



# NORTH HAVEN HIGH SCHOOL

221 ELM STREET  
NORTH HAVEN, CT 06473

## Algebra One (Level 3) Summer Assignment

June 2017

Dear Parents, Guardians, and Students:

The Algebra I curriculum builds on concepts that were introduced in eighth grade. It is an extremely important course since it is the foundation for all of the other mathematics courses students will take throughout high school and college. Students will also see many of the algebra concepts and skills they learn this year when they take the SAT.

This packet reviews key concepts from 8<sup>th</sup> grade. Please be sure that the completed packet is brought to school on the first day of class. Teachers will check this assignment and review the answers with students. It is expected that students complete all problems in the packet. Completion of the packet will be counted as a grade and there will be a quiz on the material. Calculators may be used when needed, unless otherwise noted, but cannot serve as a replacement for showing work. If students find that they are struggling with any of these concepts, this should be addressed over the summer. A good resource to start with is

[www.khanacademy.org](http://www.khanacademy.org).

### A Note About Graphing Calculators

Students will be using graphing calculators in mathematics courses such as Algebra I, Algebra II, Pre-calculus, Calculus, and Statistics. Each teacher has enough graphing calculators for every student to use in class, so students are not required to purchase graphing calculators. However, if a student would like to make the investment to use throughout high school and most likely college, we recommend the TI-84 Plus, which is the calculator used in class. (Please note that the TI-84 Plus CE is not necessary.) There are many sales over the summer so if you wish to purchase one it is a good time to do so. These calculators can be found at Amazon, Walmart, Staples, Target, and other stores that sell school supplies.

The mathematics department thanks you for your support and wishes you and your family a happy and restful summer!

Sincerely,

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Algebra I L3 Teacher

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Name: \_\_\_\_\_

- 1) List all the factors of each number. Name the greatest common factor and the least common multiple of the two numbers.

48 and 52

Factors of 48: \_\_\_\_\_

Factors of 52: \_\_\_\_\_

GCF: \_\_\_\_\_

LCM: \_\_\_\_\_

- 2) Solve each proportion for x. Show work.

a)  $\frac{m}{40} = \frac{14}{16}$

b)  $\frac{2}{12} = \frac{8}{x+4}$

3) Convert 4% from a percent into a decimal \_\_\_\_\_

4) Convert 1.5 into a percent \_\_\_\_\_

5) Convert 23  $\frac{1}{2}$  % from a percent into a decimal \_\_\_\_\_

4) Solving Percent Equations – set up an equation or proportion and solve. Show work

a) What is 75% of 832?

f) 5.7 is 15% of what number?

5) What is the opposite of 5? \_\_\_\_\_ 6) What is the opposite of -12? \_\_\_\_\_

7) What is the reciprocal of -2? \_\_\_\_\_ 8) What is the reciprocal of  $\frac{3}{4}$ ? \_\_\_\_\_

9) Find the absolute value of each number

a)  $|7|$

b)  $|-12|$

c)  $|0|$

The problems in #s 10, 11 & 13 need to be computed WITHOUT a calculator!

10) Find the sum or difference. These should be easy for you to calculate quickly.

a)  $-12 + 15$

b)  $-6 - (-6)$

c)  $-8 + 3$

d)  $-9 - (-3)$

11) Find the product or quotient.

(We will see parentheses for multiplication and the fraction bar for division in high school)

a)  $8(-5)$

b)  $(-12)(-3)$

c)  $\frac{-48}{-6}$

d)  $\frac{\left(\frac{14}{7}\right)}{-\left(\frac{15}{21}\right)}$

e)  $(-3)(-7)(-2)$

f)  $\frac{0}{-4}$

g)  $\frac{15}{0}$

h)  $\left(\frac{5}{27}\right) \cdot \left(-\frac{9}{15}\right)$

12) Evaluate the expression.

a)  $2^5$

b)  $-3^4$

c)  $(-3)^4$

d)  $8^0$

e)  $x^{-4}$

f)  $(4x^2y^4z)^3$

g)  $\left(\frac{4}{x^2}\right)^2$

h)  $12b^8c^2 * 5b^3c$

i)  $\frac{4x^2y^5}{8x^4y^2}$

13) Evaluate using order of operations. Show work, do not use a calculator

a)  $[(7-4)^2 + 3] + 15$

c)  $\frac{24 \cdot 3}{5 + 3^2 - 2}$

d)  $3 + 2(5 + 2 \cdot 6)$

14) Simplify by combining like terms.

