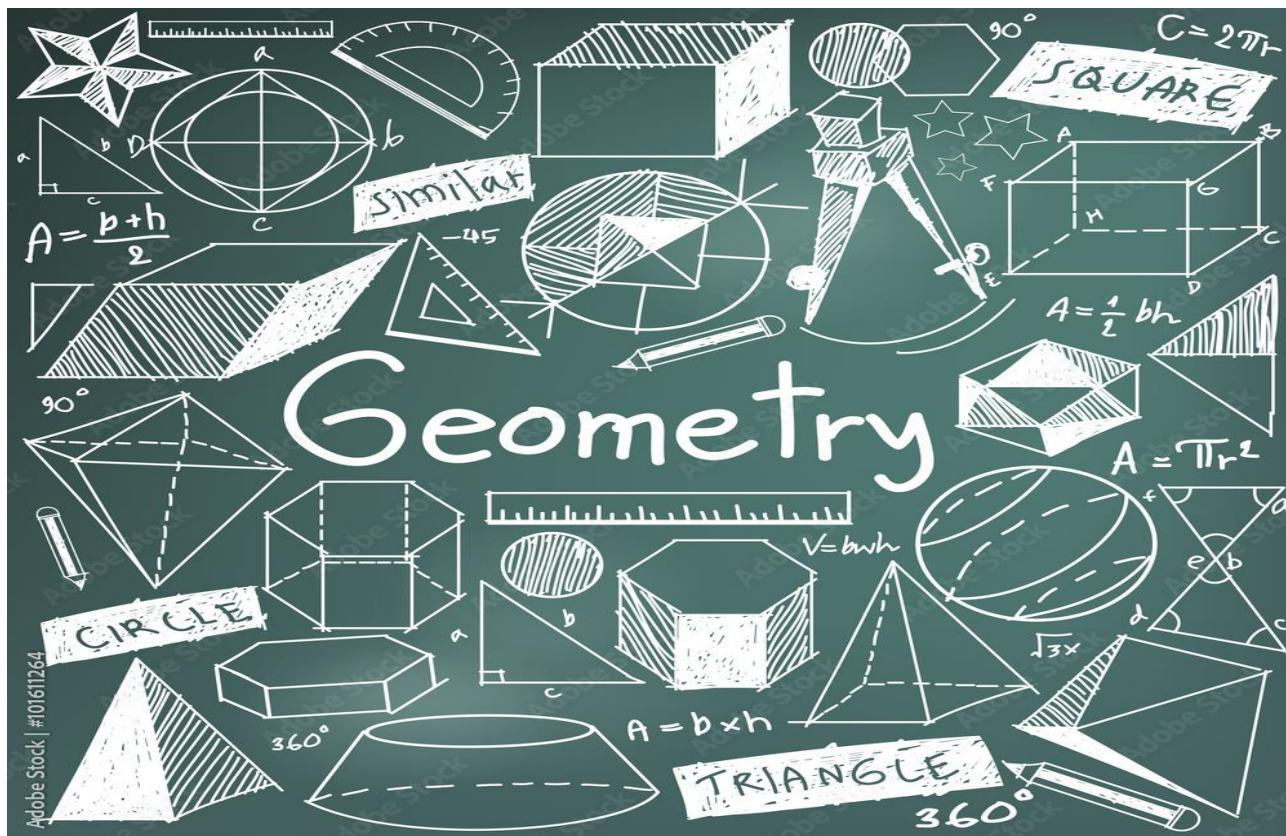


SUMMER PACKET

PREPARING FOR GEOMETRY



Supply List	Video/ App Resources	Pre-Requisites
<ul style="list-style-type: none"> • Pencils • Colored Pencils • Graph Paper • Graphing Calculator (TI 84 – Preferred)) • Compass and Protractor • Ruler 	<ul style="list-style-type: none"> • https://www.khanacademy.org/ • https://mathantics.com/ • https://webmath.com/ • https://www.mathplanet.com/ • http://www.math.com/ • https://www.ixl.com/math/algebra-1 • https://www.purplemath.com 	<ul style="list-style-type: none"> • Adding and Subtracting Polynomials • Simplifying Algebraic Expressions using Properties of exponents. • Solving Linear Equations • Graphing Linear Functions • Writing Equations of Lines • Solving and Graphing Systems of Linear Equations • Solving and Graphing Absolute Value Equations • Factoring • Solving Quadratic Equations • Graphing Quadratic Functions

To Any student entering Geometry in the fall –

To ensure your success in Geometry, you need to be proficient in the foundational skills and concepts that you have learned over the course of Algebra 1 as this will enable you to easily grasp the new concepts that will be covered, and apply them to solve mathematical and real-life problems. We highly recommend that you take time to review and solidify your knowledge of these topics over the course of the summer. Just like we take the time to practice our skills in other activities (soccer, baseball, softball, dancing, running, swimming), we also need to practice our mathematical skills.

Learning Mathematics is like building a house; if your foundation is weak, you can't build high, and if there are gaps or floors that are not complete, the next floor is nearly impossible to build. **Our wish and hope for all our math students is not just to get by, but to excel in mathematics, and to ultimately enjoy and appreciate the beauty and power of mathematics** – a subject we are passionate about. We are providing you with resources to do as much preparation and solidification of the basic skills needed to engage with the course material fluently and confidently.

