SUMMER MATH FUN
GEOMETRY

Dear Parents/Guardians and Students:

I hope you are all excited for summer break and the time to rest up and get refreshed so that you are ready for a challenging year of Geometry.

Below you will find the summer assignment questions. They have been broken up into 10 core topics. This assignment will be due on August 16, 2019.

I would suggest that you to try to **NOT** use a calculator to solve these problems. When you find yourself unable to answer a question, do not skip it – research it. That research can be in the form of a parent, a friend, free on-line help like KHAN academy. Khan academy is user-friendly and offers excellent explanations. Definitely check it out as a resource..

For the summer:

1. Complete the summer packet.
2. Create YOUR own account on KHAN academy.
   - If you do not have an email sign up for one on GMAIL.
   - After creating your KHAN academy account, please go to khanacademy.org/coaches and type in:

S9D8D52P

This will enable me to see your progress and post assignments on KHAN academy You will also be able to add other coaches so other teachers can follow you if need be.

If a student needs assistance I will be available this summer for help from

9:00-11:00 on the follwing dates:

June 11, June 18, June 25, July 2, July 9, July 16, July 23, July 30, August 6 and August 8

If something comes up and I can not make it a particular day, I will have Fr. Black send an email and post on Facebook.

We will meet in the school library, please bring the summer packet and a pencil.

There is plenty of math to learn this year. It will be much easier to begin Geometry if all students remember what they learned in Algebra. Hopefully this packet will give you a jump-start to Geometry.

I am looking forward to a successful and productive 2019-2020 school year. Enjoy your summer and I look forward to seeing you in August. Go Saints!

Thanks,

Margaret Klee

mklee@stpatschool.com

TOPIC 1: Solve One-Step Equations

Example 1

a. Solve for x.

$x+7=10$

$x+7=10$ **(Isolate x, think opposite of $+7$)**

$-7=-7$ **(Subtract 7 from both sides)**

$x=3$

b. Solve for x.

$\frac{x}{7}=3$

$\frac{x}{7}=3$ **(Isolate x, think opposite of $\div 7$)**

$(7)\frac{x}{7}=3(7)$ **(Multiply both sides by 7)**

$x=21$

Solve for x. Circle your final answer. Show ALL work.

1. $x+2=13$

2. $4x=48$

3. $x+9=8$

4. $x-5=-5$

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

6. $x+14=7$

7. $x-10=23$

8. $-6=\frac{x}{3}$

9. $-6+x=-13$

10. $\frac{2}{3}x=8$

11. $5x=35$

12. $18=-3x$

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TOPIC 2: Solve Two-Step Equations

Example 1

a. Solve for x.

$2x+8=14$

$2x+8-8=14-8$ Subtract 8 from both sides

$2x=6$

$\frac{2x}{2}=\frac{6}{2}$ Divide by 2 on both sides

$x=3$

b. Solve for x.

$\frac{x}{5}-3=-6$

$\frac{x}{5}-3+3=-6+3$ Add 3 to both sides

$\frac{x}{5}=-3$

$5\cdot\frac{x}{5}=-3\cdot 5$ Multiply by 5 on both sides

$x=-15$

Solve for x. Circle your final answer. Show ALL work.

1. $2x+4=12$
2. $-3x+8=-4$
3. $15=-x-7$
4. $5x-4=21$
5. $-8=\frac{x}{2}+3$
6. $\frac{x}{5}-3=10$
7. $\frac{x}{4}+5=16$
8. $6x+8=5$
9. $\frac{2}{3}x-1=11$

TOPIC 3: Multi- Equations

Problem

What is the solution of $-3y + 8 + 13y = -52$?

$-3y + 13y + 8 = -52$	Group the terms with y together so that the like terms are grouped together.
$10y + 8 = -52$	Add the coefficients to combine like terms.
$10y + 8 = -52$ $-8 \quad -8$	To get the variable term by itself on the left side, subtract 8 from each side.
$10y = -60$	Simplify.
$\frac{10y}{10} = \frac{-60}{10}$	Divide each side by 10 since y is being multiplied by 10 on the left side. This isolates y.
$y = -6$	Simplify.

Problem

What is the solution of $-2(3n - 4) = -10$?

