

Geometry Summer Assignment Name: \_\_\_\_\_

**1. Solving equations**

<https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-variables-expressions/cc-7th-2-step-equations/v/why-we-do-the-same-thing-to-both-sides-two-step-equations>

a)  $2x - 16 = 8$

b)  $2y - 3 + 5y = 9$

c)  $7x + 9 = 13x - 27$

d)  $-8w + 34 = 5w - 18$

e)  $3(5x + 10) = 180$

f)  $\frac{1}{2}(9x + 14) = 59$

g)  $x^2 - 14 = 16$

h)  $5y^2 + 18 = 63$

## 2. Proportions and Fractions

<https://www.khanacademy.org/math/algebra-basics/core-algebra-foundations/algebra-foundations-decimal-operations/e/converting-fractions-to-decimals>

<https://www.khanacademy.org/math/algebra-basics/core-algebra-foundations/algebra-foundations-decimal-operations/v/finding-percentages-example>

<https://www.khanacademy.org/math/algebra-basics/core-algebra-linear-equations-inequalities/ratios-core-algebra/v/proportions-2-exercise-examples>

### Complete the table

Fraction	Decimal	Percent
$\frac{4}{5}$		
	1.05	
		8%
	0.015	
$1\frac{7}{8}$		

### Solve each proportion

a)  $\frac{5x}{7} = \frac{8}{9}$

b)  $\frac{2}{5} = \frac{3}{y}$

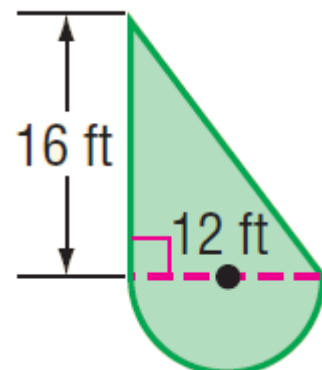
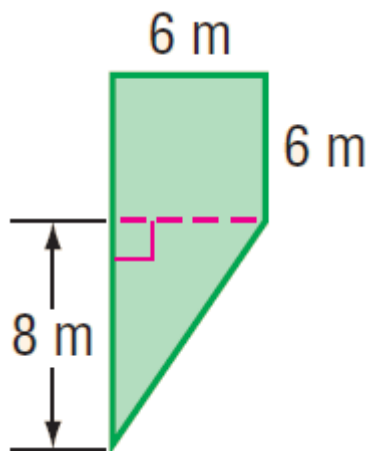
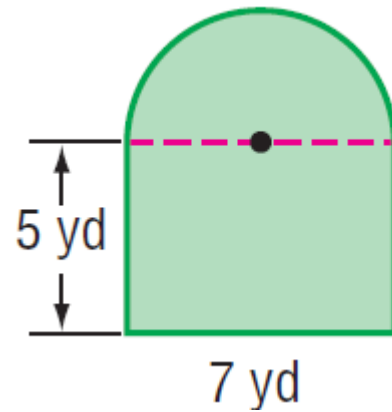
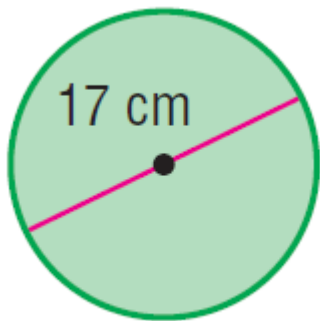
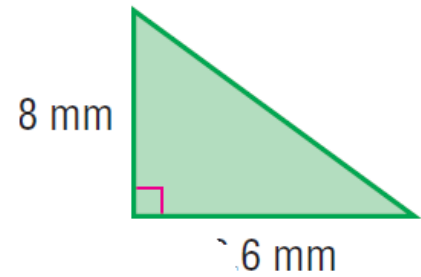
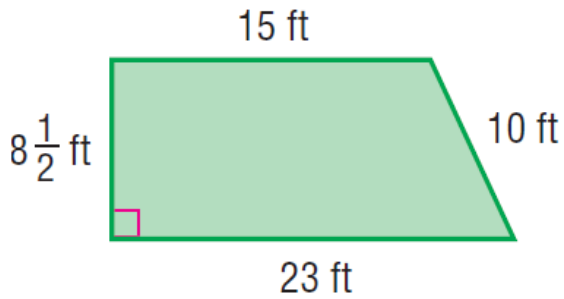
c)  $\frac{x-2}{4} = \frac{x+3}{6}$