The purpose of this packet is to help you review and reinforce the concepts/topics that are necessary for the study of Geometry in the fall. The packet has been designed to provide a review of Algebra 1 skills that are essential for student success in Geometry and beyond. It also contains a review of Geometry concepts students should have previously learned in middle school. There are also links to on-line tutorials for these topics. You are strongly encouraged to take the time to work through the packet and use the resources that are provided for review when you do not remember how to solve a problem. You can certainly use other on-line resources that you can find for help, or ask relatives and/or friends for help. Completion of the summer packet will be of great value to you, as you will be able to self-assess your own strengths and weaknesses, and seek extra help or resources on topics that you may struggle with.

We wish you a happy summer, and hope you return in the fall with high expectations for yourself, the willingness to ask questions and reach out for help when you are struggling, and with the confidence that you can be successful.

A. Simplifying Polynomial Expressions

Objectives: The Student will be able to –

- Apply the appropriate arithmetic operations and algebraic properties needed to simplify an algebraic expression.
- Simplify polynomial expressions using addition and subtraction

Simplify:

1. $8x - 9y + 16x + 12y$

2. $14y + 22 - 15y^2 + 23y$

3. $5n - (3 - 4n)$

4. $-2(11x - 3)$

5. $3(8z - 4w) + 2(10z - 6w)$

6. $5(3x - 4) - 2(4x - 6)$

Simplifying Polynomials:

<https://www.youtube.com/watch?v=ZvL9aDGNHqA>

<https://www.khanacademy.org/math/algebra-home/alg-polynomials/alg-introduction-to-polynomials/v/simplify-a-polynomial>

<https://www.youtube.com/watch?v=ZvL9aDGNHqA>

B. Solving Linear Equations

Objectives: The Student will be able to –

- Solve one and two step equations.
- Solve equations with variables on both sides.
- Solve Multi-step equations that need to be simplified first
- Solve Literal Equations for a specific variable.

Solve each equation. You must show all work.

1. $5x - 2 = 33$

2. $140 = 4x + 36$

3. $8(3x - 4) = 196$

4. $45x - 720 + 15x = 60$

5. $132 = 4(12x - 9)$

6. $154 + 7x - 68 = 198$

7. $-5(3x - 8) + 6x = -131$

8. $-7x - 10 = 18 + 3x$

9. $12x + 8 - 15 = -2(3x - 82)$

10. $-(12x - 6) = 2x - 14$

Solving Linear Equations (One Step):

<https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/algebra-linear-equations-1>

Solving Linear Equations (Two Step):

<https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/algebra-linear-equations-2>

Solving Linear Equations (Multi - Step):

<https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/algebra-linear-equations-3>

<https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/algebra-linear-equations-4>

Solve the Literal Equations for the indicated variable.

11. $Y + M = Z$, for M

12. $2x - 3y = 9$, for y

13. $2xy + w = 10$, for x

14. $4x + y - 5h = 10y + k$, for x

Solving Literal Equations:

<https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/solving-for-a-variable>

<https://www.youtube.com/watch?v=ggSfw2gmMsg>

C. Solving Absolute Value Equations

Objectives: The Student will be able to –

- Solve absolute value equations.

1. $|2x| = 12$

2. $|3x + 4| = 8$

3. $2|3x - 2| + 5 = 15$

4. $|5x + 2| = -7$

Solving Absolute Value Equations:

<https://www.youtube.com/watch?v=cHbzQVd7Y>

<https://www.khanacademy.org/math/algebra-home/alg-absolute-value/alg-absolute-value-equations/v/absolute-value-equations>

D. Properties of Exponents

Objectives: The Student will be able to –

- Simplify expressions using the properties of exponents

Simplify each expression. Express answers with positive exponents.

1. $x^5 \cdot x \cdot x^2 =$

2. $\frac{m^{15}}{m^3} =$

3. $(k^4)^5 =$

4. $y^0 =$

5. $(p^4n^2) \cdot (p^7n^5) =$

6. $\frac{45y^3z^{10}}{5y^3z} =$

7. $(4h^5k^3) \cdot (15h^3k^2) =$

8. $\frac{12a^4b^6}{36ab^2c} =$

9. $(3m^2y)^3 =$

10. $(3x^4y^2)^2 \cdot (2x^3y^5m^3)^2 =$

11. $4x^2(3x^5y^2)^0 =$

Properties of Exponents:

<https://www.youtube.com/watch?v=tePk4uUBrsU>

<https://www.youtube.com/watch?v=etMK3xViMAc>

<https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/cc-8th-exponent-properties/v/exponent-properties-involving-products>

E. Slopes of Lines & Equations of Lines

Objectives: The Student will be able to –

- Identify and calculate the slope of a line.
- Write the equation of a line in Point-Slope Form.
- Write the equation of a line in Slope-Intercept Form.
- Write the equation of a line in Standard Form.
- Write the equations of parallel and perpendicular lines.

Calculate the Slopes of the lines with following pairs of points.

1. $(-1,4)$ and $(1,-2)$

2. $(3,5)$ and $(-3,1)$

3. $(2,5)$ and $(5,10)$

4. $(2,-5)$ and $(-4,-5)$

5. $(3,-2)$ and $(3,7)$

Slopes:

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:linear-equations-graphs/x2f8bb11595b61c86:slope/v/slope-of-a-line-2>

https://www.youtube.com/watch?v=Id_UqMLAXzY

Write the equation of the lines with given slope and a point on the line.

