St. Mary's Academy

Freshman Math Placement Review Sheet

The Freshman Math Placement Review Sheet is for students taking the MAP Growth placement test in April of 2021. This guide provides an outline of topics that students will be expected to show mastery of in order to be placed into the next math course. All topics can be found in any standard Algebra, Geometry, or Algebra 2 textbook.

ALGEBRA TOPICS: *(To place into Algebra, Accelerated Algebra, Geometry or Honors Geometry)*

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

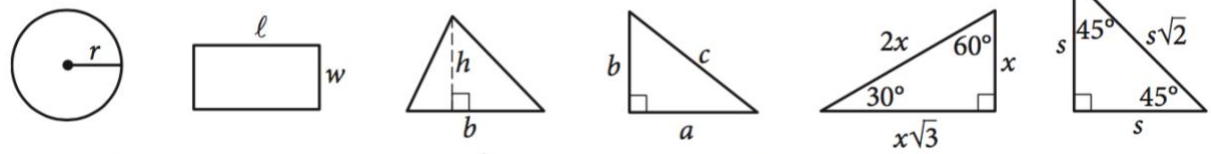
Graphing Linear Inequalities	Graphing solutions to an inequality on a number line Graphing solutions to a two-variable inequality on a graph
Patterns	Observing and representing patterns using math.
Function Notation	Understanding and using f(x) notation.
Quadratic Functions	Drawing a quadratic function 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: *(To place into Honors Geometry, Algebra 2+Trig or Honors Algebra 2+Trig)*

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

REFERENCE



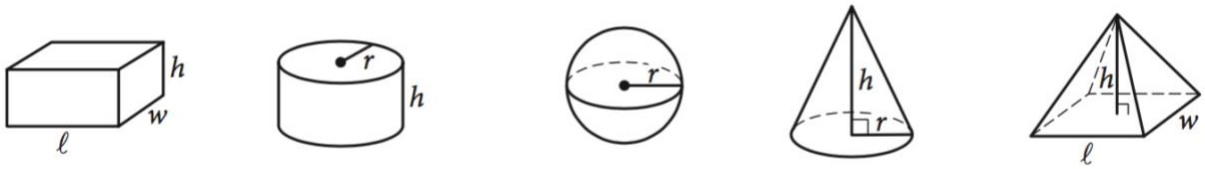
$A = \pi r^2$
$C = 2\pi r$

$A = \ell w$

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

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

Special Right Triangles



$V = \ell wh$

$V = \pi r^2 h$

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

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

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

ALGEBRA 2 TOPICS: *(To place into Precalculus)*

General Topic	Specific Skills
Expressions and Equations	Order of operations Using the distributive property Combining like terms Multiplying a monomials, binomials, and polynomials Simplifying exponential expressions using the Laws of Exponents Simplifying expressions with negative and fractional exponents Simplifying and solving expressions with absolute value Solving equations including polynomial, rational, radical, and absolute value expressions
Functions	Function notation Evaluating functions given an input Finding the input given an output Domain and range Function composition Finding inverse functions algebraically, graphically
Graphing Basic Functions	Graphing linear functions in point-slope and slope-intercept from Graphing quadratic functions in standard from, factored form, and vertex form Graphing exponential functions in standard from Graphing transformations of basic parent functions including linear, parabolic, absolute value, inverse, square root, cubic, exponential, and trig functions Identifying domain and range of a function Identifying x-intercepts/roots and y-intercepts from an equation, graph
Graphing Linear Inequalities	Graphing solutions to an inequality on a number line Graphing solutions to a two-variable inequality on a graph
Solving Systems of Equations	Using substitution Using the addition/subtraction (elimination) method By graphing Writing a system and solving from a word problem

Quadratic Functions	Solving quadratic functions by factoring Solving quadratic functions using the Quadratic Formula Solving by completing the square Converting between forms of a quadratic equation (standard, factored, and vertex)
Exponential Functions	Sketching an exponential function based on an equation Using the initial value and growth factor to write an equation Solve exponential function application problems including population, depreciation, and compound interest problems
Polynomial Functions	Finding the degree of a polynomial function Graphing polynomial functions Factoring Polynomial division
Trigonometry	Setting up equations and solving for unknowns using right triangle trigonometry (SOH-CAH-TOA) Using inverse trigonometry to solve for unknown angles Law of Sines Law of Cosines Special Right Triangles (30-60-90) (45-45-90) Converting from radians to degrees and vice versa Unit Circle Finding trig values with given angle measure (in degrees and radians)
Geometry	Area and perimeter Surface area and volume
Logarithms	Evaluating logarithmic expressions Laws of Logarithms Converting from exponential form to logarithmic form and vice versa

Unit Circle: