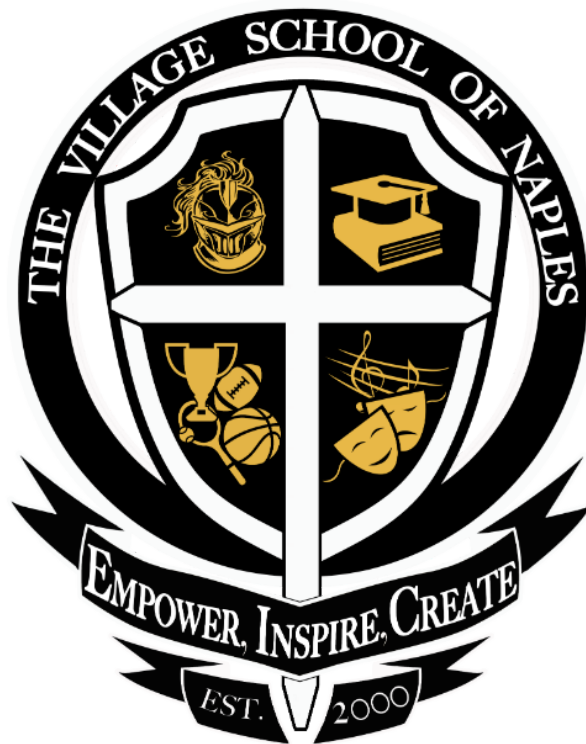


The Village School's Rising 9th Grade Algebra 1 Packet & STEAM Activity



Please complete and turn in the following pages
on the first day of school in August.

Name: _____

Upper School Algebra 1 Packet

Welcome to Upper School Algebra 1 at The Village School! This packet is comprised of important concepts necessary for success in Algebra 1. **Completion of this packet is mandatory for all 9th grade Algebra 1 students and must be done in pencil. As you complete this packet, show all steps used to arrive at your final answer.**

Operations Review:

1. $2(-3) =$

2. $-17 + (-45) =$

3. $8(13) =$

4. $-60 + 80 =$

5. $-12(4) =$

6. $3(0) =$

7. $39 + (-39) =$

8. $-24 \div (-6) =$

9. $12 - (-12) =$

10. $54 \div (-9) =$

11. $-13 \div 13 =$

12. $-9 - 12 =$

13. $-95 - (-48) =$

14. $125 \div -5 =$

15. $26.714 \div 3.61 =$

16. $\frac{3}{5} + \frac{7}{9} + \frac{4}{15} =$

17. $\frac{5}{16} \div \frac{35}{48} =$

18. $2\frac{5}{6} - 1\frac{1}{7} =$

19. $2\frac{1}{3} \div 1\frac{3}{4} =$

20. $2(9 - 2)^2 - 6 * 3 + 4^2 =$

21. $72 [(15 - 9) * 2] =$

22. Solve the proportion:

$$\frac{b}{6} = \frac{75}{90}$$

Linear Equations:

1. $-4x - 4 = 16$

4. $-3x + 5 = 2x + 10$

2. $\frac{2}{3}x = 6$

5. $2(3 + x) = 14$

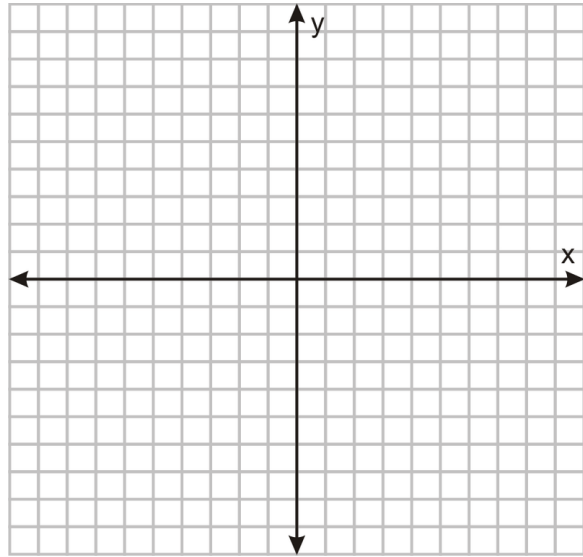
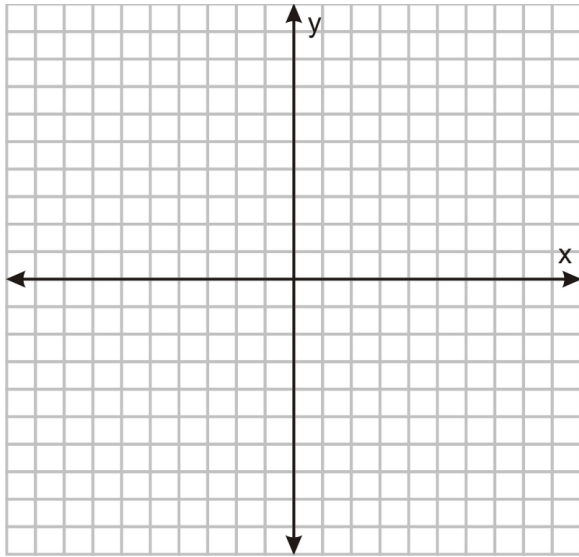
3. $8x = \frac{16}{5}$

6. $\frac{3}{4}(4 + \frac{4}{3}x) = 8$

For questions #7 - 8, state the slope and y-intercept. Then, graph the equations in the coordinate planes provided.

