PRACTICE 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

- (b) Give a proof of the fact that $\cos 30^\circ = \frac{\sqrt{3}}{2}$. You may only assume the definitions of the trigonometric numbers.
- 2. If $\sin \theta = \frac{5}{13}$ and $\frac{\pi}{2} < \theta < \pi$, find $\cos \theta$ and $\cot \theta$.
- 3. Suppose that you are given a wave whose amplitude is 4 units, its period is $\frac{\pi}{12}$ and its phase shift is $-\frac{\pi}{4}$. Find an equation that describes this wave and then roughly sketch its graph over 2 periods.
- 4. Find the exact value of $\cos(\sin^{-1}(-\frac{1}{3}))$. Do not omit any details.
- 5. Show that

$$\frac{\sin^3\theta + \cos^3\theta}{\sin\theta + \cos\theta} = 1 - \sin\theta\cos\theta$$

Do not omit any steps.

6. Find $\sin(\sin^{-1}\frac{3}{5} - \cos^{-1}(-\frac{4}{5}))$