

Math 1151, Lec 010
Study Guide for Exam 2

This exam covers all the material from Ch 7-9 that we covered in class, as well as the material from Appendix A7.

- 7.1, 7.3-7.5, 7.7-7.8
- 8.1-8.4
- A7, 9.1, 9.3

You need to be able to:

1. Evaluate inverse trig functions at “easy” points and at values of trig functions.
2. Find the inverse function (and its domain) of a function involving trig functions.
3. Derive trig identities using the fundamental identities, sum/difference formulas, half/double-angle formulas.
4. Evaluate trig functions using sum/difference formulas and half/double-angle formulas.
5. Write $\sin n\theta$ (or $\cos n\theta$) as a polynomial in $\sin \theta$ (or $\cos \theta$, respectively.)
6. Solve equations involving trig functions: give general formula for solutions or give solutions in the interval $[0, 2\pi)$.
7. Solve right triangles using SOH-CAH-TOA and the pythagorean theorem.
8. Solve other (“oblique”) triangles using the law of sines and the law of cosines.
9. Compute the area of triangles.
10. Perform basic arithmetic with the complex numbers.
11. Put a complex number in polar form (modulus and argument).
12. Find complex powers and roots using DeMoivre’s Theorem.

These trig identities will be provided on the exam.

Sum and Difference Formulas

$$\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cos \beta + \sin \alpha \sin \beta$$

$$\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cos \beta - \cos \alpha \sin \beta$$

Double-angle Formulas

$$\sin(2\theta) = 2 \sin \theta \cos \theta$$

$$\cos(2\theta) = \cos^2 \theta - \sin^2 \theta$$

$$\cos(2\theta) = 2 \cos^2 \theta - 1$$

$$\cos(2\theta) = 1 - 2 \sin^2 \theta$$

Half-angle Formulas

$$\sin^2 \frac{\alpha}{2} = \frac{1 - \cos \alpha}{2}$$

$$\cos^2 \frac{\alpha}{2} = \frac{1 + \cos \alpha}{2}$$

Here's a list of formulas and basic facts you should have at the tip of your fingers for the exam. Write them out in the space provided.

1. **Inverse trig functions**

- (a) The domain and range of arcsine ($\sin^{-1}$), arccosine ($\cos^{-1}$), and arctangent ($\tan^{-1}$):

	$\sin^{-1} x$	$\cos^{-1} x$	$\tan^{-1} x$
Domain			
Range			

- (b) Draw graphs of arcsine and arccosine. Make sure to label 3 key points.

- (c) Draw the graph of arctangent. Label the asymptotes and 3 key points.

2. **Right triangle trigonometry** (SOH-CAH-TOA). For a right triangle with sides a , b , and c (c being the hypotenuse) and angles A and B (opposite sides a and b , respectively), write sine, cosine, and tangent in terms of a , b , and c :

$$\sin A =$$

$$\cos A =$$

$$\tan A =$$

$$\sin B =$$

$$\cos B =$$

$$\tan B =$$

3. The law of sines is

4. The law of cosines is

5. The equation for the area of a triangle is

6. The standard form of a complex number is

7. The polar form of a complex number is

8. DeMoivre's Theorem states that

$$z^n =$$

9. The formula for complex roots of a number is

$$z_k =$$