Write the equations of the lines in:

(a) Point - Slope Form.

(b) Slope - Intercept Form

(c) Standard Form

1. Slope = -3 Point : $(2,3)$

2. Slope = 5 Point : $(-2,4)$

3. Slope = $\frac{2}{3}$ Point : $(3,-5)$

Write the equation of the lines through the given points on the line.

Write the equations of the lines in:

(a) Point - Slope Form.

(b) Slope - Intercept Form

(c) Standard Form

1. Points : $(2,-3)$ and : $(5,-12)$

2. Points : $(-4,-5)$ and : $(2,19)$

3. Points : $(5,-1)$ and : $(10,2)$

Equations of Lines:

<https://www.youtube.com/watch?v=lzqTD0JWwhY>

<https://www.youtube.com/watch?v=xlzDjC11udE>

<https://www.youtube.com/watch?v=4u7MZvFqFJo>

4. Rewrite the equation into Slope-Intercept Form : $8x - 2y = 24$.
Identify the slope and y-intercept.
5. Rewrite the equation into Slope-Intercept Form : $3x + 5y = 30$.
Identify the slope and y-intercept.
6. Write the equation of the line through the point $(3,8)$
and parallel to the line $6x + 3y = 30$.
7. Write the equation of the line through the point $(-4,5)$
and perpendicular to the line $3x - 9y = 18$.

Equations of Parallel and Perpendicular Lines:

<https://www.youtube.com/watch?v=LTb2-LE7StE>

<https://www.khanacademy.org/math/geometry/hs-geo-analytic-geometry/hs-geo-parallel-perpendicular-eq/v/perpendicular-lines-2>

F. Graphing Linear Functions

Objectives: The Student will be able to –

- Graph lines given in Slope – Intercept form.
- Graph lines given in Point – Slope form.
- Graph lines given in Standard Form.
- Identify the equation of a line from its graph.

Graphing Linear Functions:

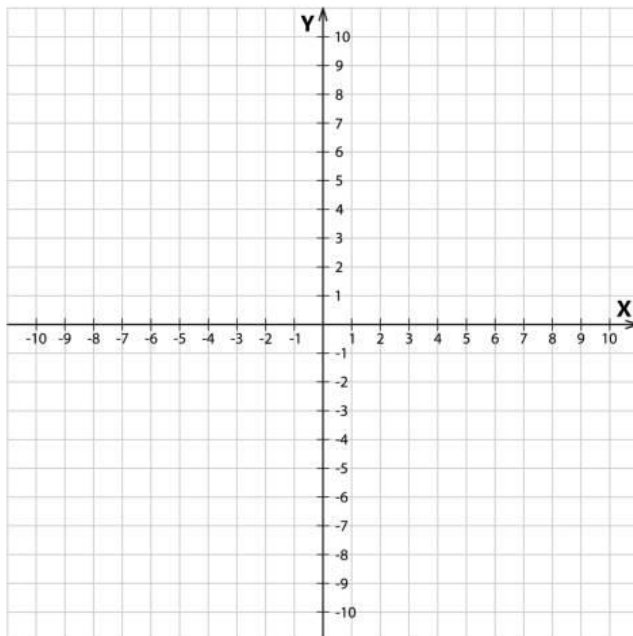
<https://www.youtube.com/watch?v=zihUOJgDkv0>

<https://www.khanacademy.org/math/in-in-grade-9-ncert/xfd53e0255cd302f8:linear-equations-in-two-variables/xfd53e0255cd302f8:graph-of-a-linear-equation-in-two-variables/v/graphs-of-linear-equations>

https://www.youtube.com/watch?v=UgtMbCl4G_I

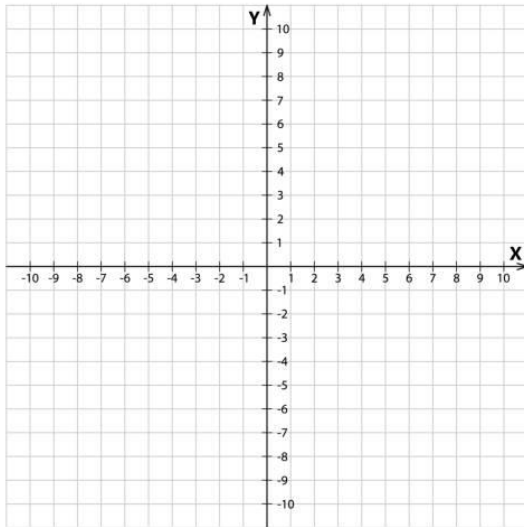
1. Graph the line : $y = 2x + 5$

Slope = _____ Y-intercept = _____



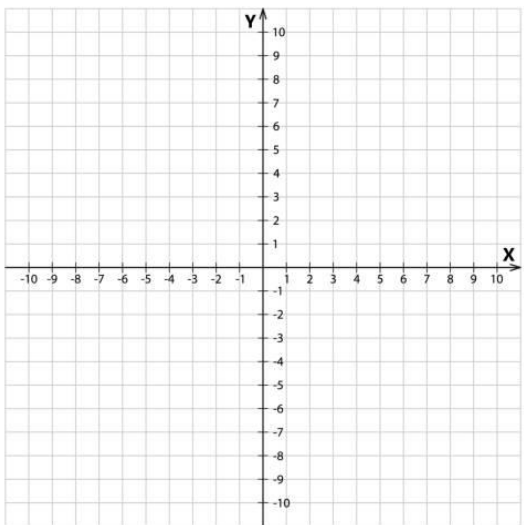
2. Graph the line : $y = -\frac{2}{5}x + 4$