7. $y = -3x + 5$

8. $y = \frac{5}{2}x - 4$



Systems of Equations:

For questions #1 - 2, solve the systems of equations using substitution.

1. $4x + 2y = 20$
 $y = x + 4$

2. $-3x + y = 16$
 $y = -x + 24$

For questions #3 - 4, solve the systems of equations using elimination (+ or -).

$$\begin{array}{l} 3. \quad 2x + 2y = 10 \\ \quad \quad 2x + y = 6 \end{array}$$

$$\begin{array}{l} 4. \quad 7x + y = -4 \\ \quad \quad -5x - y = 6 \end{array}$$

For questions #5 - 6, solve the systems of equations using elimination (x).

$$\begin{array}{l} 5. \quad -x + y = 5 \\ \quad \quad 2x + 6y = 6 \end{array}$$

$$\begin{array}{l} 6. \quad 3x + y = 2 \\ \quad \quad -4x - 2y = 6 \end{array}$$

For questions #7 - 8, solve the special systems of equations using any method.

$$\begin{array}{l} 7. \quad -5x + 2y = 6 \\ \quad \quad -10x + 4y = 12 \end{array}$$

$$\begin{array}{l} 8. \quad 12x - 4y = 6 \\ \quad \quad 12x - 4y = 3 \end{array}$$

Exponents & Exponential Functions:

Simplify the expression.

$$1. \quad x^4 \cdot x =$$

$$6. \quad 1,024^0 =$$

$$2. \quad y^3 \cdot y^{-3} =$$

$$7. \quad 3^{-2} =$$

$$3. \quad \frac{b^{15}}{b^5} =$$

$$8. \quad (4m^2)^2 =$$

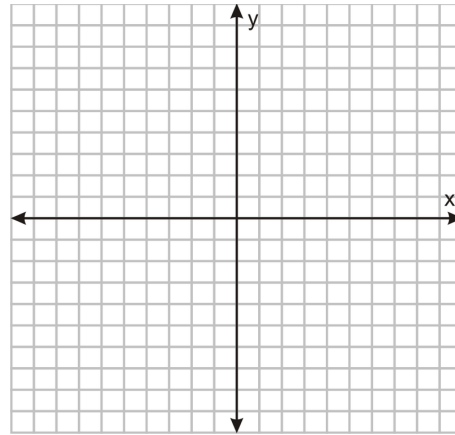
$$4. \quad \frac{c^6 \cdot c^2}{c^3} =$$

$$9. \quad 3(c^2 + 4) =$$

$$5. \quad (h^3)^6 =$$

For question #10, graph the exponential function and state whether it is exponential growth or decay.

10. $y = 4^x$



Polynomials:

For questions #1 - 4, multiply the binomials using the FOIL method.

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

3. $(r - 5)(r + 1) =$

2. $(2y + 4)(y - 1) =$

4. $(3h - 2)(2h - 1) =$

Factoring:

For questions #1 - 5, simplify the expression by factoring. Worked out examples are provided below. (Hint: Consider factoring as “reverse distribution”)

Example 1: $5x + 25 = 5(x + 5)$

[A common factor of 5 is taken out]

Example 2: $6x^2 + 12x = 6x(x + 2)$

[A common factor of 6x is taken out]

1. $3y + 12 =$

4. $7x^2 + 14x =$

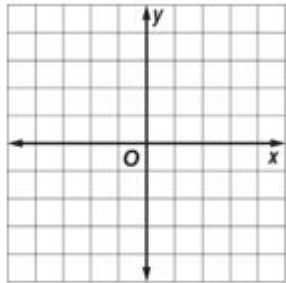
2. $-4h - 8 =$

5. $-9y^2 - 18y =$

3. $\frac{2}{3}k + \frac{4}{6} =$

Coordinate Plane:

1. Name each quadrant number.



2. Graph each point below on the graph:

R(2,0)

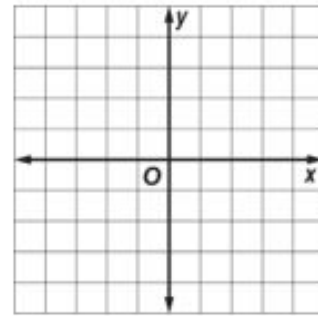
V(-1,4)

S(-3,-4)

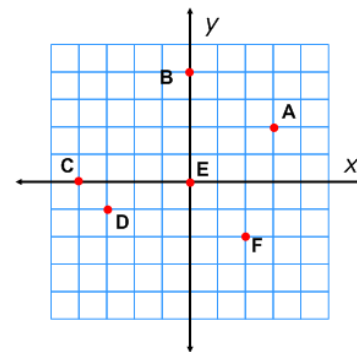
T(2,-5)

W(1,2)

Z(0,-3)



3. Write the coordinates of the points seen in the provided graph.



Square Roots:

1. Find the two square roots of each number:

a) 49

b) 2500



Directions:

1. On the pages that follow, you will find three STEAM activities to choose from. **You must choose ONE of the activities to complete and bring to school in August.**
2. You must document your chosen STEAM activity using the formats described in each activities' description.
3. On your return to school, you must bring in any and all materials and products that were created for the STEAM project. Be prepared to present what you created.