$26n + 8 = -10$	Distribute the –2 into the parentheses by multiplying each term inside by –2.
$-6n + 8 = -10$ $-8 \quad -8$	To get the variable term by itself on the left side, subtract 8 from each side.
$-6n = -18$	Simplify.
$\frac{-6n}{-6} = \frac{-18}{-6}$	Divide each side by –6 since n is being multiplied by –6 on the left side. This isolates n.
$n = 3$	Simplify.

Solve each equation. Check your answer.

1. $4 - 6h - 8h = 60$ **2.** $-32 = -7n - 12 + 3n$ **3.** $14 + 12 = -15x + 2x$

4. $8(-3d + 2) = 88$ **5.** $-22 = -(x - 4)$ **6.** $35 = -5(2k + 5)$

7. $3m + 6 - 2m = -22$ **8.** $4(3r + 2) - 3r = -10$ **9.** $-18 = 15 - 3(6t + 5)$

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TOPIC 4: Solving Equations with Variables on Both Sides

Solving Equations with Variables on Both Sides

Problem

What is the solution of $2m - 4 + 5m = 13 - 6m - 4$?

$7m - 4 = -6m + 9$	Add the terms with variables together on the left side and the constants on the right side to combine like terms.
$7m - 4 = -6m + 9$ $+6m \quad +6m$	To move the variables to the left side, add $6m$ to each side.
$13m - 4 = 9$	Simplify.
$13m - 4 = 9$ $+4 \quad +4$	To get the variable term alone on the left, add 4 to each side.
$13m = 13$	Simplify.
$\frac{13m}{13} = \frac{13}{13}$	Divide each side by 13 since x is being multiplied by 13 on the left side. This isolates x.
$m = 1$	Simplify.

Problem

What is the solution of $3(5x - 2) = -3(x + 6)$?

$15x - 6 = -3x - 18$	Distribute 3 on the left side and -3 on the right side into the parentheses by multiplying them by each term inside.
$15x - 6 = -3x - 18$ $+6 \quad +6$	To move all of the terms without a variable to the right side, add 6 to each side.
$15x = -3x - 12$	Simplify.
$15x = -3x - 12$ $+3x \quad +3x$	To get the variable terms to the left side, add $3x$ to each side.
$18x = -12$	Simplify.
$\frac{18x}{18} = -\frac{12}{18}$	Divide each side by 18 since x is being multiplied by 18 on the left side. This isolates x.
$x = -\frac{2}{3}$	Simplify and reduce the fraction.

Solve each equation. Check your answer.

1. $-5x + 9 = -3x + 1$ **2.** $14 + 7n = 14n + 28$ **3.** $22(g - 1) = 2g + 8$

4. $-d + 12 - 3d = 5d - 6$ **5.** $4(m - 2) = -2(3m + 3)$ **6.** $-(4y - 8) = 2(y + 4)$

7. $5a - 2(4a + 5) = 7a$ **8.** $11w + 2(3w - 1) = 15w$ **9.** $4(3 - 5p) = -5(3p + 3)$

TOPIC 5: Solving Proportions

Objective: To solve a proportion using cross-multiplication.

Example 1
Solve for x.

$$\frac{x}{4}=\frac{21}{7}$$

$$\frac{x}{4}\times\frac{21}{7}$$ (Cross-multiply)

$$7x=82$$

$$\frac{7x}{7}=\frac{82}{7}$$ (Divide both sides by 7)

$$x=12$$

Reminder:

Cross-multiplying creates an equation that you already know

Solve each proportion for x using cross multiplication. Circle your final answer. Show ALL work.

1. $\frac{x}{9}=\frac{4}{12}$

2. $\frac{5}{x}=\frac{9}{27}$

3. $\frac{7}{16}=\frac{x}{32}$

4. $\frac{x}{35}=\frac{2}{5}$

5. $\frac{1}{3}=\frac{2x}{18}$

6. $\frac{20}{12}=\frac{5}{3x}$

7. $\frac{x-2}{4}=\frac{x+3}{6}$

8. $\frac{2x-5}{6}=\frac{10}{3}$

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TOPIC 6: Pythagorean Theorem

Objective: To find the missing side in a right triangle using Pythagorean Theorem

Steps: (Solving for a missing side in a right triangle)

1. Identify the legs and hypotenuse of the right triangle
2. Substitute the values into the formula $a^2 + b^2 = c^2$
3. Solve the equation for the missing side.

