MATH 119: Midterm 2

Name: _____

Directions:

* Show your thought process (commonly said as ”show your work”) when solving each problem for full credit.
* If you do not know how to solve a problem, try your best and/or explain in English what you would do.
* Good luck!

Problem	Score	Points
1		10
2		10
3		10
4		10
5		10
6		10
7		10
8		10
		80

1. Prove the identity

$$\frac{(\sin x + \cos x)^2}{\sin^2 x - \cos^2 x} = \frac{\sin^2 x - \cos^2 x}{(\sin x - \cos x)^2}$$

2. Evaluate the following:

(a) $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

(b) $\cos 112.5^\circ$

(c) $\sin 75^\circ$

3. Solve the equation for θ. Check your work if necessary.

   (a) $\sqrt{2}\sin\theta + 1 = 0$

   (b) $\sqrt{2}\tan\theta\sin\theta - \tan\theta = 0$

4. Prove these identities algebraically:

(a) $\dfrac{\sin\theta}{\tan\theta} = \cos\theta$

(b) $\dfrac{\cos x}{\sec x} + \dfrac{\sin x}{\csc x} = 1$

(c) $\cos^4 x - \sin^4 x = \cos 2x$

5. Answer the following:

   (a) A triangle ABC has $\angle A = 90^\circ, \angle B = 30^\circ$ and $A = 25$. Solve the triangle and draw a picture of it.

   (b) Are $\frac{-\pi}{4}$ rad and 315° coterminal? Show with calculations.

   (c) If the directrix of a parabola is a vertical line and the focus is to the right of the directrix, which way does the parabola open?

6. Answer the following:

   (a) Convert $(\sqrt{8}, \sqrt{8})$ into polar coordinates.

   (b) Convert $r = \dfrac{1}{1 + \sin\theta}$ into rectangular form.

   (c) Convert $r = 6\cos\theta$ into rectangular form.

7. Simplify the following trigonometric expressions:

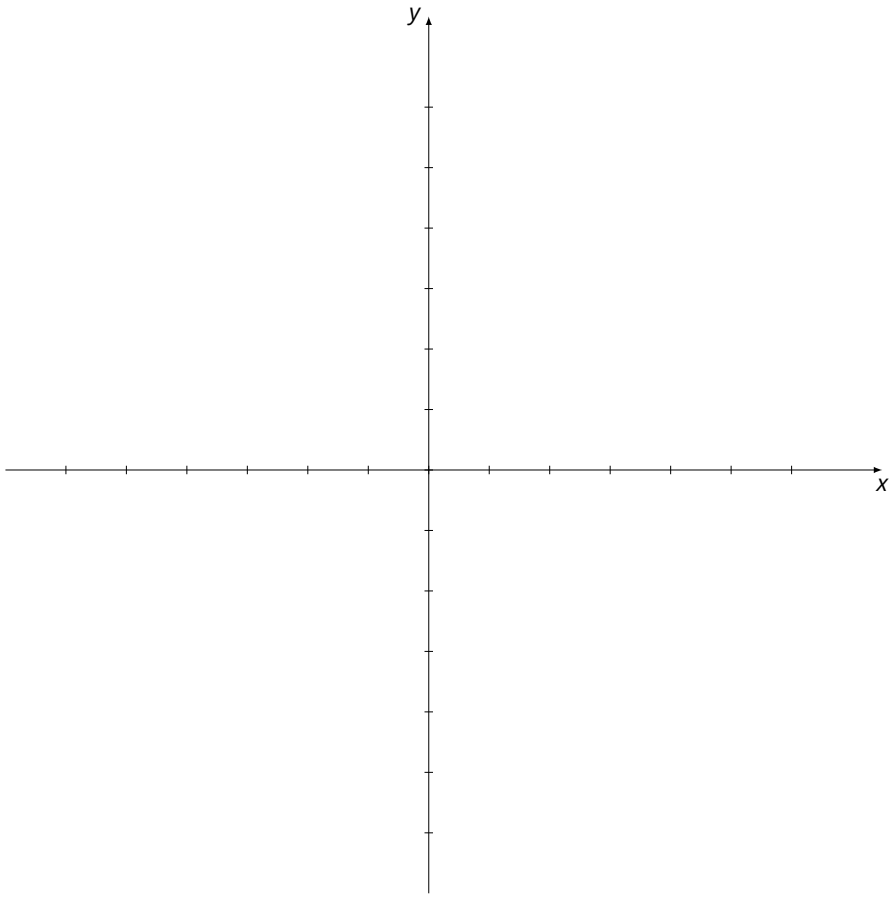
   (a) $\sin 20^\circ \cos 40^\circ + \cos 20^\circ \sin 40^\circ$

   (b) $\dfrac{\sin(x+y) - \sin(x-y)}{\cos(x+y) + \cos(x-y)}$

8. Here is a pair of parametric equations

$$x = 2t \qquad y = t + 2$$

(a) Sketch the curve represented by the equations.



(b) Find a rectangular coordinate equation for the curve by eliminating the parameter.