d)  $\frac{2x-5}{6} = \frac{10}{3}$

3. Area and Perimeter. Find area and perimeter for each shape. (Leave answers for circles in terms of  $\pi$ )

<https://www.khanacademy.org/math/basic-geo/basic-geo-area-perimeter/basic-geo-area-perimeter-polygon/v/perimeter-and-area-basics>

[https://www.khanacademy.org/math/geometry/right\\_triangles\\_topic/pyth\\_theor/v/the-pythagorean-theorem](https://www.khanacademy.org/math/geometry/right_triangles_topic/pyth_theor/v/the-pythagorean-theorem)



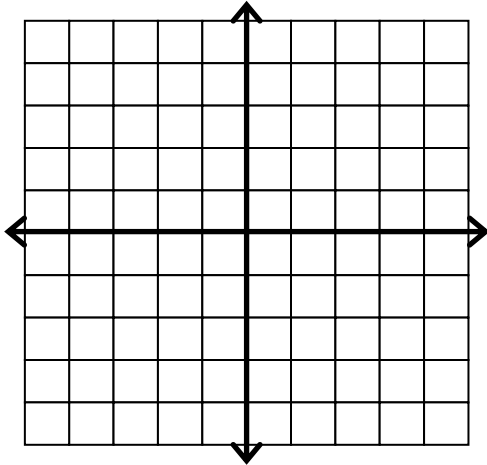
## 4. Linear equations

<https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-linear-equations-functions/8th-slope/v/graphing-a-line-in-slope-intercept-form>

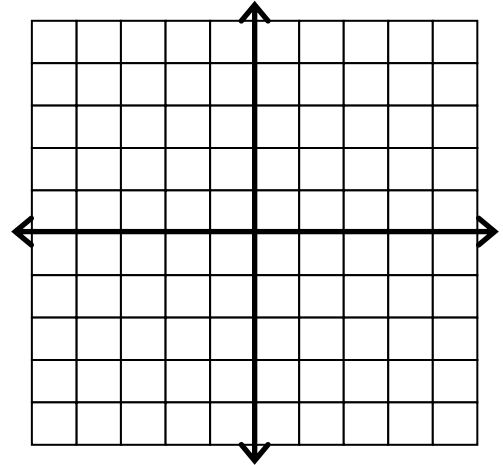
<https://www.khanacademy.org/math/algebra-basics/core-algebra-graphing-lines-slope/core-algebra-slope/v/slope-of-a-line>

**Graph each line.**

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



$$2x + 3y = 6$$



**List slope and x and y intercepts for the lines above.**

$$m = \underline{\hspace{2cm}}$$

$$x \text{ int} = \underline{\hspace{2cm}}$$

$$y \text{ int} = \underline{\hspace{2cm}}$$

$$m = \underline{\hspace{2cm}}$$

$$x \text{ int} = \underline{\hspace{2cm}}$$

$$y \text{ int} = \underline{\hspace{2cm}}$$

**Find the slope of the line through each pair of points and write an equation for the line through them in point-slope and slope intercept form.**

a) A(-5, 3) B(1, - 1)

b) C(9/2, 6) D(7, -4)

## 5. Quadratics and Parabolas

[https://www.khanacademy.org/math/algebra/quadratics/solving\\_graphing\\_quadratics/v/graphs-of-quadratic-functions](https://www.khanacademy.org/math/algebra/quadratics/solving_graphing_quadratics/v/graphs-of-quadratic-functions)

