

Precalculus Practice Problems: Midterm 1

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2024-2025

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1 Trig (I): Right Triangle and Unit Circle

1.1 Review problems

1. *Unit conversions for angles.*
 - (a) 360 degrees to radians
 - (b) π radians to degrees
 - (c) 60 degrees to radians
 - (d) $3\pi/4$ radians to degrees
 - (e) $\pi/5$ degrees to radians
2. *Trig functions as ratios of lengths.* Let ABC be a triangle with a right angle at B . Suppose $AB = 8$ and $BC = 15$.
 - (a) Evaluate $\tan A$ and $\cot A$.
 - (b) Find the length of AC .
 - (c) Evaluate $\sin A$, $\cos A$, $\sec A$, and $\csc A$.
3. *Using one trig function to compute another.* Throughout, assume θ is acute.
 - (a) If $\sin \theta = 1/3$, what is $\cos \theta$?
 - (b) If $\sec \theta = \sqrt{10}$, what is $\tan \theta$?
 - (c) If $\tan \theta = 2/5$, what is $\csc \theta$?
4. *Important acute angles.* Fill in the table below.

θ (deg)	θ (rad)	$\sin \theta$	$\cos \theta$	$\tan \theta$	$\sec \theta$	$\csc \theta$	$\cot \theta$
30							
45							
	$\pi/3$						

5. *Unit circle calculations.* Compute the following.

- (a) $\cos(0)$
- (b) $\sin(150^\circ)$
- (c) $\cos(-3\pi/4)$
- (d) $\sin(7\pi/3)$
- (e) $\cos(330^\circ)$
- (f) $\sin(-\pi/4)$

6. *Unit circle identities.* Express each of the following in terms of $\sin \theta$ and/or $\cos \theta$.

- (a) $\sin(\pi - \theta)$
- (b) $\cos(\pi - \theta)$
- (c) $\sin(\pi + \theta)$
- (d) $\cos(\pi + \theta)$
- (e) $\sin(-\theta)$
- (f) $\cos(-\theta)$
- (g) $\sin(\frac{\pi}{2} - \theta)$
- (h) $\cos(\frac{\pi}{2} - \theta)$
- (i) $\sin(\frac{\pi}{2} + \theta)$
- (j) $\cos(\frac{\pi}{2} + \theta)$

7. *Some triangle geometry.* In acute triangle ABC , it is given that $AB = 13$, that $BC = 14$, and that $\sin B = 12/13$.

- (a) Find the area of triangle ABC .
- (b) Find the length of AC .
- (c) Find $\sin A$.

1.2 Challenge problems

8. Let