

Name: _____

Summer Packet-Incoming 7th Grade
Algebra

We're so proud of you for taking the time to work on math over the summer!

Here are some helpful hints for success:

- ☺ Find a quiet work space where you can get organized and stay focused.
- ☺ It's ok to struggle, it allows you to self-monitor what you do and do not know.
- ☺ If you don't know how to do something, make note of it on the answer sheet, so you know to ask questions when you come back to school. However, use your resources when needed to try and figure it out.
- ☺ Remember to persevere (Mathematical Practice #1)! Don't just give up after one attempt.
- ☺ Complete all of the problems in the packet (showing all of your work as evidence/proof of your solution).
- ☺ Remember to do a little work each week. DO NOT wait until the week before school starts to complete your packet!
- ☺ The packet should be returned to your math teacher during the first week of school.

Have fun & we'll see you in August!

The expectation is that the concepts contained in the packet are mastered before beginning the Algebra course in August. This packet is to be completed by the first day of school.

Section A. Write an algebraic expression for each phrase. Then evaluate the expression for $x = 4$, $y = 3$, and $z = 12$.

- 14 increased by x
- the product of z and 5
- the sum of x and y
- the quotient of 24 and x
- 4 times z
- 10 more than the sum of y and z
- y plus twice x
- the product of x and z

Is each statement *true* or *false*? If the statement is false, give a counterexample.

- The *opposite* of the *opposite* of a negative number is a positive number.
- The set of whole numbers is reasonable to use to record the daily temperature of Boston, Massachusetts.

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math:
1 2 3 4 5

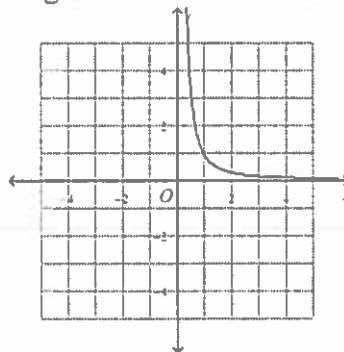
Section B.

- The relationship in the table below is a function. Write a function rule.

Number of Games of Bowling	Total Cost
1	\$5.50
2	\$6.00
3	\$6.50
4	\$7.00

- Is the relation $\{(1, 4), (3, 3), (1, 3), (3, 5), (2, -5)\}$ a function? Explain.

- Find the domain and range of the relation and determine whether it is a function.



4. Graph the equation $y = \frac{7}{4}x + 2$.

5. Graph the equation $x - 2y = -12$.

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math:

1 2 3 4 5

Section C.

Simplify each expression.

1. $8 + 4w + 3 + w$

2. $(6 \cdot 12) \cdot 3$

3. $(3 + 22)4$

4. $(-3)^2 + (-4)(-9)$

5. $-3(7 + w) - 5w$

6. $-(-6 - 5x)$

7. $|4.3 + (-7.2)|$

8. $12 \div (-4) - 5 \div (-10)$

9. $5x + 4y - 11x - 2y$

10.a. Simplify the expression $4w + 7(w + 3)$. Justify each step.

b. Evaluate the expression for $w = -4$.

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math:

1 2 3 4 5

Section D.

Name the property that each equation illustrates.

1. $\frac{-2}{3} \times 1 = \frac{-2}{3}$

2. $-5(22 + 7) = -5(22) - 5(7)$

3. $(-16 + 9) + 3 = -16 + (9 + 3)$

4. $34 + 8 = 8 + 34$

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math:

1 2 3 4 5

Section E.

Solve and check.

1. $4x - 9 = 19$

2. $6x + 7 = 8x - 13$

3. $9(n + 4) = -27$

Solve each proportion.

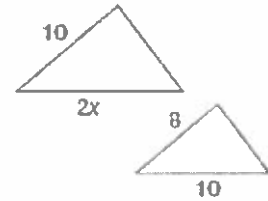
4. $\frac{x}{35} = \frac{2}{5}$

5. $\frac{x-2}{10} = \frac{2}{3}$

6. Complete: $15 \text{ h} = \underline{\hspace{2cm}} \text{ s}$

7. Write \$6.95 for 5 lb as a unit rate.

8. The pair of triangles are similar. Find the length of x .



9. A model train is built to a 1 in. ; 64 in. scale. Find the actual length for a piece on the model that is 0.75 in.

10. The Waterfords rented a truck for a \$52.95 fee plus \$.35/mi. They spent \$33.75 to fill the tank with gasoline before returning the truck. If the Waterfords spent \$140.95, including gasoline, to rent the truck, how many miles was the truck driven?

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math:

1 2 3 4 5

Section F.

Simplify each expression.

