

# Math 150 - Test #3 Study Guide

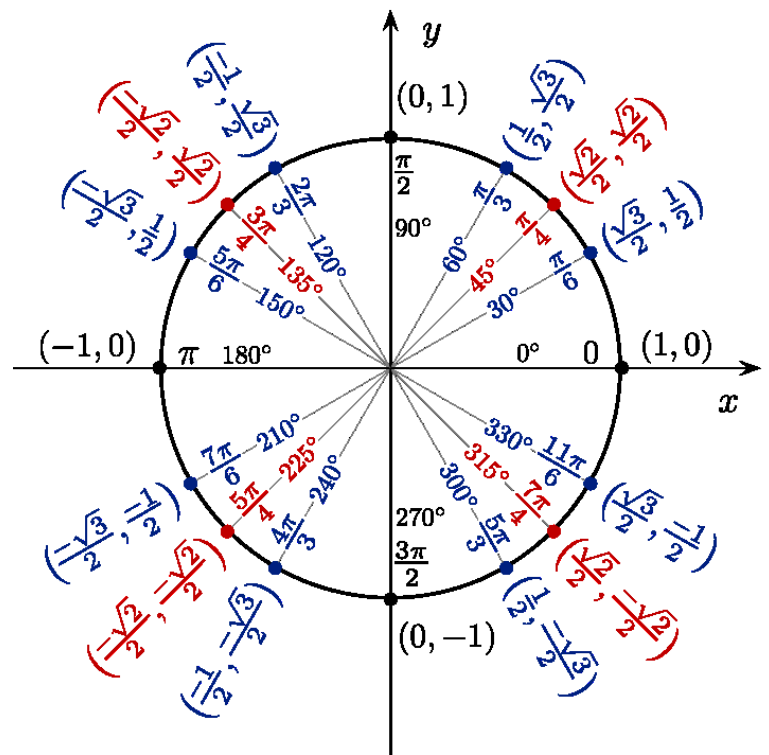
Spring 2017, Prof. Beydler


## Test #2

- Date: Thursday, May 18, 2017
- Will cover sections 5.5, 5.6, 6.1-6.3, 7.1-7.3.
- You'll have the entire class to finish the test.
- There will be 2 parts to the test:
  - Part 1: No calculators allowed.
  - Part 2: **Scientific calculator** allowed (you'll need it!).
- No notes, no books, no phones, no smart watches during the test.
- There will be a seating chart for the test.
- Where to get help as you're studying:
  - Office hours
  - TMARC, LAC, or other tutoring centers
  - E-mail me at [dbeydler@mtsac.edu](mailto:dbeydler@mtsac.edu)

## Some of the stuff on the test:

- Proving identities:
  - Start from one side (usually the more complicated side), and take steps to get to the other side.
  - OR Simplify both sides until they look the same.
  - If you get stuck, convert to sin and cos.



- Note: I'll give you the formulas that have a  next to them.

### Reciprocal Identities

$$\sin \theta = \frac{1}{\csc \theta} \quad \csc \theta = \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{1}{\sec \theta} \quad \sec \theta = \frac{1}{\cos \theta}$$

$$\tan \theta = \frac{1}{\cot \theta} \quad \cot \theta = \frac{1}{\tan \theta}$$

### Pythagorean Identities

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\tan^2 \theta + 1 = \sec^2 \theta$$

$$1 + \cot^2 \theta = \csc^2 \theta$$

### Quotient Identities

$$\tan \theta = \frac{\sin \theta}{\cos \theta} \quad \cot \theta = \frac{\cos \theta}{\sin \theta}$$

### Sum/Difference Identities

$$\sin(A + B) = \sin A \cos B + \cos A \sin B$$

$$\sin(A - B) = \sin A \cos B - \cos A \sin B$$

$$\cos(A + B) = \cos A \cos B - \sin A \sin B$$

$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$

$$\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B} \quad \text{Ⓜ}$$

$$\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B} \quad \text{Ⓜ}$$

### Double-Angle Identities

$$\cos 2A = \cos^2 A - \sin^2 A$$

$$\cos 2A = 1 - 2 \sin^2 A$$

$$\cos 2A = 2 \cos^2 A - 1$$

$$\sin 2A = 2 \sin A \cos A$$

$$\tan 2A = \frac{2 \tan A}{1 - \tan^2 A} \quad \text{🔄}$$

### Half-Angle Identities

$$\sin \frac{A}{2} = \pm \sqrt{\frac{1 - \cos A}{2}}$$

$$\cos \frac{A}{2} = \pm \sqrt{\frac{1 + \cos A}{2}}$$

$$\tan \frac{A}{2} = \pm \sqrt{\frac{1 - \cos A}{1 + \cos A}} \quad \text{🔄}$$

$$\tan \frac{A}{2} = \frac{\sin A}{1 + \cos A} \quad \text{🔄}$$

$$\tan \frac{A}{2} = \frac{1 - \cos A}{\sin A} \quad \text{🔄}$$

- Inputs and outputs of inverse functions:

	Domain	Range
$\sin^{-1} x$	$[-1, 1]$	$\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$
$\cos^{-1} x$	$[-1, 1]$	$[0, \pi]$
$\tan^{-1} x$	$(-\infty, \infty)$	$\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

- The Law of Sines:  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$  (also written  $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$ )
- The Law of Cosines:  $a^2 = b^2 + c^2 - 2bc \cos A$
- Area of a triangle:  $Area = \frac{1}{2}bc \sin A$  🔄

### Extra Credit!

- If you write up the answers to all of the review exercises listed below, and hand them in at the test, you can earn up to 3% extra credit towards your test (depending on neatness and completeness)! These review exercises don't cover everything. Also, some of the exercises might be tough, but hey, you've got to work for your extra credit! 😊
- Review exercises:
  - Chapter 5: p.248 #33-41 odd, 51, 55, 57, 65, 67
  - Chapter 6: p.291 #5-13 odd, 17-55 odd
  - Chapter 7: p.349 #1-5 odd, 11-27 odd

(If you're using the older, 10<sup>th</sup> edition, here are the equivalent problem numbers:

p.242 #33-41 odd, 51, 55, 57, 65, 67

p.284 #5-13 odd, 17-55 odd

p.343 #1-5 odd, 11-27 odd)