Slope = _____ Y-intercept = _____



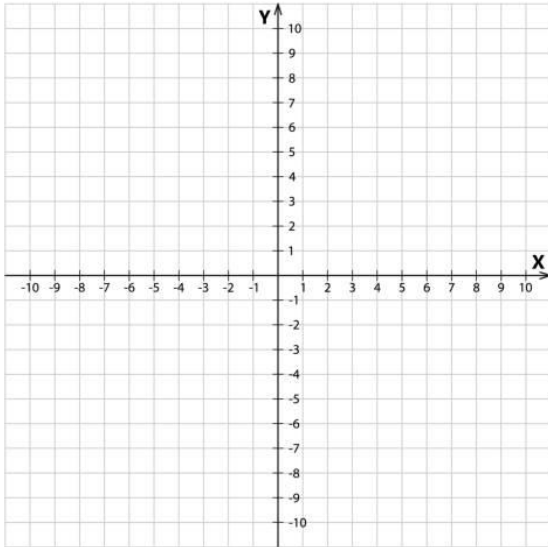
3. Graph the line : $y + 4 = -3(x - 4)$

Slope = _____ Y-intercept = _____



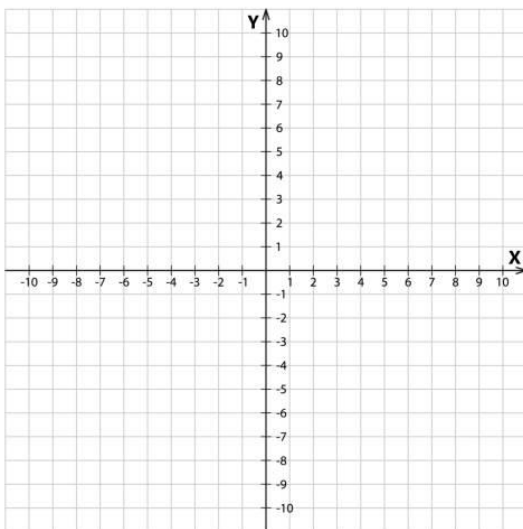
4. Graph the line : $3x + y = 3$

X-intercept = _____ Y-intercept = _____



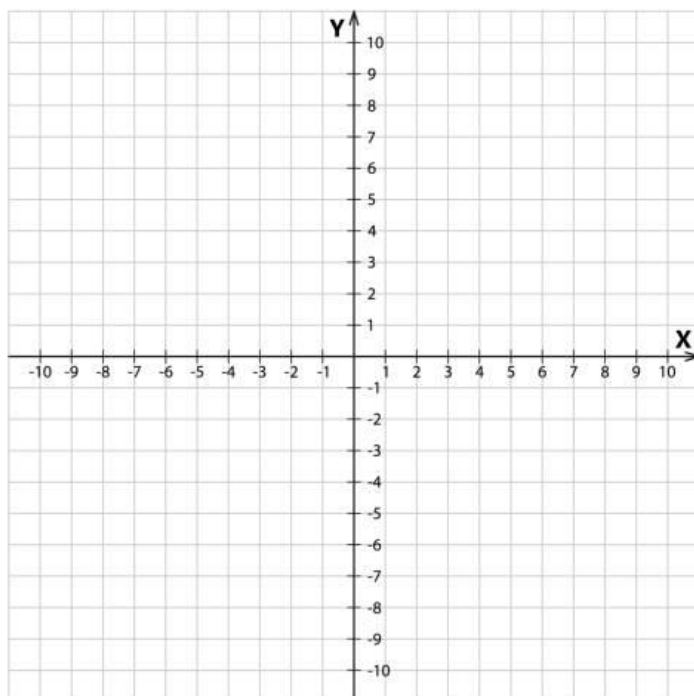
5. Graph the line : $5x - 2y = 10$

X-intercept = _____ Y-intercept = _____



6. Graph the line : $x = -4$

X-intercept = _____ Y-intercept = _____



G. Graph Inequalities in two variables

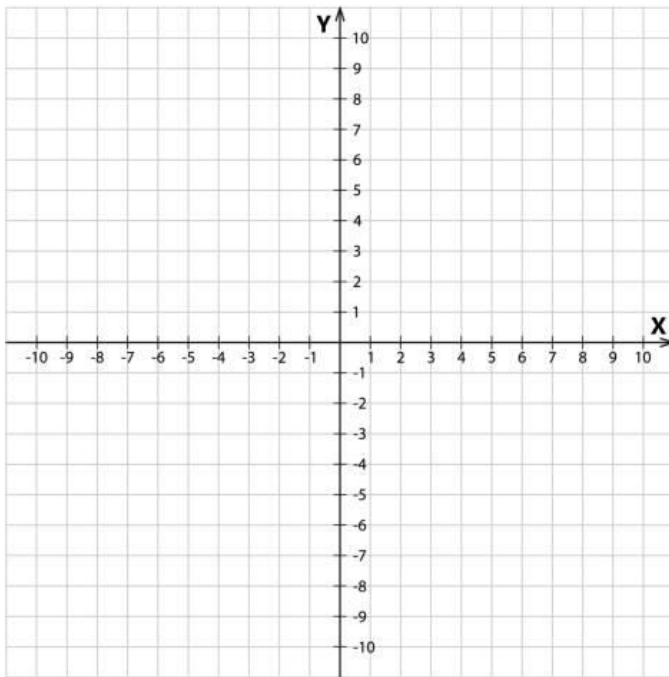
Objectives: The Student will be able to –