<https://www.khanacademy.org/math/algebra/multiplying-factoring-expression/factoring-simple-expressions/v/factor-polynomials-using-the-gcf>

<https://www.khanacademy.org/math/algebra/multiplying-factoring-expression/factoring-by-grouping/v/factor-by-grouping-and-factoring-completely>

<https://www.khanacademy.org/math/algebra/multiplying-factoring-expression/factoring-quadratic-expressions/v/factoring-quadratic-expressions>

<https://www.khanacademy.org/math/algebra2/polynomial-and-rational/quad-factoring/v/example-1-solving-a-quadratic-equation-by-factoring>

Graph the parabola  $y = x^2 - 2x - 3$

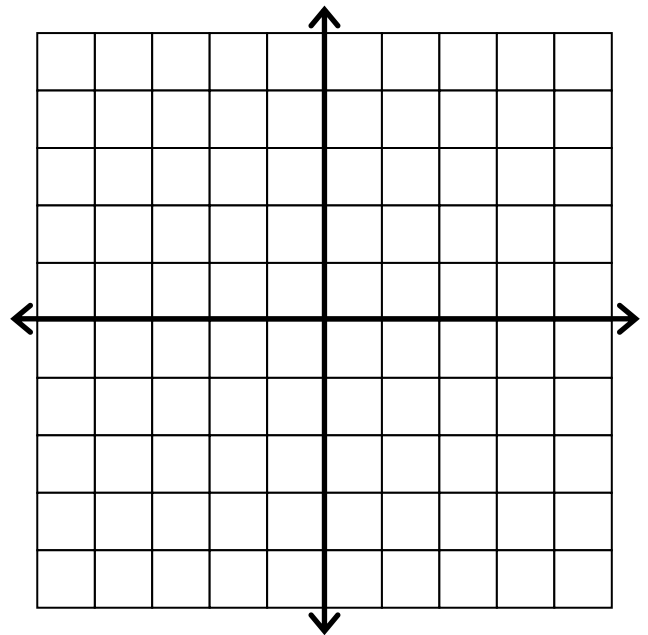
State each of the following

Vertex \_\_\_\_\_

Axis of Symmetry \_\_\_\_\_

Y intercept \_\_\_\_\_

X intercepts (roots) \_\_\_\_\_



Factor each of the following expressions

$$4x^2y - 10xy^2$$

$$30a^2b - 60ab^2 + 90a^2b^2$$

$$x^2 + 15x + 56$$

$$5y^2 - 12x - 9$$

Solve each equation

$$(y - 5)(2y + 3) = 0$$

$$x^2 - 11x + 10 = 0$$

## 6. Simplify each of the following expressions

<https://www.khanacademy.org/math/algebra-basics/core-algebra-foundations/square-roots-for-college/v/understanding-square-roots>

<https://www.khanacademy.org/math/algebra/exponent-equations/exponent-properties-algebra/v/exponent-properties-4>

[http://www.regentsprep.org/regents/math/algebra/AV3/Smul\\_bin.htm](http://www.regentsprep.org/regents/math/algebra/AV3/Smul_bin.htm)

<https://www.khanacademy.org/math/algebra/introduction-to-algebra/manipulating-expressions/v/combining-like-terms-and-the-distributive-property>

$$-\sqrt{275}$$

$$3\sqrt{12}$$

$$\sqrt{\frac{36}{25}}$$

$$2\sqrt{54} - 3\sqrt{96}$$

$$\sqrt{3}(\sqrt{5} + \sqrt{3})$$

$$(4a^2bc)(-2b^3c^2)$$

$$4ab(3a^2 - 7b)$$

$$(6g - 7)(6g + 7)$$

$$\frac{15x^4 y^2 z^5}{3x^2 z^3}$$

$$5(5 + t) - 3(t - 6)$$

## 7. Solve each system of equations.

Elimination: <https://www.youtube.com/watch?v=K9IG-aCHCSE>

Substitution: [https://www.youtube.com/watch?v=cwHR\\_B9zK7k](https://www.youtube.com/watch?v=cwHR_B9zK7k)

