Math 6D - Exam 1

Name: _____

Monday, March 3, 2014
Time: 50 minutes
Instructor: Brittany Whited

Instructions:

- Do not open the exam until I say you may.
- All cell phones and other electronic noisemaking devices must be turned off or completely silenced (i.e., not on vibrate) for the duration of the exam.
- **No calculators** are allowed on the exam.
- Failure to follow directions specific to a problem will result in the loss of points.
- Circle or box your final answer where appropriate.
- Show **all** work. Full credit will only be given if work is shown which **fully and clearly** justifies your answer.
- Answers must be exact (like $\sqrt{2}$), not approximate (like 1.414), unless a problem specifically indicates otherwise.
- All final answers must be simplified unless otherwise specified. **Rationalization is not required unless otherwise specified.**
- If you run out of room, use the back of the page and indicate this on the question.
- As always, you are expected to exhibit academic integrity during the exam.

Page:	1	2	3	4	Total
Points:	27	19	30	24	100
Score:					

1. Convert the following from radians to degrees or degrees to radians.

   (a) (3 points) 75°

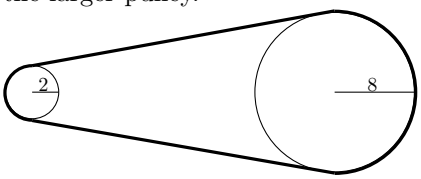
   (b) (3 points) $\dfrac{4\pi}{15}$

2. (16 points) Complete the following table.

θ in radians	θ in degrees	$\sin\theta$	$\cos\theta$	$\tan\theta$
	60°			
			$-\dfrac{\sqrt{3}}{2}$	
		-1		
$\dfrac{7\pi}{4}$				

3. (5 points) You are asked to design a sprinkler which will cover a field of 100 yd^2 in the shape of a sector of a circle with radius 10 yd. Through what angle should the sprinkler rotate?

4. (5 points) Two pulleys, one with radius 2 and one with radius 8, are connected via a belt (see diagram below). The smaller pulley rotates at a speed of 3 rev/min. Find the speed of revolution of the larger pulley.



The speed of revolution of the larger pulley is _____.

5. Solve the following expressions, giving *exact* values for each.

(a) (2 points) $\sin^2(20°) + \cos^2(20°)$

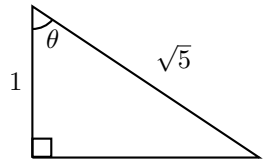
(b) (3 points) $1 - \cos^2(40°) - \cos^2(50°)$

(c) (2 points) $\sec^2(29°) - \tan^2(29°)$

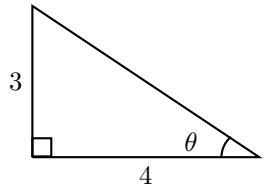
(d) (3 points) $\cos(25°)\sin(65°) + \cos(65°)\sin(25°)$

(e) (4 points) $\cos^2\left(\frac{7\pi}{6}\right) + \sin^2\left(\frac{7\pi}{6}\right) + \sin^3\left(\frac{7\pi}{6}\right)$

6. (24 points) Find the values for the six trigonometric functions for the following triangles.



$\sin\theta$	$\cos\theta$	$\tan\theta$	$\csc\theta$	$\sec\theta$	$\cot\theta$



$\sin\theta$	$\cos\theta$	$\tan\theta$	$\csc\theta$	$\sec\theta$	$\cot\theta$

7. (6 points) Find the exact value of the requested trigonometric function of θ given the following information:

$$\cos\theta = \frac{4}{5}, \quad 270^\circ < \theta < 360^\circ$$

$\sin\theta =$ _____ $\tan\theta =$ _____ $\sec\theta =$ _____

8. Graph the following function. Be sure to label key points and show at least **two full periods**.

$$y = -2\cos(2x) + 2$$

(a) (3 points) What is the amplitude of the function? _____

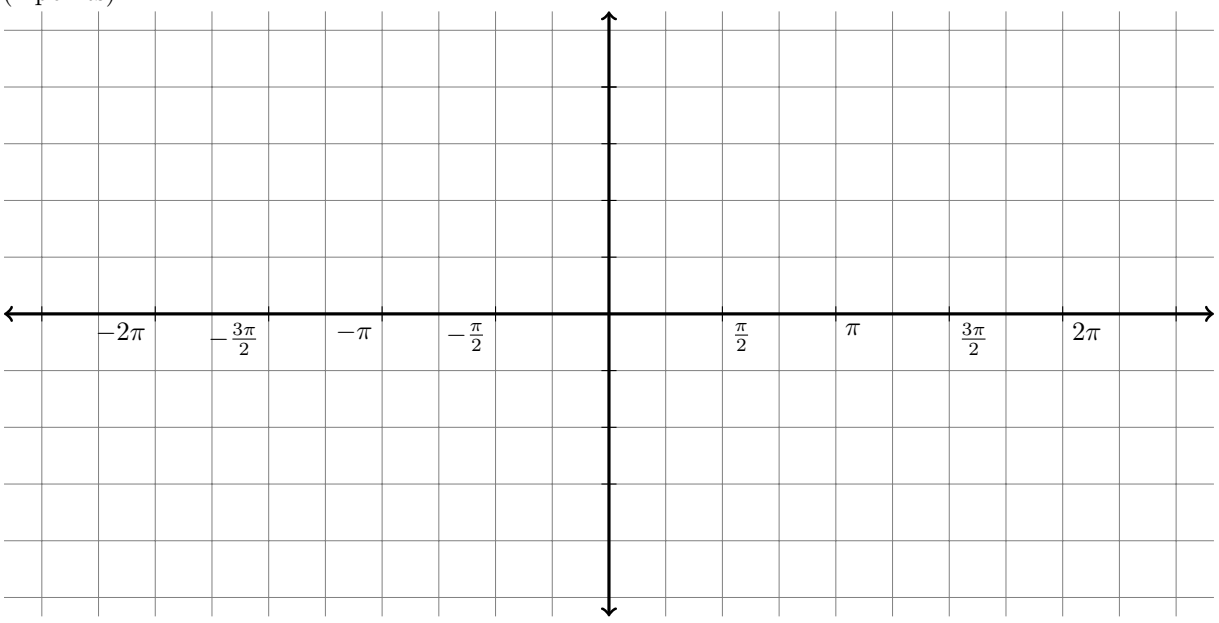
(b) (3 points) What is the period of the function? _____

(c) (3 points) What is the phase shift of the function? _____

(d) (3 points) What is the vertical shift of the function? _____

(e) (4 points) Is the function even or odd? _____

(f) (4 points)



9. (4 points) The equation above is not the only equation that can be used to express this graph. Give another equation that represents the same graph.