

PREREQUISITES: PRECALCULUS

Mathematics builds! To be successful in Precalculus, there are certain skills that you are expected to already have mastered. These prerequisites are summarized on this sheet. Although some of the topics listed here may be reviewed in Precalculus, you are expected to already have some familiarity with them, so that we can quickly move beyond the basics to higher-level discussions. ALGEBRA I, GEOMETRY, and ALGEBRA II are all prerequisites to PRECALCULUS.

There will be a test over this prerequisite material on _____ .

This prerequisite test will count as _____ of your grade.

“Sample Prerequisite Problems” (with solutions) are included with this sheet. The Prerequisite Test will consist of problems that have a similar format to the Sample Prerequisite Problems.

DON'T PANIC if you're rusty on (or just haven't ever seen!) some of the topics listed on this sheet: math courses at different schools sometimes cover different material. The first few days of class will be devoted to review, and filling in gaps. Also, the Math Department teachers are all available to help you. It's important, however, that you get this material at your fingertips right away, because we'll be drawing on these skills frequently.

1. **RENAMING EXPRESSIONS:** base ten number system; arithmetic with decimals, fractions, signed numbers; set notation (interval, set-builder, union, intersection); basic vocabulary (e.g., the phrases “at least” and “at most,” nonnegative, integers, consecutive); percents; unit conversion; scientific notation; factoring; radicals; exponent laws; polynomials; matrices; complex numbers; completing the square technique; long division of polynomials; logarithms.
2. **SOLVING EQUATIONS AND INEQUALITIES IN ONE VARIABLE:** linear; quadratic; absolute value; exponential; logarithmic; radical; systems; rational; compound inequalities; the zero factor law. Understand extraneous solutions, and when they can arise. Be sure that you can distinguish between *exact* and *approximate* solutions. You should understand the relationship between the algebraic and graphical solutions of sentences.
3. **GRAPHING SENTENCES IN TWO VARIABLES:** familiarity with these “basic models”: $y = x$, $y = x^2$, $y = x^3$, $y = |x|$, $y = \sqrt{x}$, $y = \frac{1}{x}$, $y = k$, $y = \ln x$ (and other bases), $y = e^x$ (and other bases). Be able to graph circles and lines. Be able to graph transformations of the “basic models” involving: horizontal and vertical translations; vertical scaling; reflection about the x -axis; absolute value transformation. Be able to handle compound sentences that use the mathematical words ‘and’ and ‘or.’
4. **BASIC GEOMETRY FORMULAS:** perimeters of common figures, including the circumference of a circle. Also know the following formulas:
AREA: rectangle, triangle, circle, trapezoid
VOLUME: right cylinder (with familiar base)
5. **FUNCTIONS:** function notation; domain and range; composition; piecewise-defined functions; quadratic ($y = ax^2 + bx + c$ and $y = a(x - h)^2 + k$ forms); higher-order polynomial (relationship between the zeros and factors); exponential and logarithmic (allowable bases, shapes of graphs); rational (asymptotes, end behavior, puncture points); periodic (sine and cosine).
6. **CALCULATOR SKILLS:** key in expressions using correct knowledge of order of operations; store and recall named variables; use stored values in calculations.
Graph functions: set the window; trace along a curve; find maxima/minima of graphs; find x -intercepts using the built-in calculator feature; use the table feature; use the Zoom In, Zoom Out, and ZBox features; find intersection points of graphs.