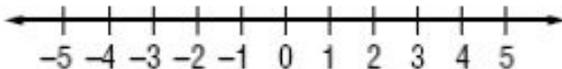H   (-6, -2)

J   (0, -2)

66) Graph and label each point on the coordinate plane.

N   (3, -1)

P   (-2, 4)

Q   (-3, -4)

R   (0, 0)

S   (-5, 0)

67) Graph and label the following numbers on the number line.

A: 0   B: $-1\frac{1}{2}$ C: $\frac{5}{2}$ D: 4

A: $-\frac{9}{3}$ B: $-\frac{3}{2}$ C: $\frac{9}{4}$ D: $\frac{12}{3}$