MATH 105: Trigonometry

Exam 1

July 3, 2013

To receive full credit you must clearly show all work and justify your answers. Give only exact solutions unless otherwise indicated. No books, or notes are allowed during this exam.

NAME:

| Question:	1	2	3	4	5	6	7	Total
Points:	5	10	10	10	10	10	10	60
Score:								

Identity Names

- Reciprical Identities

- Quotient Identities

- Even-Odd Identities

- Pythagorean Identities

- Addition and Subtraction Identities for Cosine

- Addition and Subtraction Identities for Sine

- Addition and Subtraction Identities for Tangent

- Cofunction Identities

- Double Angle Identites

- Half Angle Identites

1. (5 points) Convert the angle $30°15'10''$ to radians. Round to 3 decimal places if needed.

2. (10 points)   (a) What is the length of one period of $\tan(x)$ and the length of one period of $\cos(x)$?

    (b) Find $\tan\left(\frac{16\pi}{3}\right)$ and $\cos\left(\frac{16\pi}{3}\right)$.

3. (10 points) Consider the function $f(x) = -3\sin\left(2x - \frac{\pi}{2}\right) + 1$.

   (a) Find the period, amplitude, vertical shift, and phase shift of $f(x)$.

   (b) Use part (a) to sketch one cycle of the graph of $f(x)$.

4. (10 points) A photographer is taking a picture of a 3-foot-tall painting hung in an art gallery. The camera lens is 1 foot below the lower edge of the painting and x feet away from the painting. Suppose that the angle formed by the camera lens and the top and bottom of the painting is β.

   (a) Express β as a function of x.

   (b) What is the angle β (in degrees) if the camera is 4 feet from the painting? Round to 2 decimal places if necessary.

5. (10 points) Complete the following triangle (give your angles in degrees):
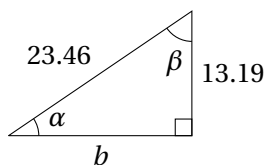
6. (10 points) Prove that $\dfrac{\sec^2(t)}{2 - \sec^2(t)} = \sec(2t)$ is an identity.

7. (10 points) Find $\cos\left[\sin^{-1}\left(-\frac{2}{3}\right) + \cos^{-1}\left(\frac{1}{3}\right)\right]$.