Example: (Finding a leg)

$a^2 + 24^2 = 26^2$

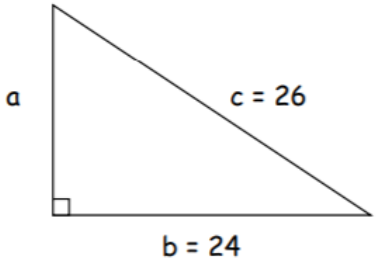
$a^2 + 576 = 676$

$a^2 = 676 - 576$

$a^2 = 100$

$a = \sqrt{100}$

$a = 10$



Example: (Finding the hypotenuse)

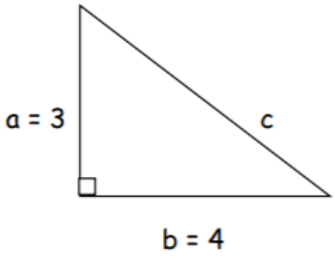
$3^2 + 4^2 = c^2$

$9 + 16 = c^2$

$25 = c^2$

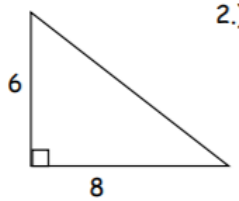
$\sqrt{25} = c^2$

$5 = c$



Find the missing side in each of the following right triangles.

1.)



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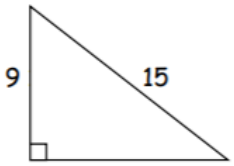

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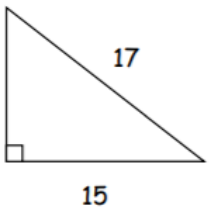

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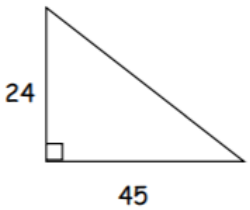
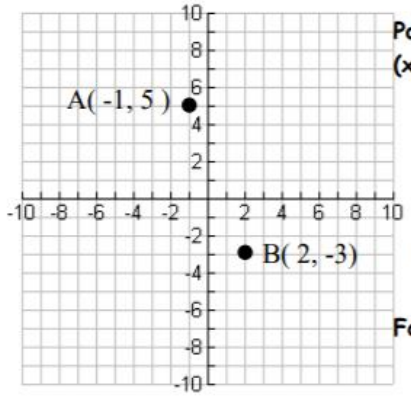


TOPIC 7 –The Coordinate Plane

Objective: To plot points on a coordinate plane.

Example 1

Plot the points $A(-1, 5)$ and $B(2, -3)$ on the coordinate plane.
Label the points using their coordinates.



Points can be located on the plane using an ordered pair (x,y).

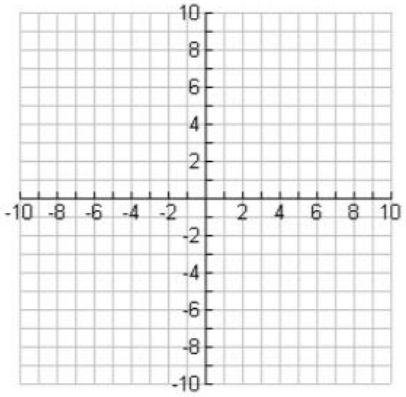
(x-coordinate, y-coordinate)
left or right, up or down
(-) (+) (+) (-)

For $(-1, 5)$ you must travel LEFT 1 (-1) and UP 5.

For $(2, -3)$ you must travel RIGHT 2 and DOWN 3 (-3).

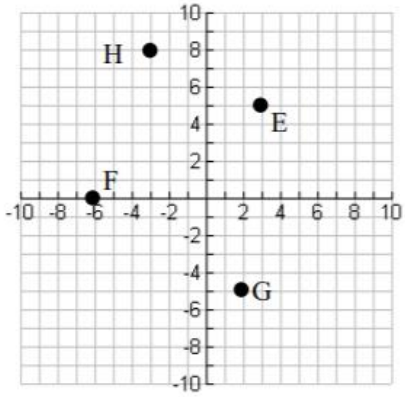
Plot the points on the coordinate plane and label them.

