JSTEM ACADEMY
Algebra 1

Mathematics Department

Summer Course Work

in preparation for

Algebra I

Completion of this summer work
is required on the first day of the
2022 - 2023 school year.

Name _____

Dear Parents and Guardians:

Attached are the summer curriculum review materials for Algebra I. This booklet was prepared by the JSTEM Academy Math department and contains topics that reflect content learned in prerequisite courses. These materials must be completed and brought to class on the first day of school in August.

Your child is required to complete this booklet over the summer.

Thank you for your cooperation.

Sincerely,

Jennifer Leary
jleary@judsonisd.org

Research Assignment:

In Algebra we focus on 3 types of equations: linear ($y=mx+b$), quadratic ($y=ax^2+bx+c$), and exponential ($y=ab^x$). I want you to research each of these equations and tell me 3 things:

1. What the variables mean in the formula
2. What the graph of each equation looks like
3. What type of situation uses each equation

JSTEM Mathematics

Department Summer

Course Work **Algebra I**

Topics

1. Expressions, Equations, and Functions

a. Evaluate expressions using order of operations.
b. Write expressions, equations and inequalities
c. Represent functions as rules, tables, and graphs
d. Identifying solutions

2. Properties of Real Numbers

a. Comparing real numbers
b. Identifying properties of real numbers
c. Identifying number sets
d. Integers and Real numbers
e. Finding and estimating square roots
f. Using scientific notation

3. Solving Linear Equations

a. Solve one-step equations
b. Solve two-step equations
c. Solve multi-step equations
d. Solve equations with variables on both sides
e. Rewriting equations and formulas

4. Graphing

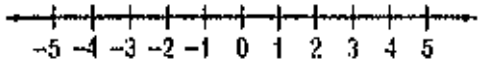
a. Plotting points
b. Graphing inequalities
c. Graphing linear equations

All pages MUST show the work in order for the work to be accepted. If more paper is needed, the work may go on a separate page. This booklet must be kept neat and in order and is to remain in your notebook as a reference guide.

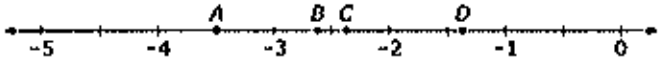
Algebra I Summer Project

1. Graph and label the following numbers on the number line below.

A. -5 B. ½ C. $\sqrt{9}$ D. $\sqrt{24}$



2. On the number line below identify which letter best approximates the value of $-\sqrt{7}$?



3. Given the fractions below,

$\frac{2}{3}$ $\frac{3}{4}$ $\frac{5}{8}$

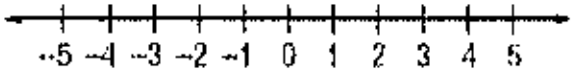
a. Write the common denominator

b. Write equivalent fractions using the common denominator

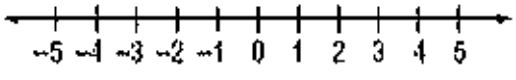
c. Order the fractions from least to greatest

4. Graph the inequalities

a. $z < 3$



b. $b \geq -1$



5. Translate the verbal phrase "the product of 9 and a number x" into an expression.

6. Translate the verbal phrase "three less than three times a number w" into an expression.

7. Write an equation or an inequality to represent: "The sum of a number y and 17 is at most 36."

8. Write an equation for "The product of 5 and the sum of a number z and 3 is equal to 45."

9. Is 7 a solution of the equation $3p - 8 = 12$?

10. Is 4 a solution of the inequality $r^2 + 8 > 21$?

11. Complete the tables below.

a.

