

### **Precalculus Exam 3 Spring 2011**

Since all of the following questions have been given to you prior to the exam, any unsupported answer will receive absolutely no credit. Also, make sure you present your work in a readable and very clean matter. Do NOT use pen, pencil only

**Name**

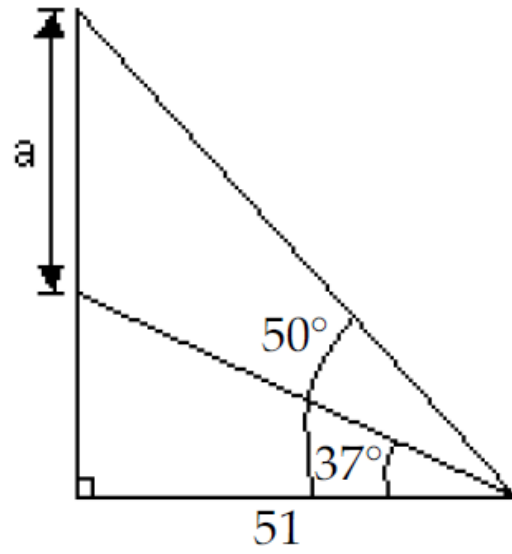
1. (10 points) Solve the following trig equation in the interval  $[0, 2\pi)$

$$\cos 2x = \frac{\sqrt{2}}{2}.$$

2. (10 points) Solve in the interval  $[0, 2\pi)$  the trig equation

$$\cos x + 2 \cos x \sin x = 0.$$

3. (15 points) Find the value of  $a$



4. (20 points)

a. Find the rectangular coordinates of the following point

$$\left(-3, \frac{3\pi}{4}\right).$$

b. Find the polar coordinates of the following point

$$\left(4, -4\sqrt{3}\right).$$

5. (10 points) Convert the rectangular equation to a polar equation that expresses  $r$  in terms of  $\theta$

$$x^2 + y^2 = 16$$

6. (10 points) Convert the polar equation to a rectangular equation. **Hint:** use the double angle formula.

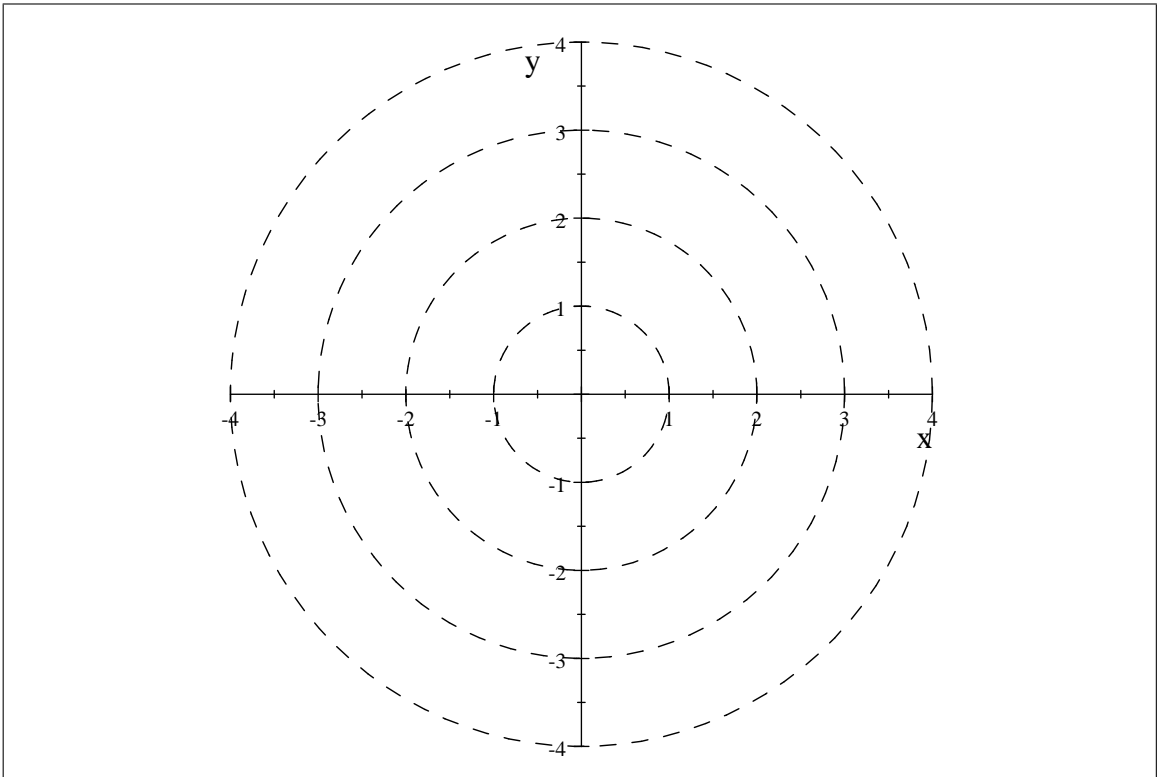
$$r^2 \sin(2\theta) = 4.$$

7. (15 points) First fill in the tables below as done in class, and plot in the space provided below the tables the following expression given in polar coordinates:

$$r = 3 \cos 3\theta$$

**You may use a calculator to obtain the values for this table.**

$\theta$ (in rad)	$r$	$(r, \theta)$
0		
$\frac{\pi}{4}$		
$\frac{\pi}{3}$		
$\frac{\pi}{2}$		
$\frac{2\pi}{3}$		
$\frac{3\pi}{4}$		
$\pi$		
$\frac{5\pi}{4}$		
$\frac{4\pi}{3}$		
$\frac{3\pi}{2}$		
$\frac{5\pi}{3}$		
$\frac{7\pi}{4}$		
$2\pi$		



**You must plot your graph here !**

8. (10 points) Write the complex number in rectangular form.(recall the rectangular form is of  $x + iy$  )

$$5 \left[ \cos \left( \frac{2\pi}{3} \right) + i \sin \left( \frac{2\pi}{3} \right) \right]$$