Math 121 Special Assignment II Lowman Fall 2011

Calculators cannot be used. In all problems show your work, put a box around your answer and clearly label it. Put your name, your TA's name, your discussion time, and your UIN on **both pages** of the exam. You can show your clearly labeled work on the back of either sheet.

1. (a) Fill in all boxes of the table with EXACT values.

θ degrees	θ radians	$\sin(\theta)$	$\cos(\theta)$
0			
30			
45			
60			
90			

(b) In the boxes complete the trigonometric identities as given in lectures

left side of identity		right side of identity
$\sin(x+y)$	$=$	
$\cos(x+y)$	$=$	
$\sin(2x)$	$=$	
$\cos(2x)$	$=$	
$\cos^2(x)$ in terms of $\sin^2(x)$	$=$	
half angle identity for $\sin^2(x)$	$=$	

Show clearly labeled work for problems 2, 3, 4 and 5 on the back of the exam sheets.

2. If $\tan(\theta) = \frac{-4}{3}$ and $\cos(\theta) > 0$, find $\sin(\theta)$ and $\cos(\theta)$.

3. Find all solutions to:

$$\frac{log_3(10)}{log_3(e)} + \frac{1}{3} \cdot \log_2(2^3) \cdot e^{ln(3) \cdot x} - ln(10) = 3^{(5-6/x)} \cdot ln(e) + 99 * ln(1) \cdot 10^{(x^2+1)}$$

4. Solve for $\boldsymbol{t}$ when $\boldsymbol{P}$ is two times $\boldsymbol{A}$:

$$\boldsymbol{P = \frac{A}{1 - B \cdot 2^{-rt}}}$$

Show all steps and box your answer.

5. A wheel with radius $\boldsymbol{r = 24\ in}$ is rolling at a speed of $\boldsymbol{44\ ft/sec}$.

   (a) What is $\boldsymbol{\omega}$ the ***angular speed***, in **radians per second**?

   (b) Convert your answer to **rpms** (rotations per minute).

   Show all work, including units, for full credit. Give your answer in terms of $\boldsymbol{\pi}$ and reduce fractions when possible.
   $\boldsymbol{5280ft = 1mile}$, $\boldsymbol{1in = 2.54cm}$. $\boldsymbol{1km = 1000m}$, $\boldsymbol{1m = 100cm}$, $\boldsymbol{1\ rotation = 2\pi\ radians = 360\ degrees}$, $\boldsymbol{1min = 60sec}$.

6. Given $\boldsymbol{y = A\sin(\omega(x - x_0)) = A\sin(\omega x - \phi)}$ Find:

   - amplitude $\boldsymbol{A}$ = _____
   - period $\boldsymbol{T}$ = _____
   - angular frequency $\boldsymbol{\omega = \frac{2\pi}{T}}$ = _____
   - phase shift $\boldsymbol{x_0}$ = _____
   - phase constant $\boldsymbol{\phi}$ = _____
   - phase $\boldsymbol{\omega x - \phi}$ = _____