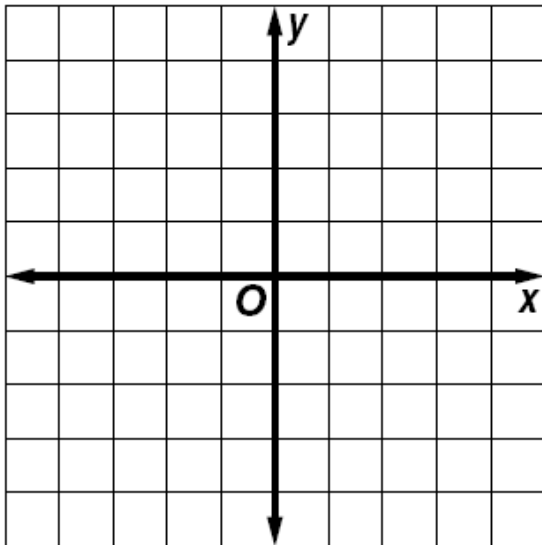
$$\begin{aligned} y &= 6x \\ 2x + 3y &= -20 \end{aligned}$$

$$\begin{aligned} 2x - 4y &= -22 \\ 3x + 3y &= 30 \end{aligned}$$

Solve the system by graphing.

$$2x - y = 1$$

$$y = -3$$



### 8. Simplify each expression (Number Sense)

<http://www.virtualnerd.com/middle-math/number-algebraic-sense/order-operations/simplify-expression-order-operations>

$$15 + (-19) - 8 + (-5)$$

$$-76 - - 57$$

$$18 - 29$$

$$(-23) + (-42) + (91)$$

$$5 - 6(-4 + 3)$$

$$23 + 8(-9 - 7)$$



$$(-9)(3)(-1)(-4)$$

$$-6^2 - 4(-3)^2$$

$$7^2 - 8(2 - 9)$$

$$-4^3 + 8(-3)(-2)$$

Evaluate each of the following if  $x = -5$ ,  $y = 7$ , and  $z = -3$

$$xy - z$$

$$x^2y + z^3$$

$$x(yz - x^2)$$

$$x + y + z - xyz$$

## 9. Simplify each rational expression.

<https://www.youtube.com/watch?v=-YMVu5nFvzc>

<https://www.youtube.com/watch?v=Znm2F09whmY>

$$\frac{3}{4} + \frac{5}{6} - \frac{2}{3}$$

$$2\frac{1}{5} - 4\frac{1}{3}$$

$$\frac{3}{4} \left( 5 + 4\frac{1}{2} \right)$$

$$3\frac{1}{4} \times 2\frac{4}{5}$$

$$\frac{3}{4} \div \frac{5}{6}$$

$$1\frac{2}{3} \div \frac{5}{6}$$

Evaluate if  $a = 1/3$ ,  $b = 2.5$  and  $c = 4/7$












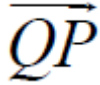
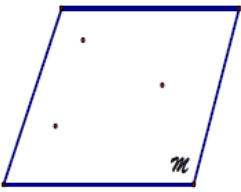


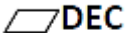



$$a(b + c)$$

$$a - b \div c$$

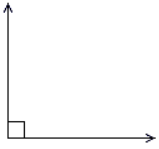
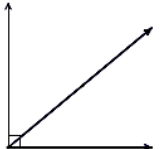
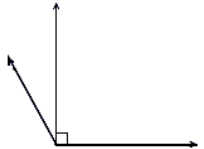
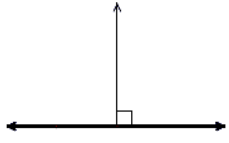
**GEOMETRY REVIEW/PREVIEW (REFERENCE SHEETS)**

You should know the following vocabulary from previous math classes. Please review the terms and definitions.

