

# EXAM 3 - MATH 140

DATE: Friday, November 12

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

**GOOD LUCK!!**

1. (a) Copy and fill in the missing entries in the following table

	sin	cos	tan	csc
$\frac{3\pi}{4}$				
$-\frac{4\pi}{3}$				
$\frac{11\pi}{6}$				

- (b) Starting from known trigonometric numbers calculate for me the numbers

$$\sin \frac{\pi}{12} \quad \text{and} \quad \cos \frac{5\pi}{12}.$$

2. If  $\tan \theta = \frac{4}{3}$  and  $\pi < \theta < \frac{3\pi}{2}$ , find  $\sin \theta$  and  $\cos \theta$ .
3. Suppose that you are given a wave whose amplitude is 3 units, its period is  $\frac{\pi}{6}$  and its phase shift is  $-\frac{\pi}{2}$ . Find an equation that describes this wave and then roughly sketch its graph over 2 periods. (**Please, please, please**, try to label critical points on your graph!!)
4. Find the exact value of  $\sin(\cos^{-1}(-\frac{2}{5}))$ . **Please**, do not omit any details.
5. **Start from the left** and show that

$$\frac{\cos \theta}{1 - \tan \theta} + \frac{\sin \theta}{1 - \cot \theta} = \sin \theta + \cos \theta.$$

**Please**, do not omit any steps.

6. Calculate  $\sin[\frac{\pi}{4} - \cos^{-1}(-\frac{4}{5})]$ .