EXAM 1 - MATH 131

YOUR NAME:_____

Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Imagine an analog watch in which the length of the "seconds" hand is $\frac{3}{\pi}$ cm.

   (a) What is the angular speed of the hand in rad/sec?

   (b) What is the linear speed of the tip of the hand in cm/sec?

2. Suppose that $\tan \theta = \frac{2}{7}$ and $\pi < \theta < \frac{3\pi}{2}$. Find $\sec \theta$.

3. The angle of depression to one side of a lake, measured from a balloon 2500 feet above the lake is 43°. The angle of depression to the opposite side of the lake is 27°. What is the width of the lake?
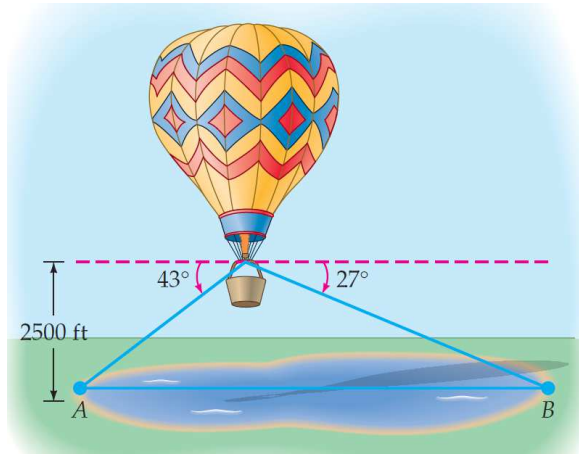
4. Perform the operations and simplify. You may only assume the three reciprocal, the two ratio and the three Pythagorean identities visited in class.

$$\cot\theta + \frac{1}{\cot\theta}.$$

5. (a) Write an equation for a sine-shaped wave with amplitude 5 and period $\frac{\pi}{6}$.

(b) Graph the function $f(t) = \cos t$, $0 \le t \le 2\pi$, showing all important points.

(c) What are the amplitude and period of $g(t) = \dfrac{3}{2} \cos\left(\dfrac{1}{3}t\right)$?

(d) Graph $y = g(t)$, the function of Part (c), showing one of its periods in detail.