a)  $5m + 6m$

b)  $3x - 7x$

c)  $8a - a$

d)  $4w + 2 + 3w - 5$

15) Simplify by using the Distributive Property

a)  $3(x + 8)$

b)  $4(2x - 3)$

c)  $-2(x - 7)$

d)  $-5(3x + 4)$

e)  $-(4m + 3)$

f)  $-(5x - 6)$

16) Factor each expression (this looks like “un-distributing”)

a)  $5x + 35$

b)  $-18x - 6y$

17) Solve each one step equation. Show solving work (that is use of “inverse operations”)

a)  $w + 4 = 13$

b)  $-3 = x + 9$

c)  $-2x = -36$

d)  $10x = 5$

e)  $\frac{3}{4}x = 9$

f)  $\frac{x}{6} = 11$

18) Solve each equation (these have 2 or more steps) Show solving work (that is use of "inverse operations")

a)  $\frac{x}{4} - 19 = 22$

b)  $-2w + 6 = -14$

c)  $\frac{2}{3}x + 8 = 2$

d)  $25 = 10 + 3g + 2g$

e)  $-32 + 8h = 8 + 4h$

f)  $2(x + 3) + 3x = 31$

g)  $8x + 3 = \frac{1}{4}(16x - 20)$

19) Solve each inequality. Show solving work. Graph each on a number line.

a)  $7 + 9x > -5$

b)  $-5x \geq 2(7 + x)$



20) Complete the table

$y = 4(2x + 1)$

X	-2	-1	0	1	2
y					

21) Rewrite each equation to get y by itself. Then find the value of y when x =3

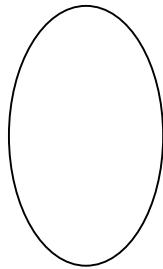
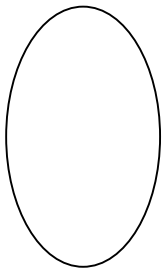
a)  $2x - 1 = 2(y + 7)$

b)  $2x + 3y = 6$

22) This table shows the number of students in each grade at North Haven High School from the 2016-2017 school year

Input (Grade)	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>
Output (# students)	281	242	281	233

a) Fill in the mapping diagram and draw the arrows to represent the relation between grade and number of students.



b) Is this relation a function? Explain why or why not.

23) Use the sets of coordinates to find the slope of a line using the slope formula. Your final result must be in simplest form.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

a) (4, 10) and (2, 0)

b) (0, 4) and (8,0)

24) Use the given slope and y-intercept to write an equation in slope intercept form  $y = mx + b$

$m = -2$   $b = 4$

Equation: \_\_\_\_\_

25) Write an equation of the line with the given slope that passes through the given point. Show work.

$M = \frac{1}{2}$ , passes through (2, -1)

Equation: \_\_\_\_\_

26) Write an equation of the line that passes through the given point and is parallel to  $y = -3x + 8$ . Show work.

Passes through (5, 2)

Equation: \_\_\_\_\_

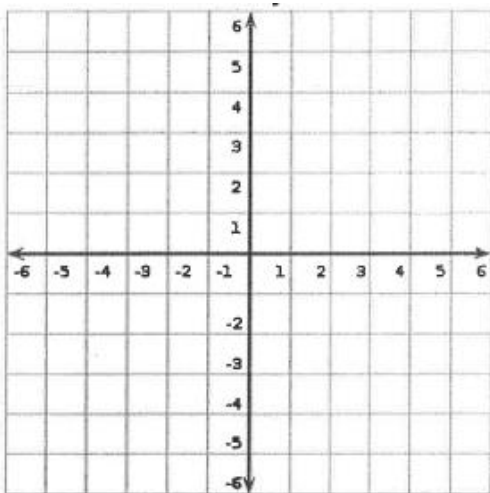
27) Write an equation of the line that passes through the given points. Show work

Passes through (1, 2) and (3, 8)