- Graph inequalities in two variables

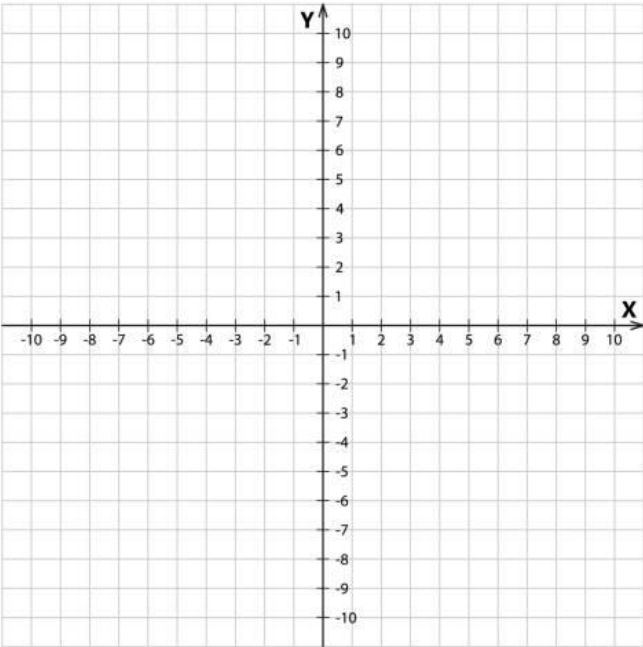
Graphing Inequalities in two variables:

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:inequalities-systems-graphs/x2f8bb11595b61c86:graphing-two-variable-inequalities/v/graphing-linear-inequalities-in-two-variables-example-2>

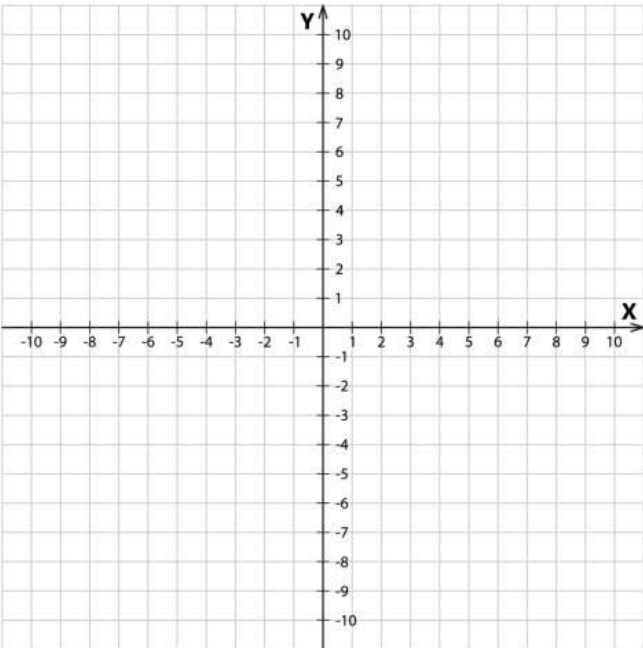
1. Graph the inequality: $2x + 3y < 12$



2. Graph the inequality : $3x + 5y \geq 30$



3. Graph the inequality : $4x - 3y < 24$



H. Solving Systems of Equations

Objectives: The Student will be able to –

- Solve systems of linear equations by graphing
- Solve systems of linear equations by elimination
- Solve systems of linear equations by substitution

Solving Systems by graphing:

<https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-systems-topic/cc-8th-systems-graphically/v/solving-linear-systems-by-graphing>

<https://www.youtube.com/watch?v=Pd4hwS8qHms>

Solving Systems by Elimination:

<https://www.khanacademy.org/math/algebra-home/alg-system-of-equations/alg-equivalent-systems-of-equations/v/solving-systems-of-equations-by-elimination>

<https://www.youtube.com/watch?v=HL2fDIOMLJO>

Solving Systems by Substitution:

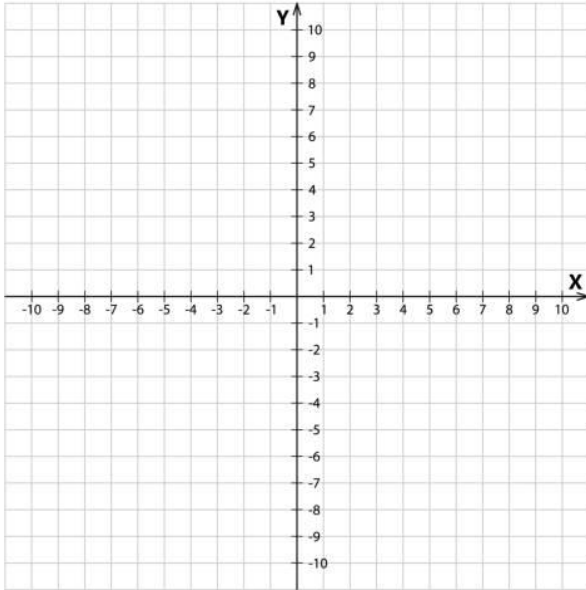
<https://www.khanacademy.org/math/algebra-home/alg-system-of-equations/alg-solving-systems-of-equations-with-substitution/v/solving-linear-systems-by-substitution>