The three undetermined terms in geometry are: point, line and plane. These are also called the “Building Blocks of Geometry” because everything is based on these 3 ideas. We are able to describe them but not able to define them.

Vocabulary Term	Description/Definition	Diagram	Symbol Explanation	Symbol
Point	A <b>point</b> is the basic unit in geometry. It has no size – infinitely small. It represents locations. Use a dot to represent a point.		Name a point by using a capital printed letter.	<b>A</b>
Line	A <b>line</b> is a straight arrangement of points – it is made up of an infinite number of points. It extends infinitely in two directions but has no thickness.		Name a line by using 2 points that are on the line and putting  above these 2 letters. The letters may be in any order.	 
Line Segment	A <b>line segment</b> consists of 2 points and all the points between them that lie on the line containing them.		Name a line by using 2 points that are on the line and putting  above the 2 letters. The letters may be in any order.	 
Ray	A <b>ray</b> is a part of a line. It contains one endpoint and all of the points on that line to one side of it.		Always name a ray by two points. First name the endpoint, then name the point that it goes through. Put a ray <u>symbol</u>  above the letters: Note: the ray symbol always faces to the right, no matter which way the ray is facing.	
Plane	A <b>plane</b> has length and width but no thickness – it is a flat surface that extends indefinitely.		Name a plane by either 3 points that are on the plane or a capital script letter that can be found in the corner of the plane.  Note: you may not name a plane with 3 points that are all on the same line.	       plane $\mu$ $\mu$

- Angles

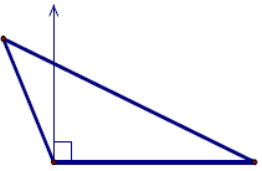
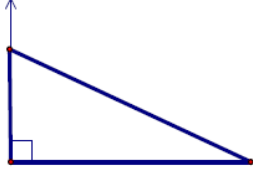
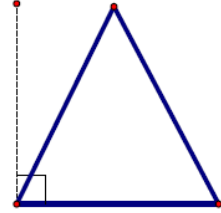
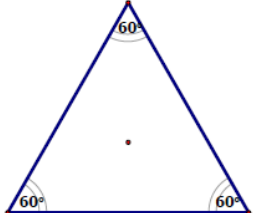
<p><b>Right Angle:</b> measures exactly <math>90^\circ</math></p> 	<p><b>Acute Angle:</b> Measures more than <math>0^\circ</math> and less than <math>90^\circ</math></p> 	<p><b>Obtuse Angle:</b> Measures more than <math>90^\circ</math> and less than <math>180^\circ</math></p> 	<p><b>"Straight Angle":</b> Measures <math>180^\circ</math></p> 
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- Polygons

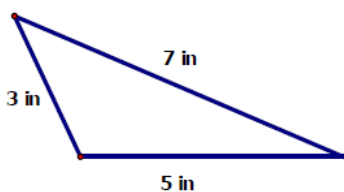
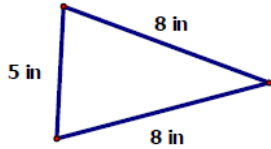
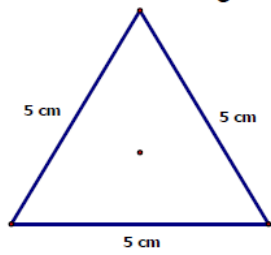
# of Sides	Name
3	Triangle
4	Quadrilateral
5	Pentagon
6	Hexagon