1. $A(4, 5)$
2. $B(-3, -2)$
3. $C(0, -4)$
4. $D(1, -5)$



Name the ordered pair where each point is located.

5. E
6. F
7. G
8. H



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TOPIC 8: Quadratic Formula

Hints/Guide:

- **Assume that the radical extends over the whole expression** $b^2 - 4ac$ **.**
- Equation must be in the form $ax^2 + bx + c = 0$ (standard form) to begin.
- Try to factor first.
- If you cannot find factors, then use the quadratic formula.

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Example:

Solve $x^2 = 4x + 7$

Write the equation in standard form: $x^2 - 4x - 7 = 0$

Identify a, b, and c for the formula: a = 1, b = -4, c = -7

Substitute into the formula: $x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-7)}}{2(1)}$

Simplify: $x = \frac{4 \pm \sqrt{16 + 28}}{2}$

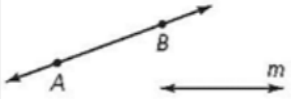
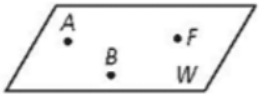
Separate into two solutions: $x = \frac{4 + \sqrt{44}}{2}$ and $x = \frac{4 - \sqrt{44}}{2}$

Solutions: $x = 5.32$ and $x = -1.32$

Exercises: Solve using the quadratic formula. Be sure the equation is in standard form before using the quadratic formula. Show all work.

1. $x^2 - 4x = 21$
2. $x^2 = 6x - 9$
3. $3x^2 - 7x + 4 = 0$

TOPIC 9: Introduction to Points, Lines and Planes

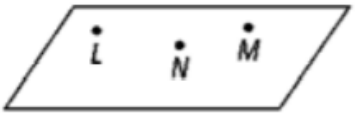
Term	Examples of Labels	Diagram
Point	Italicized capital letter: *D*	
Line	Two capital letters with a line drawn over them: $\overleftrightarrow{AB}$ or $\overleftrightarrow{BA}$ One italicized lowercase letter: *m*	
Line Segment	Two capital letters (called endpoints) with a segment drawn over them: $\overline{AB}$ or $\overline{BA}$	
Ray	Two capital letters with a ray symbol drawn over them: $\overrightarrow{AB}$	
Plane	Three capital letters **(points)**: *ABF, AFB, BAF, BFA, FAB,* or *FBA* One capital letter **(NOT a point)**: *W*	

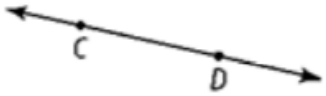
Remember:

1. When you name a ray, an arrowhead is not drawn over the beginning point. The arrowhead also ***always*** points to the right.
2. When you name a plane with three points, choose no more than two collinear points.
3. An arrow indicates the direction of a path that extends without end.
4. A plane is represented by a parallelogram. However, the plane actually has no edges. It is flat and extends forever in all directions.

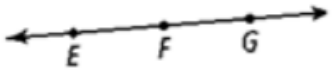
Identify each figure as a *point, segment, ray, line,* or *plane,* and name each.

1. 

2. 

3. 

4. 

5. 

6. 

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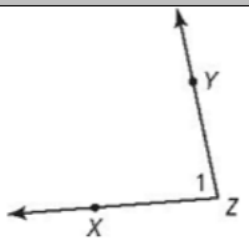
TOPIC 10: Angles

Introduction to Geometry: Angles

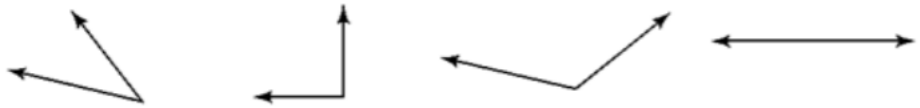
The *vertex* of an angle is the common endpoint of the rays that form the angle. In the diagram to the right, the vertex is point Z. An angle may be named by its vertex. It may also be named by a number or by a point on each ray and the vertex (in the middle).

This is $\angle Z$, $\angle XZY$, $\angle YZX$, or $\angle 1$.

