## Math 121 Exam II Lowman Spring 2009

**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.

| $\theta$ degrees | $\theta$ radians | $\sin(\theta)$ | $\cos(\theta)$ | $\cot(\theta)$ |
|---|---|---|---|---|
| $0$ | | | | |
| $30$ | | | | |
| $45$ | | | | |
| $60$ | | | | |
| $90$ | | | | |

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

| left side of identity | right side of identity |
|---|---|
| $\sin(x+y)$ = | |
| $\cos(x+y)$ = | |
| $\sin(2x)$ = | |
| $\cos(2x)$ = | |
| $\cos^2(x)$ = | |
| alternate identity for $\cos^2(x)$ = | |

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

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

3. A wheel with radius $r = 0.5m$ is rolling at a speed of $10\ km/hr$. (a) What is $\omega$, the ***angular speed***, in **radians per second**? (b) Convert your answer to **rpms** (rotations per minute). Show all work, including units, for full credit. $1km = 1000m$ and $1m = 100cm$.

4. Find all solutions to:

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

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

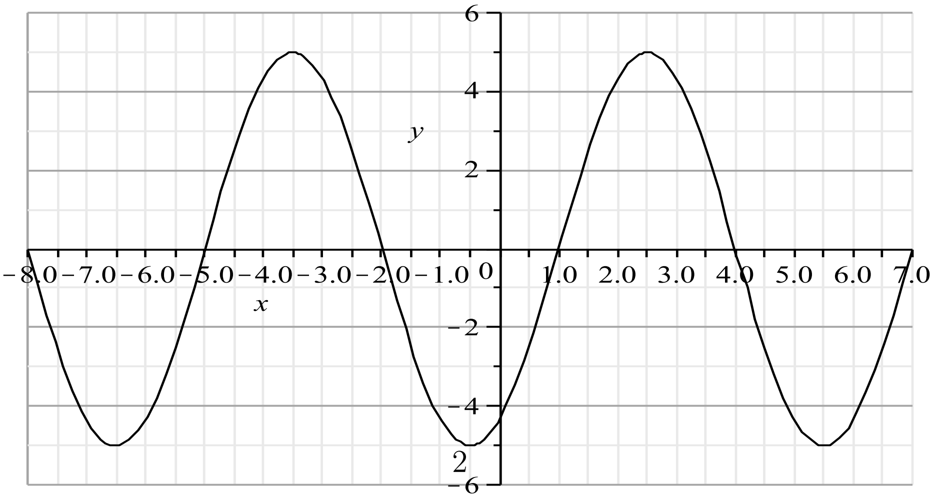
5. Solve for $t$ in terms of $r$ and $k$ when $F$ is two times $P$:

$$F = P\cdot(1+\frac{r}{k})^{k\cdot t}$$

Show all steps and box your answer.

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

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

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