



## St. Mary's Academy

# Algebra + Geometry Challenge Exam Review Sheet

*(To place into Algebra 2/Trig)*

The Algebra + Geometry Challenge Exam is for students hoping to enroll in Algebra 2/Trig 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)	<ul style="list-style-type: none"><li>• Order of operations</li><li>• Using the distributive property</li><li>• Combining like terms</li><li>• Multiplying a monomial and a polynomial</li><li>• Multiplying two binomials</li><li>• Multiplying a binomial and a trinomial</li><li>• Expressions with absolute value</li></ul>
Area and Perimeter	<ul style="list-style-type: none"><li>• Solving a problem given area and/or perimeter of an object</li></ul>
Solving Linear Equations	<ul style="list-style-type: none"><li>• Solving equations with variables on one side</li><li>• Solving equations with variables on both sides</li><li>• Solving equations involving parentheses</li><li>• Solving equations involving like terms</li><li>• Writing and solving proportional equations</li></ul>
Graphing on the Coordinate Plane	<ul style="list-style-type: none"><li>• Graphing Ordered pairs</li><li>• Graphing Linear equations from:<ol style="list-style-type: none"><li>1. a table of values</li><li>2. an equation with slope and y-intercept</li></ol></li></ul>
Working with Linear Functions	<ul style="list-style-type: none"><li>• Rates of change and slope</li><li>• Identify a graph, table, or word problem as linear or non-linear</li><li>• Identify slope &amp; y-intercept from a graph or word problem</li><li>• Write equation of a line given any of the following:<ol style="list-style-type: none"><li>1. slope and y-intercept</li><li>2. 2 points on the line</li><li>3. slope and one point on the line</li><li>4. standard form of a line</li><li>5. a situation that follows a linear pattern</li><li>6. a table that follows a linear pattern</li></ol></li></ul>
Solving Systems of Equations	<ul style="list-style-type: none"><li>• Using substitution</li><li>• Using the addition/subtraction (elimination) method</li><li>• By graphing</li><li>• Writing a system and solving from a word problem</li></ul>

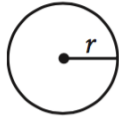
Graphing Linear Inequalities	<ul style="list-style-type: none"> <li>Graphing solutions to an inequality on a number line</li> <li>Graphing solutions to a two-variable inequality on a graph</li> </ul>
Patterns	<ul style="list-style-type: none"> <li>Observing and representing patterns using equations, tables, and graphs</li> </ul>
Function Notation	<ul style="list-style-type: none"> <li>Understanding and using <math>f(x)</math> notation</li> </ul>
Quadratic Functions	<ul style="list-style-type: none"> <li>Drawing a quadratic function from a table of values</li> <li>Solving a quadratic by using the Quadratic Formula (will be provided)</li> <li>Solving a quadratic by factoring and/or the zero-product property</li> </ul>
Factoring Methods	<ul style="list-style-type: none"> <li>Factoring out a common monomial factor</li> <li>Factoring a trinomial expression</li> <li>Factoring a difference of two perfect squares</li> </ul>
Exponential Functions	<ul style="list-style-type: none"> <li>Sketching an exponential function based on an equation</li> <li>Using the initial value and growth factor to write an equation</li> </ul>
Simplifying Expressions with Exponents	<ul style="list-style-type: none"> <li>Multiplying and dividing exponential expressions</li> <li>Simplifying expressions with negative exponents</li> <li>Powers of exponential expressions</li> </ul>

## GEOMETRY TOPICS:

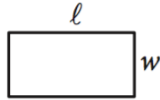
Definitions	<ul style="list-style-type: none"> <li>Pythagorean Theorem</li> <li>Converse of the Pythagorean Theorem</li> <li>Parts of a Circle</li> <li>Vertical Angles</li> </ul>
Lines & Angles	<ul style="list-style-type: none"> <li>Estimating the measure of an angle</li> <li>Properties of Parallel &amp; Perpendicular lines</li> <li>Properties of angles when two parallel lines are cut by a transversal</li> </ul>
Polygons	<ul style="list-style-type: none"> <li>Isosceles/equilateral triangles and their properties</li> <li>Triangle Inequality</li> <li>Types of quadrilaterals</li> <li>Sums of interior angle measures in polygons</li> </ul>
Triangle Congruence	<ul style="list-style-type: none"> <li>Triangle congruence theorems</li> <li>Triangle congruence proofs</li> <li>Properties of regular polygons and parallelograms</li> </ul>
Measurement	<ul style="list-style-type: none"> <li>Perimeter/circumference</li> <li>Areas of triangles, quadrilaterals, circles and sectors</li> <li>Pythagorean Theorem</li> </ul>
Surface Area & Volume	<ul style="list-style-type: none"> <li>Prisms, cylinders</li> <li>Complex shapes</li> </ul>
Coordinate Geometry	<ul style="list-style-type: none"> <li>Distance between 2 points</li> <li>Distance formula</li> <li>Midpoint formula</li> <li>Slopes of parallel and perpendicular lines</li> </ul>
Similarity	<ul style="list-style-type: none"> <li>Ratios &amp; Proportions</li> <li>Similar Figures</li> <li>Fundamental Theorem of Similarity</li> </ul>
Trigonometry	<ul style="list-style-type: none"> <li>Right triangle trigonometry</li> <li>Answering questions about situations involving right triangles</li> <li>Special right triangles (45-45-90 and 30-60-90)</li> </ul>

# Geometry Formula Sheet\*

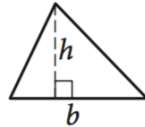
## REFERENCE



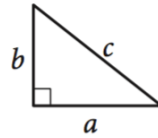
$$A = \pi r^2$$
$$C = 2\pi r$$



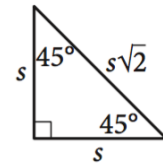
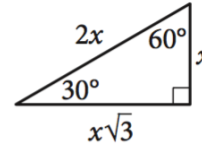
$$A = \ell w$$



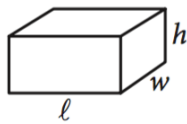
$$A = \frac{1}{2}bh$$



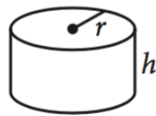
$$c^2 = a^2 + b^2$$



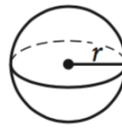
Special Right Triangles



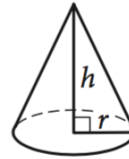
$$V = \ell wh$$



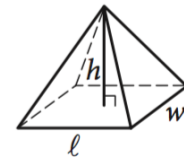
$$V = \pi r^2 h$$



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



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



$$V = \frac{1}{3}\ell wh$$