C= 3H + 4

H	C= 3H + 4	C
2		
4		
6		
10		

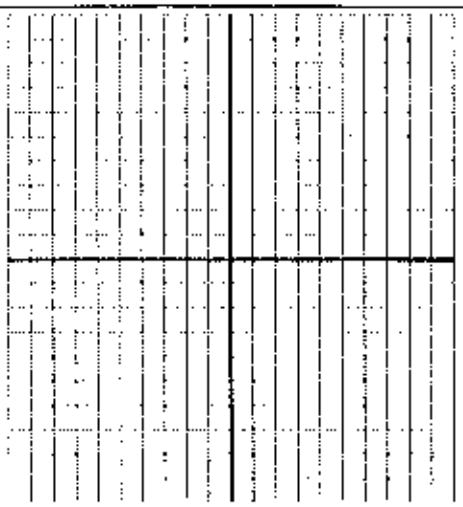
b.

Y = 5X – 3

X	Y = 5X – 3	Y
-1		
-2		
-3		
-4		

12. A contractor buys screws for $1.55 per box and nails for $1.05 per box. Write an equation for the total cost. Then find the cost of 3 boxes of screws and 5 boxes of nails.

13. Plot the ordered pairs in the coordinate plane below. Describe the location (quadrant or axis) of each point.



A (1,7)

B (-2,4)

C (3,-5)

D (-6,2)

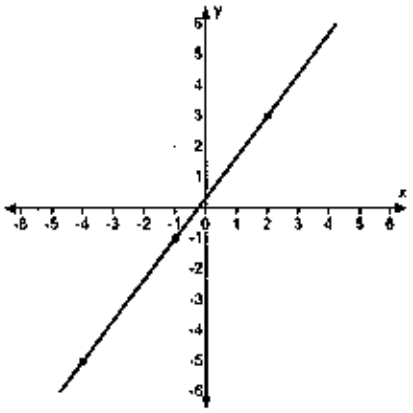
E (-9,0)

F (5,0)

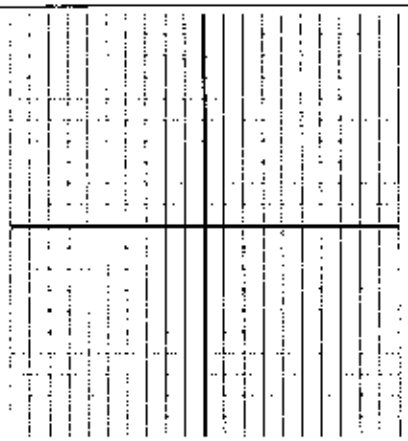
14. Find the slope of the following.

a. The line that passes through the points (9, 2) and (5, 4).

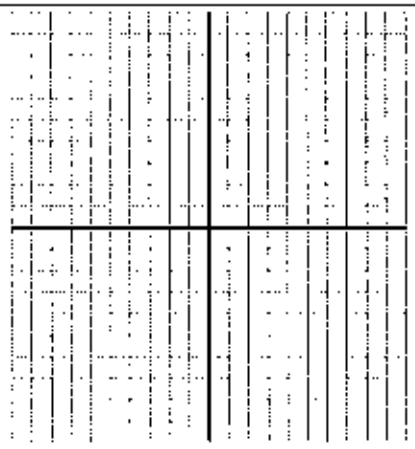
b. The line graphed below.



15. Graph the function $y = 3x - 5$.



16. Graph the function $y = \frac{2}{3}x + 2$.



17. Evaluate the expression $x + (-5) + 5$ when $x = -3$

18. Evaluate the expression $3(x - 2) + 7$ when $x = -12$

19. Write an equation of a line that has a slope of -4 and a y-intercept of 3.

20. Write an equation of a line that has a slope of $\frac{3}{4}$ and passes through the point (0, 14)

21. Write an equation of a line that passes through the point (3,2) and (4,9).

22. Simplify the expression, show your work.

$3x + 6(x - 5)$

23. Solve for x:

a. $-3x + 4 = -17$

b. $-3x + 2 = -4x + 4$

24. The following are the properties of real numbers:

IDENTITY AND EQUALITY PROPERTIES (used to simplify expressions)

For any numbers a, b, c

Additive Identity Property	a + 0 = 0 + a = a
Multiplicative Identity Property	a * 1 = 1 * a = a
Multiplicative Property of Zero	a*0 = 0*a = 0
Substitution Property	If a = b, then a may be replaced by b
Reflexive Property	a = a
Symmetric Property	If a = b, then b = a
Transitive Property	If a = b and b = c, then a = c
Distributive Property	a(b+c) = ab + ac and a(b-c) = ab - ac
Commutative Property	a + b = b + a and a * b = b * a
Associative property	(a+b)+c = a+(b+c) and (ab)c = a(bc)

Name the property used in the statements below.