<https://www.youtube.com/watch?v=cbIHUeq3bkE>

1. Solve the system of equations by graphing:

$$x + y = 6$$

$$2x - 2y = -8$$



2. Solve the system of linear equations by elimination:

$$3x + 2y = -2$$

$$4x - 3y = 20$$

3. Solve the system of linear equations by substitution:

$$5x - 3y = 2$$

$$y = 3x + 6$$

I. Solve Quadratic Equations

Objectives: The Student will be able to –

- Solve quadratic equations by using square roots.
- Solve quadratic equations by factoring.
- Solve quadratic equations by using the Quadratic Formula

Solve by using Square Roots:

1. $3x^2 = 9$

2. $2x^2 - 9 = 15$

3. $(2x - 5)^2 - 5 = 31$

Solving Quadratic Equations by Square Roots:

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations/x2f8bb11595b61c86:untitled-1082/v/simple-quadratic-equation>

Solve by Factoring:

1. $x^2 - 25 = 0$

2. $x^2 - 8x + 15 = 0$

3. $x^2 + 11x + 30 = 0$

4. $x^2 - 3x - 40 = 0$

5. $x^2 + 5x - 24 = 0$

6. $3x^2 + 12x - 36 = 0$

7. $6x^2 + x - 12 = 0$

8. $x^2 + 9x - 12 = 3x + 4$

Solving Quadratic Equations by Factoring:

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations/x2f8bb11595b61c86:quadratics-solve-factoring/v/example-1-solving-a-quadratic-equation-by-factoring>

<https://www.youtube.com/watch?v=qeByhTF8WEw>

<https://www.youtube.com/watch?v=zc2CpyRtjvY>

Solve by using the Quadratic Formula:

1. $2x^2 + 6x + 3 = 0$

2. $3x^2 - 2x + 2 = 7$

3. $5x^2 - 4x + 2 = 4x^2 - 6x + 8$

Solving Quadratic Equations using the Quadratic Formula:

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations/x2f8bb11595b61c86:quadratic-formula-a1/v/using-the-quadratic-formula>

<https://www.youtube.com/watch?v=IINAJI36-10>

J. Graphing Quadratic Functions

Objectives: The Student will be able to –

- Graph quadratic functions given in vertex form.
- Graph quadratic functions given in standard form.
- Graph quadratic functions given in intercept form.
- Identify the intercepts of a quadratic function.
- Identify the vertex of a quadratic function
- Identify the axis of symmetry of a quadratic function
- Determine the concavity of a quadratic function.

Graphing Quadratic Functions:

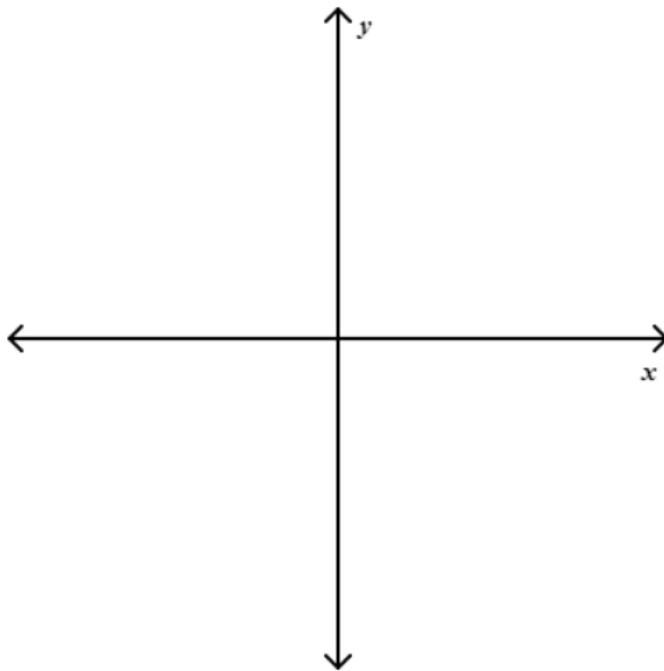
https://www.youtube.com/watch?v=Hq2Up_1lh5E

