Math 121 Special Assignment II Lowman Fall 2012

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.

$\boldsymbol{\theta}$ degrees	$\boldsymbol{\theta}$ radians	$\sin(\boldsymbol{\theta})$	$\cos(\boldsymbol{\theta})$	$\tan(\boldsymbol{\theta})$
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
$\sin(x+y) \quad =$	
$\cos(x+y) \quad =$	
$\sin(2x) \quad =$	
$\cos(2x) \quad =$	
$\sin^2(x)$ in terms of $\cos^2(x) \quad =$	
half angle identity for $\cos^2(x) \quad =$	

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

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

3. A wheel with radius $r = 2\ m$ is rolling at a speed of $2000\ cm/hr$. (a) What is ω, the ***angular speed***, in **radians per second**? (b) Convert your answer to **rpms** (rotations per minute). i Show all work, including units, for full credit. $1km = 1000m$, $1m = 100cm$ and $1\ rotation = 2\pi\ radians = 360\ degrees$.

4. Solve for x. Give the exact solution. $\boldsymbol{6.2^{2x+1} = \pi}$

5. Find all solutions to:

$$\boldsymbol{99 * ln(1) \cdot 10^{(x^2+1)} + e^{ln(3)\cdot(x-7)} + ln(10) = 3^{-12/x} \cdot ln(e) + \frac{log_3(10)}{log_3(e)}}$$

Hint, if you use the properties of logarithms, the expression reduces to one that is easy to solve.

6. Find all solutions to:

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

Hint, if you use the properties of logarithms, the expression reduces to one that is easy to solve.

7. Solve for $\boldsymbol{t}$ in terms of $\boldsymbol{k}$, $\boldsymbol{F}$ and $\boldsymbol{P}$:

$$\boldsymbol{F = P \cdot e^{k\cdot t}}$$

Give the exact answer. Show all steps and box your answer.

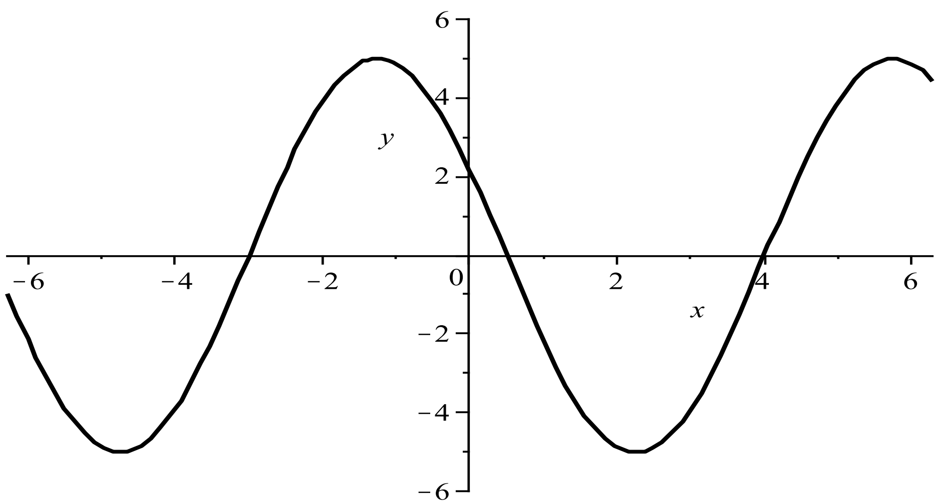
8. Solve for $\boldsymbol{t}$ when $\boldsymbol{P}$ is ten times $\boldsymbol{A}$:

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

Show all steps and box your answer.

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

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



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

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