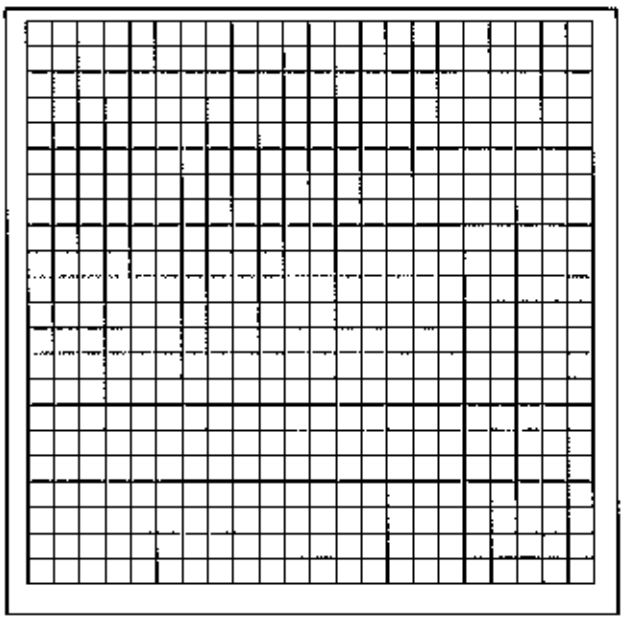
21 + 0 = 21	
0 (15) = 0	
$x^3 * 1 = x^3$	
4 + 3 = 4 + 3	
6x + 2y = 2y + 6x	
(14 – 6) + 3 = 8 + 3	
If x + y = 9 then 9 = x + y	
$9(r^2 + s^2) = 9r^2 + 9s^2$	
If 3 + 3 = 6 and 6 = 3 * 2, then 3 + 3 = 3 * 2	
(2c + 6) + 10 = 2c + (6 + 10)	

25. Complete the chart by identifying if each number is a real, rational, irrational, integer or whole number.

Number	Real Number?	Rational Number?	Irrational Number?	Integer?	Whole Number?
$\sqrt{24}$					
$\sqrt{100}$					
0.6					
-24					
5					

26. Nick is hungry and is going to restaurant to eat pizza. He predicts that he will eat 3 slices of pizza every two minutes. Use this information to complete the table and then create a graph that represents the number of pieces of pizza Nick can eat for different numbers of minutes. Label your axes.

Number of Minutes	Slices of Pizza Eaten by Nick
2	3
4	
6	
8	
10	



What is the slope and what does it mean in the context of this problem?

27. The Cooking Club made some pies to sell during lunch to raise money for a field trip. The cafeteria helped by donating three pies to the club. Each pie was then cut into six pieces and sold. There were a total of 72 pieces to sell. How many pies did the club make?

28. To become a member of an ice skating rink, you have to pay a $30 membership fee. The cost of admission to the rink is $5 for members and $7 for nonmembers. After how many visits to the rink is the total cost for members, including the membership fee, the same as the total cost for nonmembers?

29. Write each number in scientific notation.

a. 43200000000000

b. .000000000081

30. Write each number in standard notation.

a. 6.98×10^{5}

b. 9.13×10^{-8}

31. Find the perimeter and the area of a rectangle with the given dimensions

32. What is the value of $\frac{5}{6}x-(-\frac{2}{3}x)$? (Simplify the expression)

33. Solve the equation. Check your solution.

$10x + 2 = 72$

34. Solve the equation. Check your solution.

$1.1x + 1.2 = 5.6$

35. Solve the equation. Check your solution.

$2x - (-5) = 23$

36. Solve the equation. Check your solution.

$-3y + 18 + 5y = 38$