# of Sides	Name
7	Septagon
8	Octagon
9	Nonagon
10	Decagon

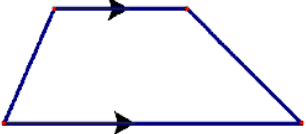
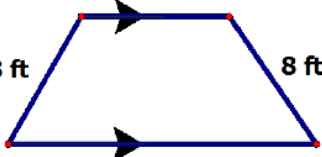
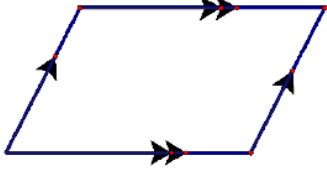
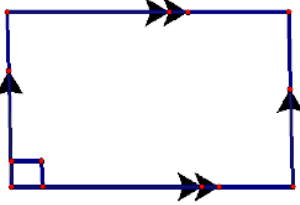
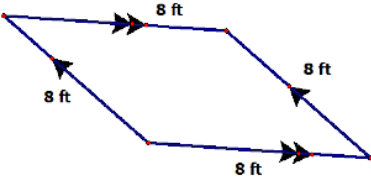
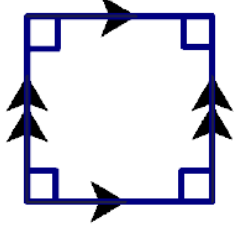
- There are special kinds of triangles. Triangles may be classified by their angle measures.

<p><b>Obtuse Triangle:</b> has one obtuse angle and two acute angles</p> 	<p><b>Right Triangle:</b> has one right angle and two acute angles</p> 	<p><b>Acute Triangle:</b> has three acute angles</p> 	<p><b>Equiangular Triangle:</b> special kind of acute triangle, all 3 angles measure <math>60^\circ</math></p> 
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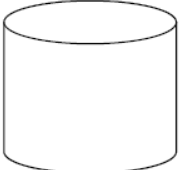

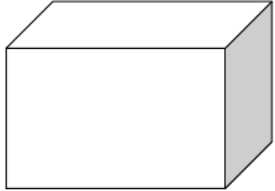
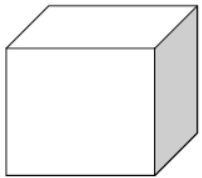
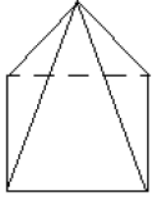
Triangles may also be classified by their side lengths.

<p><b>Scalene Triangle:</b> no sides are the same length</p> 	<p><b>Isosceles Triangle:</b> at least two sides are the same length</p> 	<p><b>Equilateral Triangle:</b> all three sides are the same length</p> 
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- There are special kinds of quadrilaterals.

<p><b>Trapezoid:</b> has one pair of parallel sides (called bases... shown to be parallel by use of arrows)</p> 	<p><b>Isosceles Trapezoid:</b> has one pair of parallel sides and the other two sides are the same length</p> 	<p><b>Parallelogram:</b> has two pairs of parallel sides</p> 
<p><b>Rectangle:</b> parallelogram with four right angles</p> 	<p><b>Rhombus:</b> parallelogram with four sides that are the same length</p> 	<p><b>Square:</b> parallelogram with four right angles and four sides that are the same length</p> <p>All sides measure 5 feet</p> 

- Three dimensional figures

<p><b>Cone</b></p> 	<p><b>Cylinder</b></p> 	<p><b>Sphere</b></p> 
<p><b>Rectangular Prism</b></p> 	<p><b>Cube (prism with 6 square faces that are the same size)</b></p> 	<p><b>Pyramid</b></p> 

$\pi$  equals approximately 3.14

Circumference	circle	$C = 2\pi r$
Area	triangle	$A = \frac{1}{2}bh$
	trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$
	circle	$A = \pi r^2$
Surface Area	right cylinder	$S = 2\pi rh + 2\pi r^2$
	sphere	$S = 4\pi r^2$

Volume

rectangular prism	$V = lwh$
cylinder	$V = \pi r^2 h$
cone	$V = \frac{1}{3}\pi r^2 h$
sphere	$V = \frac{4}{3}\pi r^3$

Pythagorean Theorem

right triangle	$a^2 + b^2 = c^2$
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