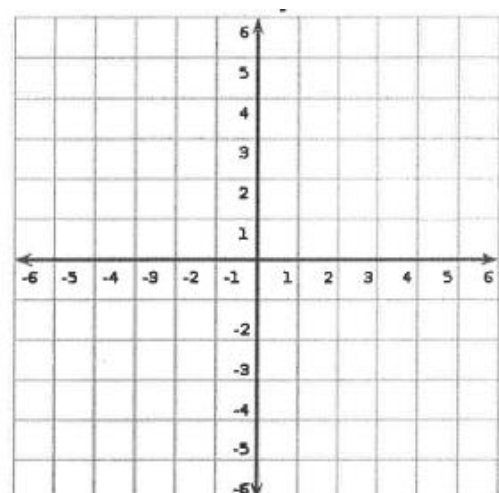
Equation: \_\_\_\_\_

28) Graph the equations

a)  $y = 2x - 1$



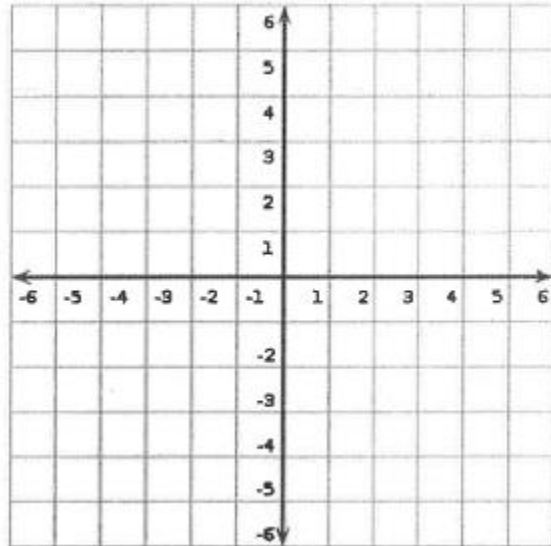
b)  $y = -\frac{3}{4}x + 2$



29) Graph the system (both equations on the same graph) and find the intersection point. Name the intersection point as an ordered pair.

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

$$y = -2x + 5$$



30) Solve the systems of equations using algebra. Show work. Write your solution as an ordered pair.

a)  $4y + x = 10$   
 $x = -3y - 2$

(Hint: substitution works well here)

b)  $2x + y = 11$   
 $3x - y = 4$

(Hint: elimination works well here)



PROBLEM SOLVING (These are all similar to problems you saw in eighth grade on assessments).

31) A pencil costs \$3.50 and a pen costs \$6.70. Jasper bought  $m$  pens. He also bought 4 fewer pencils than pens. Write an algebraic expression that represents the total amount he spent. (there is nothing to solve here)

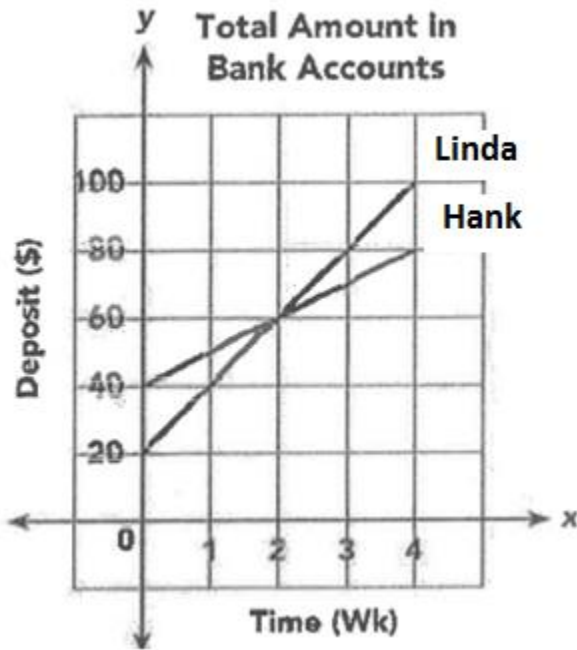
32) A family purchased tickets for a concert. They paid a total of \$90 for 7 adult tickets and 12 child tickets. The price of a child ticket was two-thirds the price of an adult ticket. How much was the price of an adult ticket? *Show work using algebra concepts you learned in eighth grade*

33) Suzanne is offered a job selling computers. She is given two payment options for her weekly salary as noted in the table below:

OPTION A	OPTION B
Weekly wage of \$120 plus \$4 for each computer sold.	Weekly wage of \$90 plus \$12 for each computer sold.

She aims to sell a total of  $c$  computers each week. What is the least number of computers she must sell for option B to be a better choice than option A? *Show work using algebra concepts you learned in eighth grade*

34) Hank and Linda both work as chefs in a restaurant. After receiving their weekly paychecks, they each deposit a fixed amount into their respective bank accounts. The graph shows the amount of money in each of their accounts after one month.



a) Which chef deposits the greater amount each week into their account? Explain what information you used to determine your answer.

b) When do the two chefs have the same amount of money and how much do they each have? Explain how you determined this.

c) Which chef started with more money? Explain how you determine this.

Solve the following word problem using systems of equations. It is suggested you use the elimination method. Show work.

35) Two copies of the same hardcover book and three copies of the same paperback book cost \$93. Sam bought three of the hardcover book and four of the paperback book for \$132. Find the cost of each type of book. (use  $x$  = cost of a hardcover book and  $y$  = cost of a paperback book)