

MATH 141: PRECALCULUS

MIDTERM 4: ADVANCED TRIG (CHAPTERS 5 AND 6)

DISCLAIMER: This may or may not be a comprehensive list, but it's a very good start!
Know all aspects of these topics; I may go beyond listed subtopics.

CHAPTER 5: ANALYTIC TRIG

Identities (5.1, 5.2)

Reciprocal, Quotient, Pythagorean, Cofunction, and Even/Odd (Negative Angle)

Simplifying Trig Expressions and Verifying Identities

Tricks include:

Going to sin and cos

Using Basic Identities

Factoring

Adding and Subtracting Fractions; LCDs

Using Trig Conjugates

Splitting: Peeling and Addition / Subtraction

Modeling Using an Easy Algebra Problem

Verifying Identities (5.2):

We usually start with the “longer” side.

Aim for your target!

Trig Substitutions

Solving Trig Equations (5.3)

Tricks include:

Solving Linear Forms

Using Reciprocals

Recognizing when there is No Solution

Square Root Method

Factoring (get “Product = 0” and set each factor equal to 0)

Using Identities

Letting $\theta = bx$ in Multiple-Angle Expressions

Remember to go back to x !!

Using Periodicity ($+2\pi n$, etc., where n is an integer; maybe simplify)

(If you are asked for all real solutions)

Using Increments

(If you are asked for real solutions in some bounded interval.)

Using Inverse Trig Functions

More Trig IDs (5.4, 5.5)

See the Handout!

Sum and Difference, Double-Angle, Power-Reducing (PRIs), Half-Angle IDs
Know and be able to use these in “both directions.”

Using Product-to-Sum and Sum-to-Product IDs; these will be given as necessary

Using IDs to:

Find Exact Trig Values

Relate Info about

Angles u , v , $u + v$, and $u - v$

Angles u , $2u$, $u/2$

(Right Triangle Models may be helpful.)

Simplify / Rewrite Expressions and Verify Identities

Solve Equations

CHAPTER 6: ADDITIONAL TOPICS IN TRIG

Triangles (6.1, 6.2)

180° Rule, Triangle Inequality, “Eating” Rule

Law of Sines

Law of Cosines

Formulas for Area

sin Formulas (SAS Case)

Heron’s Formula (SSS Case): not on exams

Vectors (6.3)

Scalar Multiplication and Vector Addition

Graphical and Computational Approaches

Position Vectors, Length (Magnitude), Component Form and Direction Angles

Related Formulas

Length and Unit Vectors

Standard Unit Vectors: **i** and **j**

Vectors and Dot Products (6.4)

Dot Products

Finding the Angle between Two Vectors

Work

Complex Numbers (6.5) (this might not be covered on exams)

Trig (Polar) Form

Euler (Exponential) Form

Operations: $z_1 z_2$, $\frac{z_1}{z_2}$, z^n (DeMoivre’s Theorem), Roots