

# Expectations for Math 150 Students

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You should know certain basic things upon entry to Math 150. If you haven't learned them before, do so now!

1. You should know or be able to deduce geometric formulae for:

- A. Perimeter and area of a rectangle, parallelogram, trapezoid, triangle, circle, and regular polygons.
- B. Similar triangles and medians of triangles.
- C. Surface area and volume of right cylinder, sphere, and rectangular and parallelepiped solids.
- D. Volume of pyramids and cones.
- E. Comparable quantities for combinations of these shapes.

2. You should know or be able to deduce basic conversion factors:

- A. Time: seconds/minute, minutes/hour, hours/day, days/week, etc.
- B. Distance: inches/foot, centimeters/inch, feet/yard, feet/mile, etc.
- C. Volume/Weight: ounces/cup, cups/pint, pints/quart, quarts/gallon, ounces/pound, pounds/ton, pounds/kilogram
- D. Angle: degrees/radian, p to 5 significant figures
- E. Metric prefixes: nano, micro, milli, centi, deci, deca, kilo, mega, giga

3. You should be able to do simple arithmetic without a calculator:

- A. Know multiplication tables up to 12 and squares up to 20.
- B. Do long division.
- C. Simplify numeric expressions to exact values.
- D. Simplify complex fractions.
- E. Factor any number into a product of primes.
- F. Apply the concept of significant figures.

4. You should be able to do basic algebra correctly:

- A. Complex fractions, laws of exponents, factoring, long division.
- B. Solutions of simultaneous equations (2 or more).

5. You should be able to do basic trigonometry:

- A. Solve triangles (including those that are not right).
- B. Know the fundamental, sum/difference and double-angle identities.
- C. Know or be able to find the values of the trig functions for all the special angles without a calculator.
- D. Solve trig equations, using reference angles to get all solutions, using a calculator only for non-special angles.
- E. Sketch curves of all the trig functions.

6. You should know and can do the basics of analytic geometry:

- A. Properties of straight lines (slope, point-slope and y-intercept forms; perpendicular and parallel; distance formula; etc.)
- B. Conic sections and how to analyze and sketch them.
- C. Sketch graph of  $x^r$ , where  $r$  is positive or negative, integer or rational, without using a t-table or calculator.
- D. Definition and properties of functions (including domain, range, symmetry, composition).
- E. Piecewise functions, including absolute value.
- F. Shifting/stretching graphs of curves.