It is *not* $\angle ZYX$, $\angle XYZ$, $\angle YXZ$, or $\angle ZXY$.



Angles are measured in *degrees*, and the measure of an angle is used to classify it.



The measure of an *acute* angle is between 0 and 90.

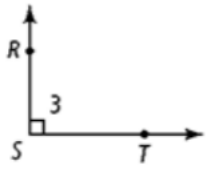
The measure of a *right* angle is 90.

The measure of an *obtuse* angle is between 90 and 180.

The measure of a *straight* angle is 180.

Exercises

Use the figure at the right for Exercises 1 and 2.



1. What are three other names for $\angle S$?
2. What type of angle is $\angle S$?
3. Name the vertex of each angle.
   a. $\angle LGH$ **b.** $\angle MBX$

Classify the following angles as *acute*, *right*, *obtuse*, or *straight*.

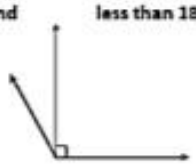
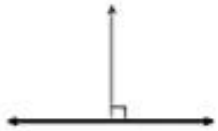
4. $m\angle LGH = 14$ **5.** $m\angle SRT = 114$

6. $m\angle SLI = 90$ **7.** $m\angle 1 = 139$

8. $m\angle L = 179$ **9.** $m\angle P = 73$

SOME IMPORTANT DEFINITIONS & FORMULAS

- Angles

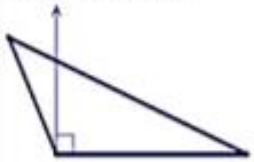
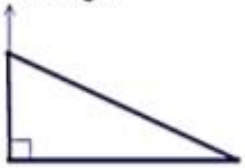
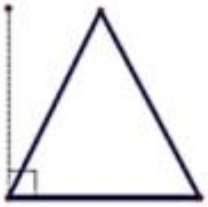
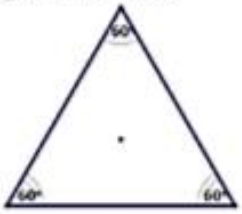
Right Angle: measures exactly 90°	Acute Angle: Measures more than 0° and less than 90°	Obtuse Angle: Measures more than 90° and less than 180°	"Straight Angle": Measures 180°
			

- Polygons

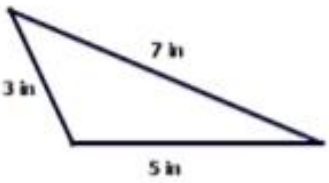
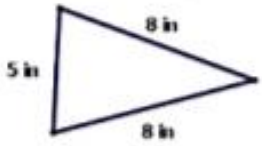
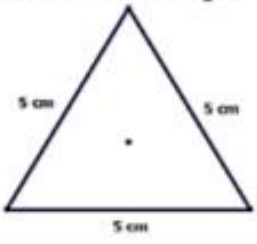
# of Sides	Name
3	Triangle
4	Quadrilateral
5	Pentagon
6	Hexagon

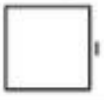
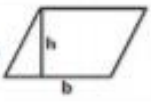
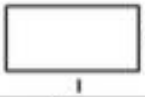
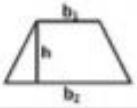
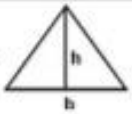
# of Sides	Name
7	Septagon
8	Octagon
9	Nonagon
10	Decagon

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

Obtuse Triangle: has one obtuse angle and two acute angles	Right Triangle: has one right angle and two acute angles	Acute Triangle: has three acute angles	Equiangular Triangle: special kind of acute triangle, all 3 angles measure 60°
			

Triangles may also be classified by their side lengths.

Scalene Triangle: no sides are the same length	Isosceles Triangle: at least two sides are the same length	Equilateral Triangle: all three sides are the same length
		

Shape	Formula		
Square 	$A = l \times l = l^2$	Parallelogram 	$A = h \times b$
Rectangle 	$A = l \times w$	Trapezoid 	$A = 1/2 \times h \times (b_1 + b_2)$
Triangle 	$A = 1/2 \times b \times h$	Circle 	$A = \pi \times r^2$ ($\pi = 3.14$ or $22/7$)