

Math 115 Carter Test 2 Fall 2008

General Instructions: Do not write on this test. Write your name on only the outside of your blue books. Do all your work inside your blue books. You do not need to simplify complicated expressions involving trig, logs, or exponentials, but you should write the values of simple trig expressions at multiples of $\pi/6$ or $\pi/4$, and you should write values of logarithms if the base and the argument are clearly related. Remember to use your turn signals when changing lanes. Good luck.

1. (3 points each) Evaluate the following:

(a) $\sin\left(\frac{7\pi}{6}\right)$

(b) $\log_4(2^8)$

2. (3 points each) Determine all values t between 0 and 2π for which:

(a) $\sin(t) = -1/2$

(b) $\tan(2t) = 1$

(c) $\cos(3t) = \frac{\sqrt{3}}{2}$

3. (5 points) What is the degree measurement of an angle whose radian measure is $\frac{7\pi}{8}$?

4. (5 points) What is the angle measurement of an arc of length 270 meters that lies upon a circle of radius 30 meters?

5. (10 points) Prove the trigonometry identity:

$$\frac{\sin(x)}{1 + \cos(x)} = \frac{1 - \cos(x)}{\sin(x)}$$

6. (5 points) Determine the side opposite the angle α in a triangle for which $\alpha = 110^\circ$, $b = 6$, and $c = 10$.

7. (10 points) Determine all points t in the interval $[0, 2\pi]$ for which

$$2(\cos(t))^2 + \cos(t) - 1 = 0$$

8. (10 points) Compute the present value of a bond that pays \$50,000 in 8 years if the current interest rate is 6% per year continuously compounded interest .

9. (8 points each) Sketch the graph of each of the following functions. Include horizontal and vertical scales, intercepts, asymptotes (if present) and at least two full cycles for a trigonometric function.

(a)

$$f(x) = \frac{x^2 - 1}{x^2 - 25}$$

(b)

$$f(x) = 10^{2x-1} + 3$$

(c)

$$f(x) = 2 \cos(3x)$$

(d)

$$f(x) = \sin\left(x - \frac{\pi}{3}\right)$$

(e)

$$f(x) = 3 \sec(x)$$