4. $\sqrt{625}$

5. $\pm\sqrt{0.49}$

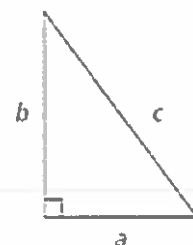
6. $-\sqrt{9}$

7. Determine whether the lengths 2, 3, and 4 can be sides of a right triangle.

Use the triangle at the right. Find the length of the missing side. If necessary, round to the nearest tenth.

8. $a = 2, b = 7$

9. $b = 3, c = 8$



10. A cargo plane and a private jet leave at the same time from the same airport, traveling in opposite directions. The jet travels at twice the speed of the cargo plane. They are 2400 mi apart in 4 hours. Find the speed of the cargo plane and jet.

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math:
1 2 3 4 5

Section G.

Solve each equation. Check your answer, if appropriate, write *identity* or *no solution*.

1. $\frac{1}{4}x + \frac{1}{2} = \frac{1}{4}x - \frac{1}{2}$

2. $6 - 4d = 16 - 9d$

3. $\frac{2}{3}a - \frac{3}{4} = \frac{3}{4}a$

4. $2s - 12 + 2s = 4s - 12$

5. $3.6y = 5.4 + 3.3y$

6. $4b - 1 = -4 + 4b + 3$

7. $\frac{2}{3}(6x + 3) = 4x + 2$

8. $6y + 9 = 3(2y + 3)$

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math:
1 2 3 4 5

Section H.

Solve each inequality. Graph the solution.

1. $3x + 2 > 5x - 8$

2. $3x + 11 \leq 8$

3. $10 - 3x \leq 7x$

4. $2(4x - 1) \geq 62$

5. $4 < 3x - 5 \leq 7$

6. $5 - x \geq 9$ or $3x - 4 > 8$

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math:
1 2 3 4 5

Section I.

Sketch a graph of each situation. Label each section.

1. the height of a child as he or she grows
2. the distance a car travels at a steady speed versus time
3. the population of bacteria that doubles every hour

Evaluate each function rule for $x = -\frac{1}{2}$

5. $f(x) = 4x$

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

7. $g(x) = -x + \frac{1}{2}$

8. $h(x) = -3x + 1$

9. $y = |x| - \frac{3}{2}$

10. $y = x^2 + \frac{1}{4}$

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math:

1 2 3 4 5

Section J.

Model each rule with a table of values for when the domains are $\{-2, 0, 1\}$.

1. $y = 5x$

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

3. $f(x) = -2x + 1$

4. $g(x) = -3x$

Write a function rule for each situation.

5. the amount of money earned for t hours of work at \$7.75 per hour
6. the total cost of n apples at \$.49 each

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math:

1 2 3 4 5

Section K.

Find the slope of the line passing through each pair of points.

1. $(-2, 5), (8, -4)$

2. $(6, 7), (2, 4)$

3. $(-4, -5), (-3, -9)$

4. $(6, -2), (-3, 7)$

5. At 6:00 A.M., there were 800,000 gallons of water remaining in a reservoir. After 8 hours of irrigation, there were 100,000 gallons of water remaining. Write an equation that describes the number of gallons of water as a function of the time the field had been irrigated.

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math:
1 2 3 4 5

Section L.

Graph each equation. On graph paper.

6. $y = 2x + 1$ 7. $y = -\frac{3}{4}x + 2$
 8. $2x + 3y = 9$ 9. $5x - 4y = -15$

10. **Writing** Explain the difference between a rate of change that is positive and one that is negative. Give an example of each.

Write an equation for the line through the given point with the given slope.

1. $(10, 1)$; $m = \frac{1}{5}$ 2. $(-9, 8)$; $m = -5$ 3. $(-4, -5)$; undefined slope
 4. Write an equation for the line through the points $(-2, 2)$ and $(2, -8)$.

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math:
1 2 3 4 5

Section M.

Solve each system by graphing.

1. $y = -x + 2$ 2. $3x + 2y = -8$ 3. $y = -\frac{1}{4}x - 1$
 $y = x - 4$ $2x - 3y = -1$ $y = \frac{3}{4}x + 3$

Solve each system by substitution.

4. $y = 2x - 9$ 5. $y = 3x$ 6. $3x + 4y = -7$
 $x + 3y = 8$ $y = -x + 4$ $2y - x = -1$
 7. $x = 2y + 2$ 8. $x + 3y = 9$ 9. $\frac{1}{2}x + \frac{3}{4}y = 2$

$$2x + 3y = 11$$

$$y = -\frac{3}{2}x + \frac{13}{2}$$

$$x + 3y = 7$$

In Exercises 10 and 11, use a system of equations to solve each problem.

