The entrance exams such as you took when applying for Harker measure general knowledge and you really cannot study for them.

The math proficiency evaluations, on the other hand, are subject specific, and you SHOULD prepare before taking the test. Look up each of these topics in your textbook and practice problems for each topic.

ALGEBRA 1

Proficiency Evaluation in Algebra 1

The student should be able to:

Simplify expressions applying one or more of the following processes/properties:

- Distributive property
- Combining like terms
- Multiplying terms and binomials
- Raising a power to a power
- Dividing a polynomial by a monomial
- Rational expressions (fractions with variables): subtract, multiply, divide
- Radical expressions

Factor polynomials

Solve single variable equations that include:

- Variables on both sides
- Rational expressions (fractions with variables)
- Quadratics (by factoring and using the Zero Product Property – not the quadratic formula)
- The absolute value of a variable
- Radicals (i.e., square roots)
- One variable inequalities (including those with absolute value)

Solve multiple variable equations

(i.e., that include both x and y) algebraically (not using graphing)

Understand lines and graphing:

- Graph inequalities on a number line
- Graph a linear equation in the coordinate plane, recognize and use slope/intercept
- Graph a system of linear equations or inequalities in the coordinate plane
- Given two points, write an equation of the line passing through them
- Recognize perpendicular and parallel lines from their equations

Solve word problems:

- Write a mathematical expression for a word phrase
- Write mathematical equations (one or a system) to represent word problems and solve

Formulas:

- Know and apply the formula for the area of a circle
- Know and apply the formula for the area of a square
- Know and apply the formula for the volume of a rectangular prism

ALGEBRA 2

Proficiency Evaluation in Algebra 2

In addition to the requirements for Algebra 1, the student should be able to:

Work with functions to include:

- Understanding and applying basic function notation
- Simplifying expressions in composite function notation
- Determining range and domain of a function graphing a function

Solve equations that include:

- Absolute value and radical equalities and inequalities
- Scientific notation
- Inequality expressions
- Inverse, direct and joint proportions
- Exponents and logarithms, including natural logarithms
- Quadratics (using the quadratic formula and/or the discriminant)

Manipulate complex expressions by:

- Adding/subtracting/multiplying/dividing complex (real and imaginary) rational expressions
- Finding the absolute value of a complex number
- Graphing a complex number
- Simplifying algebraic expressions involving radicals, imaginary numbers, and whole number or fractional exponents

Work with conic sections by:

- Finding an equation of a line in point-slope form
- Graphing a circle, parabola, ellipse and hyperbola given its equation in either standard form or by completing the square
- Find the vertex, directrix, axis of symmetry of a parabola
- Finding the foci and vertices of an ellipse

Understand basic trigonometric equations, by:

- Using right angle trigonometry to solve a given triangle (find all sides and all angles)
- Correctly applying the Law of Sines or Law of Cosines to solve a triangle
- Graphing simple sine and cosine curves, including those with non-standard periods and amplitudes
- Finding the amplitude and period sine and cosine functions
- Solving word problems that include trigonometric functions
- Solve word problems including combined work or mixtures

GEOMETRY

Geometry Requirements

Students who are currently enrolled, or have completed a course, in geometry will, in addition to the appropriate algebra level exam, be expected to answer questions on the following topics:

Basics of Euclidean geometry including:

- Types of angles
- Points/lines/planes
- Parallel and perpendicular lines

Coordinate geometry

Deductive reasoning and proofs, including "if-then" statements (i.e., logic questions)

Congruent and similar figures

Right triangles, including:

- basic trigonometry
- Pythagorean theorem
- special right triangles

Circles

Areas of plane figures

Areas and volumes of solids

Theorems to solve, and proofs of, quadrilaterals

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