

MATH 1210 COLLEGE TRIGONOMETRY

3 Credits

Offered in Lab or Lecture Format

Prerequisite required (MATH 1200 with a grade of C or better or Appropriate Placement-Test Score)

Revised 04/12/93

SYLLABUS

I. RELATIONS AND FUNCTIONS

- A. Definition and examples
- B. Domain and range
- C. Graphs and the vertical-line test
- *D. Composition of functions and inverses of functions

II. GEOMETRIC CONCEPTS

- A. Definition of angle
- B. Degree measure
- C. Description of various triangles
- D. Pythagorean Theorem
- E. Properties of 45-45-90 and 30-60-90 degree triangles (derivation)
- F. Derivation of the distance formula
- G. Definition of circle and parts of a circle
- H. Definition of pi
- I. Radian measure

III. CIRCULAR FUNCTIONS

- A. Definitions
 - 1. Unit circle
 - 2. P(2)
- B. Deriving $P\left(\frac{\pi}{4}\right)$ and $P\left(\frac{\pi}{6}\right)$, then $P\left(\frac{n\pi}{4}\right)$, and $P\left(\frac{n\pi}{6}\right)$

IV. TRIGONOMETRIC FUNCTIONS

- A. Definition of the basic functions
- B. Solving for trigonometric functions of angles
 - 1. Exact values for angles indicated in III B
 - 2. Calculator values for any angle
- C. Solving for the angle (general solution)
 - 1. Exact values for angles indicated in III B
 - 2. Calculator values for any angle

V. IDENTITIES

- A. Derivation of the basic trigonometric identities
 - 1. Reciprocal identities
 - 2. Pythagorean identities
 - 3. Ratio identities
- B. Using the basic identities and the definition of P(2) to prove new identities (such as $\sin(-2) = -\sin(2)$)
- C. Sine, cosine, and tangent of the sum or difference of two angles (no derivation)
 - 1. Numerical examples
 - 2. Use in proving other identities
- D. Double-angle and half-angle formulas (no derivation)
 - 1. Numerical examples
 - 2. Use in proving other identities

VI. TRIGONOMETRIC EQUATIONS (USING IDENTITIES DESCRIBED IN V)

- A. Solutions with restricted domains
- B. General solutions

VII. SOLVING TRIANGLES

- A. Right triangles
- B. Oblique triangles
 - 1. Law of sines (*derivation)
 - 2. Law of cosines (*derivation)
- C. Vectors
 - 1. Vector addition by using horizontal and vertical components
 - 2. Vector addition by using right or oblique triangles
- D. Word problems

VIII. GRAPHS OF THE TRIGONOMETRIC FUNCTIONS

- A. $y = a \sin (bx+c) +d$, $y = a \cos (bx+c) +d$
- B. $y = \tan (x)$, $y = \csc (x)$, $y = \sec (x)$, $y = \cot (x)$

IX. INVERSES OF TRIGONOMETRIC FUNCTIONS

- A. Definitions and examples
- B. Graphing inverses of $y = \sin (x)$, $y = \cos (x)$, $y = \tan (x)$
- C. Notation for inverses of trigonometric functions
- D. Restricting the domain for sine, cosine and tangent so that their inverses will be functions
- E. Evaluating the principal inverses of sine, cosine, and tangent

X. APPLICATIONS

- A. Areas of sectors and segments of circles
- B. Arc length
- C. Angular velocity

*Optional