

## Math Skills Video

The Math Skills + Problems video is a resource for Saint Anselm College students who wish to brush up on their mathematics skills in preparation for the algebra-based physics course General Physics I. Students planning to take Classical Physics I will also find the tape useful. The outline of part I of the video tape, a review of selected mathematics topics, is given below. On pages 2 and 3 of this handout you will find the problems whose solutions are presented in part II of the video tape. It is suggested that you watch part I and then do the problems as if the problem set was an exam. Then watch part II of the video. If any or your solutions are wrong, use the video tape to get the correct solutions figured out. (Don't memorize the solutions. Learn how to work them out on your own.) Repeat every week until you can consistently score 100% on the "exam". Since not all of the topics discussed in part I are tested in the "exam", it is recommended that you then copy down the sample problems given in part I of the video to make up a second "exam" and practice taking it until you can "ace" it as well.

Other tips for preparing yourself for the physics course include getting a mathematics book and reviewing your mathematics skills by means of it, and, reading the handbook that came with your calculator and familiarizing yourself with the operation of your calculator. (Make sure that your calculator can be used to calculate the sine of an angle. If not, get a calculator that does have the sine function on it. Manufacturers typically refer to such calculators as scientific calculators.)

### Outline of Mathematics Skills

- 1) Powers
  - a) Powers of 10
  - b) Fractional Powers
  - c) Negative Powers
- 2) Units Conversions, Multiplying by One
- 3) Properties of shapes
  - a) The Circle--Area, Circumference
  - b) The Cylinder--Volume, Surface Area
  - c) The Box--Volume, Surface Area
- 4) Percent Change--the wording associated with the change in a physical quantity
- 5) Trigonometry
  - a) Pythagorean Theorem
  - b) SOH CAH TOA
- 6) Geometry
  - a) Sums of Angles ( $90^\circ$ ,  $180^\circ$ , triangle, quadrilateral)
  - b) Angles formed by the intersection of two lines--Opposing Angles
  - c) Angles formed by the intersection of a line with Parallel Lines
- 7) Factoring and Expanding algebraic expressions
- 8) Rearranging Equations
  - a) Adding, Subtracting, Multiplying, Dividing, Inverse Functions
  - b) Non-Distributive Nature of:
    - i) The reciprocal
    - ii) Trigonometric Functions
    - iii) The square root
    - iv) Powers
  - c)  $(xy)^p = x^p y^p$
- 9) Quadratic Equations
- 10) Simultaneous Equations
- 11) Graphing--The Cartesian Coordinate System
- 12) Graphing Trigonometric Functions
- 13) Application of Understanding of Graphs of Trigonometric Functions