https://www.youtube.com/watch?v=OHH7fX_M8Ns

<https://www.youtube.com/watch?v=y99INRqLjBA>

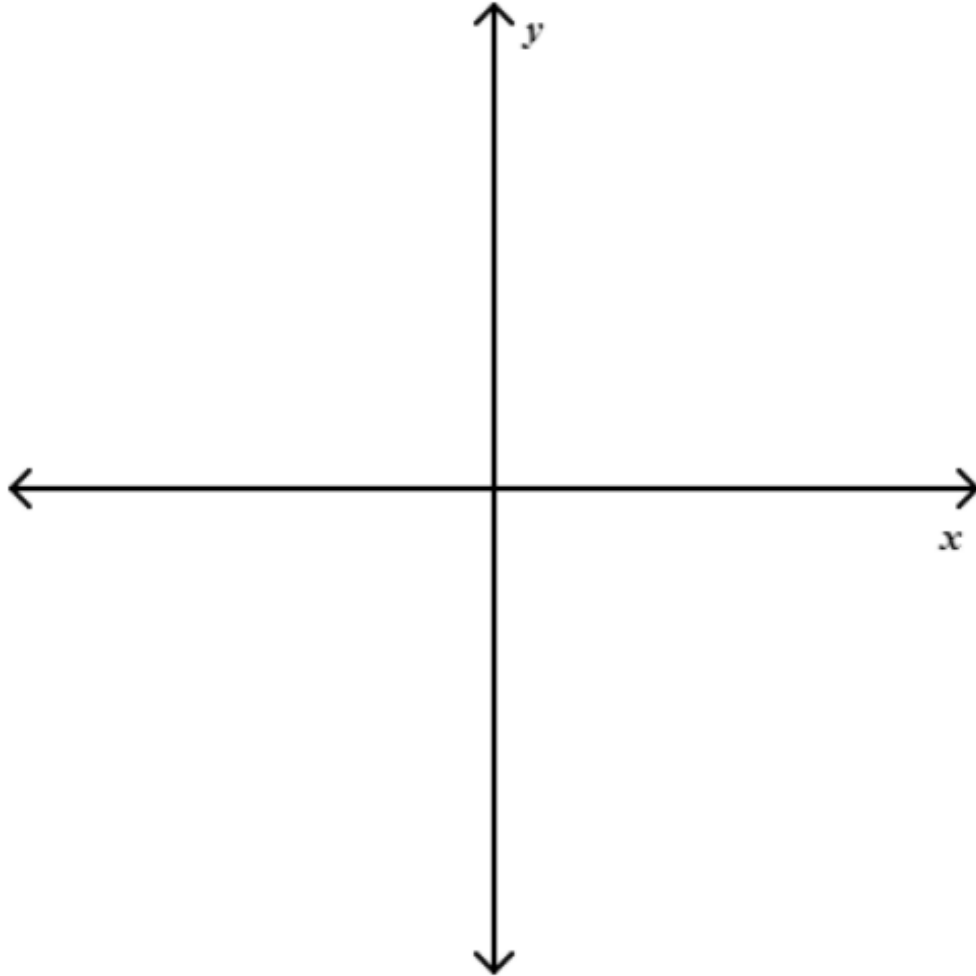
1. Graph: $f(x) = 2(x - 4)^2 - 24$

Identify all key points : Intercepts, Vertex, Axis of Symmetry.



2. Graph: $f(x) = -3(x-3)^2 + 24$

Identify all key points : Intercepts, Vertex, Axis of Symmetry.

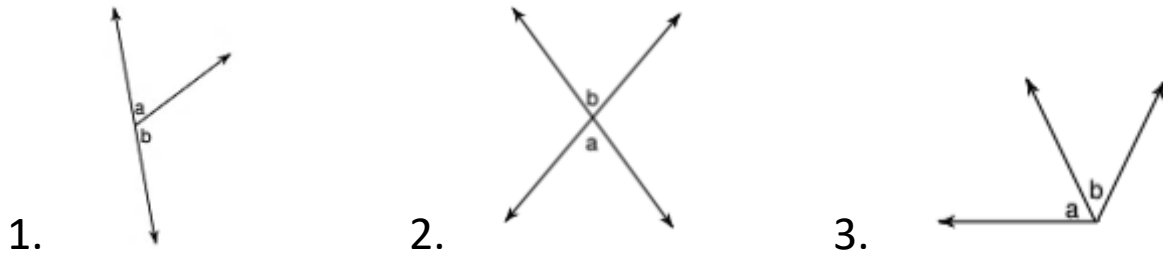


K. Angle Pair Relationships and the Pythagorean Theorem

<https://www.khanacademy.org/math/geometry-home/geometry-angles/geometry-vert-comp-supp/v/vertical-adjacent-and-linearly-paired-angles>

<https://www.youtube.com/watch?v=dA94zyaLuhk>

Name the Angle Pair Relationship (Complementary, Supplementary, Vertical or Adjacent)



Find the measure of angle b:



Find the missing side by using the Pythagorean theorem:

<https://www.youtube.com/watch?v=d8EA5TxGzcy>

<https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-geometry/cc-8th-pythagorean-theorem/v/the-pythagorean-theorem>



L. Finding the Perimeter and Circumference:

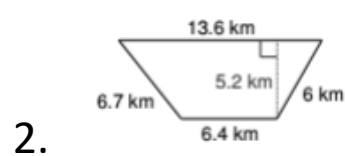
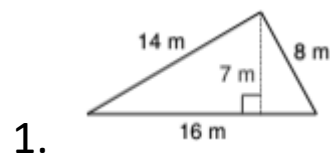
<https://www.khanacademy.org/math/cc-third-grade-math/3rd-perimeter/imp-perimeter/v/introduction-to-perimeter>

<https://www.youtube.com/watch?v=gtMKsFXjLHw>

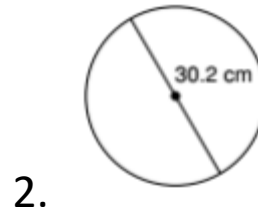
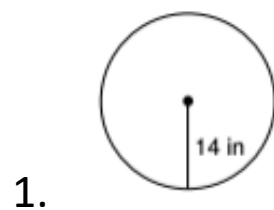
https://www.youtube.com/watch?v=w_sR3DHZt0