10. A farmer raises wheat and corn on 430 acres of land. He wants to plant 62 more acres of wheat than corn. How many acres of each should he plant?
11. Jamie has 300 ft of fencing to enclose a rectangular pasture. The pasture's length is to be 10 ft less than 3 times the width. Find the width of the garden.

Solve each system by elimination.

1. $4x + 3y = 24$

2. $2x + y = 4$

3. $x + 2y = -7$

$4x - 3y = -24$

$2x + 3y = 0$

$3x - 4y = -1$

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math:

1 2 3 4 5

Section N.

For each of the following, write an equation or systems of equation. Solve your equations. Make sure you answer the questions asked.

- 331 students went on a field trip. Six buses were filled and 7 students traveled in cars. How many students were in each bus?
- Aliyah had \$24 to spend on seven pencils. After buying them she had \$10. How much did each pencil cost?
- The sum of three consecutive numbers is 72. What are the smallest of these numbers?
- The sum of three consecutive even numbers is 48. What are the smallest of these numbers?
- You bought a magazine for \$5 and four erasers. You spent a total of \$25. How much did each eraser cost?
- All 231 students in the Math Club went on a field trip. Some students rode in vans which hold 7 students each and some students rode in buses which hold 25 students each. How many of each type of vehicle did they use if there were 15 vehicles total?
- At Elisa's Printing Company LLC there are two kinds of printing presses: Model A which can print 70 books per day and Model B which can print 55 books per day. The company owns 14 total printing presses and this allows them to print 905 books per day. How many of each type of press do they have?

8. Molly's Custom Kitchen Supplies sells handmade forks and spoons. It costs the store \$1.70 to buy the supplies to make a fork and \$1.30 to buy the supplies to make a spoon. The store sells forks for \$5.60 and spoons for \$5.40. Last April Molly's Custom Kitchen Supplies spent \$37.90 on materials for forks and spoons. They sold the finished products for a total of \$147.20. How many forks and how many spoons did they make last April?

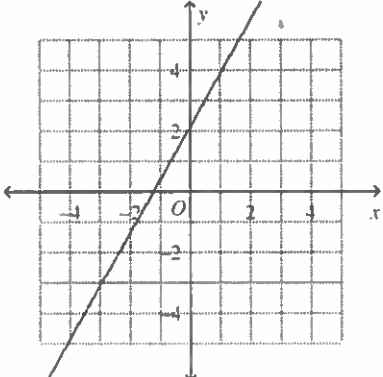
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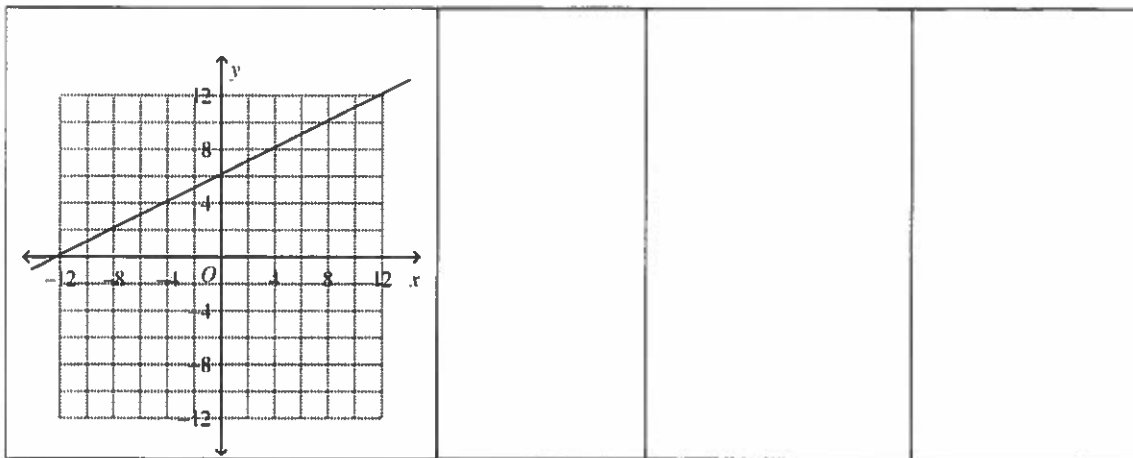
1 2 3 4 5

Section A.

Answer	I got it on the 1 st try!	I got it with corrections.	I have no idea.
1. $4+14$ 18			
2. $12*5$ 60			
3. $4 + 3$ 7			
4. $24/4$ 6			
5. $4(12)$ 48			
6. $3 + 12 + 10$ 25			
7. $3 + 2(4)$ 11			
8. $4(12)$ 48			
9. True			
10. False; integers			

Section B.

Answer	I got it on the 1 st try!	I got it with corrections.	I have no idea.
1. $f(x) = 0.5x + 5$			
2. No; a domain value corresponds to two or more range values.			
3. Yes; for each element in the domain there is exactly one element in the range			
			



Section C.