OPTION 1: When Will I Ever Use This?

For this STEAM activity, you will be tackling the age old question every math student asks at one point in their life, “When Will I Ever Use This?”

Using the resource provided to you in the link below, and others that you find, you will be developing an in-depth investigation of a career of your choosing and how it utilizes concepts of Algebra.

Some points to consider when completing this STEAM activity:

- Create an “infographic” using PowerPoint or any other presentation resource to describe, in detail, what career you chose and why. What makes it interesting? What challenges do you think you might face in pursuing this career?
- Clearly name and explain at least 3 algebraic concepts that are used in your career choice. You must carefully explain each concept and provide 5 worked out examples, for a total of 15 examples. Be prepared to present your explanation and examples to your peers clearly using supportive evidence.
- As a bonus, if you can find a professional currently working in your career choice, interview them about their job, and ask how they use Algebra on a daily basis!

Resource: http://weusemath.org/?page_id=800



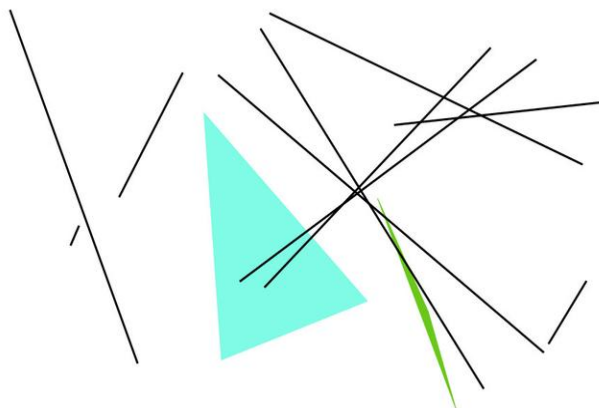
OPTION 2: Art...In A Not So Artistic Way

For this STEAM activity, you will be creating a piece of art...in a not so artistic way. Using your knowledge of linear equations, you will be painting a picture while demonstrating your mastery of this essential algebraic concept.

Rather than simply having linear equations and graphing them in a coordinate plane, you should create your very own linear equations that, when graphed together, create a beautiful piece of art!

Some points to consider when completing this STEAM activity:

- You must draw your piece of art on graph paper and use **at least** 20 linear equations. Your piece should demonstrate complexity and careful planning, not simply a colored box that took you 5 minutes to complete...
- Your linear equations should be written and numbered neatly on the worksheet provided below and be handed in with your piece of art.
- Make **sure** to label each line on your artwork with a small number matching with the number of the equation on your separate piece of paper.
- Use colors! Who doesn't love coloring? Demonstrate that you took time on this project and put your best foot forward!



Name: _____

Art...In A Not So Artistic Way
Equations

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

16. _____

17. _____

18. _____

19. _____

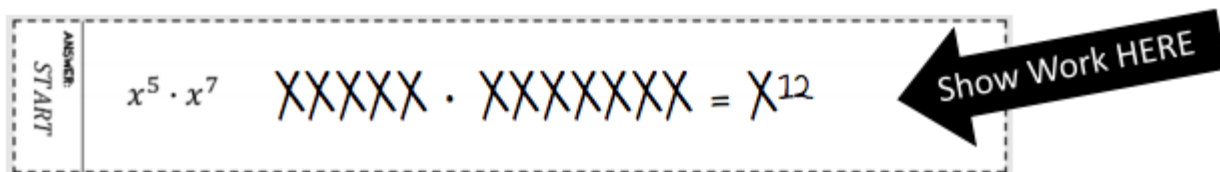
20. _____

OPTION 3: Exponential Chains

For this STEAM activity, you will be using properties of exponents to create your very own bling to show off in August. 😊

Some points to consider when completing this STEAM activity:

- Print [this PDF](#) and cut all pages along the dashed lines. There will be 5 strips per page for a total of 25 problems.
- Problem #1 is labeled “START” on the left tab. Answer the problem on the strip and show your work in the space provided *before* taping the strip together to form the first link in your chain.



- The answer to Problem #1 will lead you to the next problem. Remember to do the problem on the strip first before linking together so you can use a flat surface to write on.
- Problem #25 is the last link in your chain! Put your name and date on the final strip. Your final product should look like the picture below :)

