St. Mary's Academy
Algebra + Geometry Challenge Exam Review Sheet
(To place into Algebra 2)

The Algebra + Geometry Challenge Exam is for students hoping to enroll in Algebra 2 for their freshman year at SMA. These students must have taken both Algebra 1 and Geometry in middle school. The following topics will be tested on the Algebra + Geometry Challenge Exam. All topics can be found in any standard Algebra textbook and Geometry textbook.

ALGEBRA TOPICS:

| General Topic	Specific Skills
Simplifying Expressions with and without Variables	Order of operations Addition and subtraction of signed numbers Using the distributive property Combining like terms Multiplying and dividing signed numbers Multiplying a monomial and a polynomial Multiplying two binomials Multiplying a binomial and a trinomial Expressions with Absolute value
Area and Perimeter	Solving a problem given area and/or perimeter of an object.
Solving Linear Equations	Solving equations with variables on one side Solving equations with variables on both sides Solving equations involving parentheses Solving equations involving like terms. Writing and Solving proportional equations.
Graphing on the Coordinate Plane	Graphing Ordered pairs Graphing Linear equations from: • a table of values • an equation with slope and y-intercept
Working with Linear Functions	Rates of change and slope Identify a graph, table, or word problem as linear or non-linear Identify slope & y-intercept from a graph or word problem Write equation of a line given: • slope and y-intercept • 2 points on the line • slope and one point on the line • standard form of a line • a situation that follows a linear pattern • a table that follows a linear pattern
Solving Linear Inequalities	Same skills as listed under "Solving Linear Equations", but with inequalities
Solving Systems of Equations	Using substitution Using the addition/subtraction (elimination) method By graphing Writing a system and solving from a word problem

| Graphing Linear Inequalities | Graphing solutions to an inequality on a number line |
	Graphing solutions to a two-variable inequality on a graph
Patterns	Observing and representing patterns using math.
Function Notation	Understanding and using f(x) notation.
Quadratic Functions	Drawing a quadratic function from a table of values
	Solving a quadratic by using the Quadratic Formula (will be provided).
	Solving a quadratic by factoring and/or the zero-product property.
Factoring Methods	Factoring out a common monomial factor
	Factoring a trinomial expression
	Factoring a difference of two perfect squares
Exponential Functions	Sketching an exponential function based on an equation
	Using the initial value and growth factor to write an equation.
Simplifying Exponential Expressions	Multiplying and dividing exponential expressions.
	Simplifying expressions with negative exponents
	Powers of exponential expressions.

GEOMETRY TOPICS:

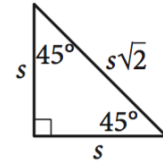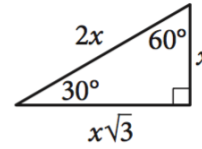| Definitions | Pythagorean Theorem |
	Converse of the Pythagorean Theorem
	Parts of a Circle
	Vertical Angles
Lines & Angles	Estimating the measure of an angle
	Parallel/perpendicular lines & the angle measures around them
	Constructing perpendiculars
Polygons	Isosceles/equilateral triangles and their properties
	Triangle Inequality
	Convex/nonconvex
	Types of quadrilaterals
	Sums of interior angle measures in polygons
Triangle Congruence	Paragraph & Two-column proofs
	Triangle congruence theorems
	Triangle congruence proofs
	Properties of regular polygons and parallelograms
Measurement	Perimeter/circumference
	Areas of triangles, quadrilaterals, circles and sectors
	Pythagorean Theorem
Surface Area & Volume	Prisms, cylinders, spheres
	Nets
Coordinate Geometry	Distance between 2 points
	Distance formula
	Midpoint formula
	Slopes of parallel and perpendicular lines
	Equations for circles
Similarity	Ratios & Proportions
	Similar Figures
	Fundamental Theorem of Similarity
Trigonometry	Right triangle trigonometry
	Law of Sines
	Law of Cosines
	Special right triangles (45-45-90 and 30-60-90)

Geometry Formula Sheet*
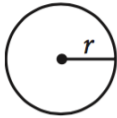
$A = \pi r^2$

$C = 2\pi r$
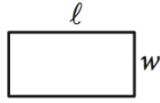
$A = \ell w$
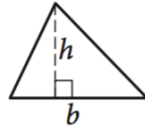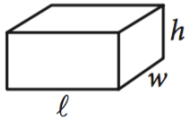
$A = \dfrac{1}{2}bh$
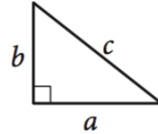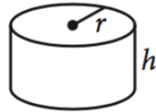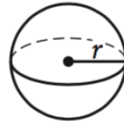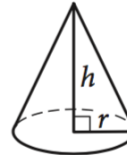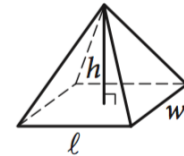
$c^2 = a^2 + b^2$

Special Right Triangles

$V = \ell w h$

$V = \pi r^2 h$

$V = \dfrac{4}{3}\pi r^3$

$V = \dfrac{1}{3}\pi r^2 h$

$V = \dfrac{1}{3}\ell w h$

---

* This Geometry Formulas sheet will be provided on the Exam