<https://www.youtube.com/watch?v=D4nGkWOPb6M>

Find the perimeter of each shape:



Find the Circumference of each circle:



M. Find the Area, Surface Area, and Volume

AREA

Triangle	$A = \frac{1}{2}bh$
Rectangle or Parallelogram	$A = bh$
Trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$

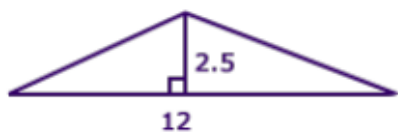
SURFACE AREA

	Lateral	Total
Prism	$S = Ph$	$S = Ph + 2B$
Pyramid	$S = \frac{1}{2}Pl$	$S = \frac{1}{2}Pl + B$
Cylinder	$S = 2\pi rh$	$S = 2\pi rh + 2\pi r^2$

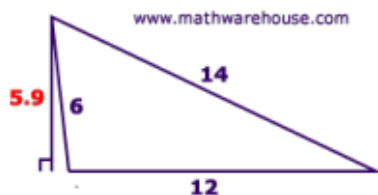
VOLUME

Prism or Cylinder	$V = Bh$
Pyramid or Cone	$V = \frac{1}{3}Bh$

1. Find the area of the triangle.

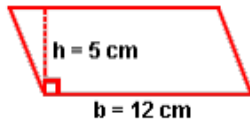


2. Find the area of the triangle.

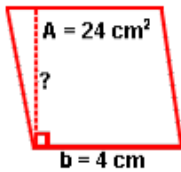


3. The perimeter of a rectangle is 20 centimeters. The length is 6 centimeters. What is the area of the rectangle? Be sure to draw and label a diagram.

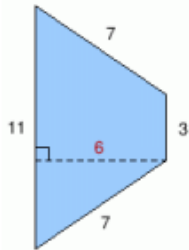
4. Find the area of the parallelogram.



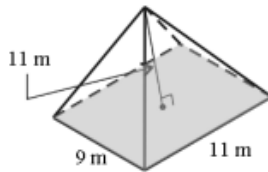
5. Find the height of the parallelogram.



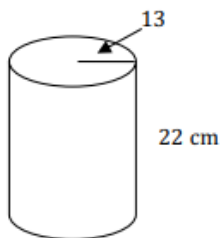
6. Find the area of the trapezoid.



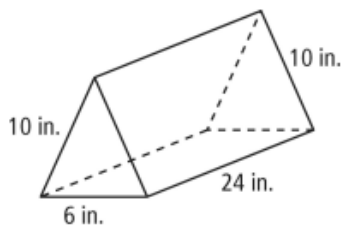
7. Find the volume of the pyramid. The base is rectangular.



8. A cylinder has a radius of 13 cm and a height of 22 cm. Find the surface area and volume.



9. Find the surface area and volume of the triangular prism below.



N. Skill Fluency

Objectives: The Student will be able to –

- Find factors of numbers.
- Find the Greatest Common Factor (GCF) of numbers.
- Add and Subtract Integers.
- Multiply and Divide Integers.
- Simplify Square Roots

Finding Factors and Common Factors:

1. Find all the factors of 48.
2. Find all the factors of 80.
3. Find the greatest common factor (GCF) of 24 and 64.
4. Find the greatest common factor (GCF) of 48 and 160.

Greatest Common Factor:

<https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-expressions-and-variables/cc-6th-gcf/v/greatest-common-divisor>

<https://www.youtube.com/watch?v=uE9O8N5JYB4>

Performing Operations with Signed Numbers:

1. Add: $2 + (-8) =$

2. $(-5) + (-9) =$

3. Subtract: $7 - (-9) =$

4. Subtract: $-3 - (-12) =$

5. Multiply: $4 \cdot (-8) =$

6. Multiply: $(-5) \cdot (-9) =$

7. Divide: $-20 \div (-4) =$

8. Divide: $\frac{24}{-6} =$

Operations with Integers:

<https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-negative-numbers-add-and-subtract/cc-7th-sub-neg-intro/v/adding-and-subtracting-negative-number-examples>

<https://www.khanacademy.org/math/arithmetic-home/negative-numbers/mult-divide-negatives/v/multiplying-and-dividing-negative-numbers>

<https://www.youtube.com/watch?v=7mxq8rkMdlM>

Simplify the square Roots:

1. Simplify: $\sqrt{36}$

2. Simplify: $\sqrt{8}$

3. Simplify: $\sqrt{20}$

4. Simplify: $\sqrt{48}$

Simplifying Square Roots

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:rational-exponents-radicals/x2f8bb11595b61c86:simplifying-square-roots/v/simplifying-square-roots-1>

https://www.youtube.com/watch?v=8UIXSvqH_Vs

Multiply and Simplify the square Roots:

1. $\frac{20\sqrt{50}}{4\sqrt{2}}$

2. $\frac{5\sqrt{320}}{\sqrt{50}}$

3. $\sqrt{5} \times \sqrt{45}$

4. $\sqrt{6} \times \sqrt{2}$

5. $5(\sqrt{10})^2$