

MATH PLACEMENT REVIEW MATERIAL

Mathematics is a component of most every major at Trine University. Of course, the Science and Engineering majors require more mathematics than other majors. As entering freshmen, a mathematics skills/placement exam may be taken prior to the beginning of classes. This exam covers concepts and skills developed in two years of algebra and one or more years of trigonometry and analytical geometry. We believe the engineering majors must have a strong grasp of algebra, trigonometry and geometry concepts to be successful in their Calculus courses. The 50-question multiple-choice exam is given in a 70-minute time frame. Although we view calculators as powerful tools and use them in the classroom, **no calculators** are permitted as this diagnostic exam measures your developed concepts and skills.

Your confidential result of this exam, together with SAT, ACT scores, high school GPA & class standing, will be used to place you in an appropriate Mathematics class at Trine University. It has been our experience that some high school students study mathematics in order to pass an exam and fail to remember the concepts/skills. For the professional Engineer, mathematics is a fundamental life-long language.

Review your Algebra and Trigonometry skills now, prior to arriving on campus. This could save you valuable time as well as money! We suggest reviewing topics in your high school math textbooks or possibly the following available at your local library or online.

- 1 High School Trigonometry Tutor by J. Ogden
- 2 Math Smart II : Getting a Grip on Algebra, Geometry and Trigonometry by Marcia Lerner
- 3 Barron's Trigonometry the Easy Way by Douglas Downing
- 4 Barron's Algebra, the Easy Way by Douglas Downing
- 5 Practical Algebra: A self-teaching guide by Selby et al

Algebra Topics:

- 1 Polynomial operations and factoring
- 2 Exponents and Radicals
Simplifying & Combining
- 3 Solution of linear, quadratic and higher degree equations
- 4 Solution of linear and quadratic systems of equations
- 5 Graphing lines, conics and other functions
- 6 Properties of logarithmic & exponential functions and equations
- 7 Matrices & Determinants
- 8 Rectangle Coordinate System
- 9 Inequalities & Absolute Values

Trigonometry Topics

- 1 The six trig functions & their graphs with translations and changes in period and amplitude
- 2 Solving right triangles
- 3 Law of Sines and Cosines
- 4 Complex numbers
- 5 Trig identities:

$$\sin(A \pm B), \cos(A \pm B), \tan(A \pm B),$$

$$\sin(2\theta), \cos(2\theta), \tan(2\theta), \sin\left(\frac{\theta}{2}\right),$$

$$\cos\left(\frac{\theta}{2}\right), \tan\left(\frac{\theta}{2}\right), (\sin \theta)^2 + (\cos \theta)^2 = 1,$$

$$1 + (\cot \theta)^2 = (\csc \theta)^2 \text{ etc....}$$

Example questions.....

Evaluate....

$$(4)^{-\frac{1}{2}} + (8)^{-\frac{1}{2}} = ?$$

$$\frac{\sqrt{87}}{\sqrt[3]{25}} = ?$$

Simplify....

$$\frac{2a}{a^2 - 1} - \frac{2}{a - 1}$$

$$x^2 + \frac{1}{x^3}$$

Solve the following.....

$$\frac{x}{2} - \frac{x-1}{3} = 0$$

$$\sqrt{3x+4} = 2$$

$$\sqrt{x-11} - \frac{1}{2}\sqrt{x-4} = 0$$

$$\left(\frac{1}{2}\right)^x = 3$$

Suppose you have 8 quarts of a solution which is a% alcohol. How much liquid must be replaced with distilled water in order to reduce the solution to a b% solution of alcohol.

Solve....

$$9^{2x} = 27^{3x-4}$$

$$\log_3(x+1) + \log_3(x+3) = 1$$

$$2\sin(x) + \sqrt{3} = 0$$

$$2(\sin x)^2 + \cos x = 2$$

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