Answer	I got it on the 1 st try!	I got it with corrections.	I have no idea.
1. $5w + 11$			
2. 216			
3. 100			
4. 45			
5. $-8w - 21$			
6. $6 + 5x$			
7. 2.9			
8. -2.5			
9. $-6x - 2y$			
10. $11w + 21$ -23			

Section D.

Answer	I got it on the 1 st try!	I got it with corrections.	I have no idea.
1. Identity property of Multiplication			
2. Distributive Property			
3. Associative Property of Addition			
4. Commutative Property of Addition			

Section E.

Answer	I got it on the 1st try!	I got it with corrections.	I have no idea.
1. $x=7$			
2. $x= 10$			
3. $n= -7$			
4. $x = 14$			
5. $4 \frac{2}{3}$			
6. 900 sec			
7. \$1.39/lb			
8. 6.25 u			
9. 48 in			
10. 155 miles			

Section F.

Answer	I got it on the 1st try!	I got it with corrections.	I have no idea.
4. 25, -25			
5. 0.7, -0.7			
6. -3			
7. False, $13 \neq 16$			
8. 7.3			
9. 7.4			
10. Cargo: 200 mph Jet: 400 mph			

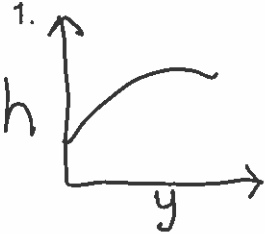
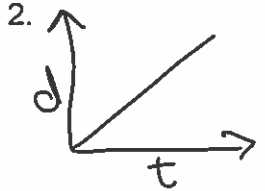
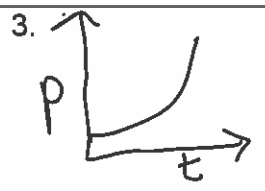
Section G.

Answer	I got it on the 1st try!	I got it with corrections.	I have no idea.
1. No solution			
2. $d=2$			
3. $a= -9$			
4. identity			
5. $y= 18$			
6. identity			
7. identity			
8. identity			

Section H.

Answer	I got it on the 1 st try!	I got it with corrections.	I have no idea.
1. $x < 5$; open to the left			
2. $x \leq -1$; closed to the left			
3. $x \geq 1$; closed to the right			
4. $x \geq 8$; closed to the right			
5. $3 < x \leq 4$; open at 3, closed at 4; connected			
6. $x \leq 4$ or $x > 4$; closed at -4 to the left; open at 4 to the right			

Section I.

Answer	I got it on the 1 st try!	I got it with corrections.	I have no idea.
1. 			
2. 			
3. 			
5. -2			
6. $-\frac{5}{2}$			
7. 7			
8. $\frac{5}{2}$			
9. -1			
10. $\frac{1}{2}$			

Section J.

Answer	I got it on the 1 st try!	I got it with corrections.	I have no idea.
1. {-10, 0, 5}			
2. {-2, -1, -1/2}			
3. {5, 1, -1}			
4. {6, 0, -3}			
5. $A(t) = 7.75t$			
6. $C(n) = 0.49n$			

Section K.

Answer	I got it on the 1 st try!	I got it with corrections.	I have no idea.
1. $\frac{-9}{10}$			
2. $\frac{3}{4}$			
3. -4			
4. -1			
5. $y = -87,500 + 800,000$			

Section L.

Answer	I got it on the 1 st try!	I got it with corrections.	I have no idea.
6. (0,1)(1,3)(2,5)			
7. (0,2)(4, -1)(-4,5)			
8. (0,3)(3,1)(-3,5)			
9. (-3,0)(1,15)(5,30)			
10. + increases over time; - decreases over time; examples will vary			
1. $y = \frac{1}{5}x - 1$			
2. $y = -5x - 37$			
3. $x = -4$			
4. $y = \frac{-5}{2}x - 3$			

Section M.

Answer	I got it on the 1st try!	I got it with corrections.	I have no idea.
1. (3, -1)			
2. (-2, -1)			
3. (-4, 0)			
4. (5, 1)			
5. (1, 3)			
6. (-1, -1)			
7. (4, 1)			
8. (3, 2)			
9. (1, 2)			
10. 246 acres of wheat; 184 acres of corn			
11. 40 ft			
1. (0, 8)			
2. (3, -2)			
3. (-3, -2)			

Section N.

Answer	I got it on the 1st try!	I got it with corrections.	I have no idea.
1. 54			
2. \$2			
3. 23			
4. 14			
5. \$5			
6. 8 vans; 6 busses			
7. 9 of Model A; 5 of Model B			
8. 7 forks; 20 spoons			

