TTU -- MATH1321 -- Josh Engwer
2/24/2011 Name:

TRIGONOMETRY – PRACTICE EXAM 2 – Chapters 4 – 5

DIRECTIONS/REMARKS:

- Do not write on exam (except your name) – use front and back of scratch paper provided.
- This exam is closed-book, closed-notes, closed-'everything' except a **scientific** calculator and 4x6 note-card.
- "EXACT" means answer must be in terms of whole #'s, fractions, and/or radicals – not calculator answers!
- Except for trig. functions of special and quadrantal angles, sufficient work must be shown for any credit!
- For graphs: label axes, label key points (or be clearly inferred from axes), and draw dashed lines for asymptotes.

PROBLEMS (10 points per entire problem):

1. Graph $y = 3 - 4\sin(2x - \pi)$ over a two-period interval (at least).

2. Given: $f(x) = 17 - 8\cos(7x + 1)$, state EXACTLY its: a) amplitude, b) period, c) domain, d) range

3. Given: $w = -\frac{3}{7} - \frac{5}{7}\tan\left(\frac{3\pi}{7}k - \frac{2}{7}\right)$, state EXACTLY its: a) amplitude, b) period, c) domain, d) range

4. The height of a weight attached to a spring (in inches) is:

   $s(t) = -17\cos(12\pi t)$, where t is time (in seconds) and, hence, t is non-negative (i.e. $t \geqslant 0\, sec.$).

   a) Find the maximum height that the weight rises above the equilibrium position.
   b) Determine the position at $t = 2.5$ seconds. (EXACT value or approximated to three decimal places).
   c) What is the period (EXACT value or approximated to three decimal places)?
   d) What is the frequency (EXACT value or approximated to three decimal places)?

5. Write each expression in terms of $\sin\theta$ and $\cos\theta$, and simplify so that no quotients remain:

   a) $sec(-\theta)\cot(-\theta)\sin(-\theta)$, b) $\cot^2(-\theta)(1 + \tan^2\theta)$

6. Verify that each trigonometric equation is an identity: a) $\sin^2\theta(1 + \cot^2\theta) - 1 = 0$, b) $\frac{\cos\alpha}{\sin\alpha\cot\alpha} = 1$

7. Find the EXACT value of each expression: a) $\cos(-\frac{\pi}{12})$, b) $\cos 173^\circ\cos 83^\circ + \sin 173^\circ\sin 83^\circ$

8. Find the EXACT value of each expression: a) $\tan\frac{13\pi}{12}$, b) $\sin 57^\circ\cos 177^\circ - \cos 57^\circ\sin 177^\circ$

9. Given that $\cos A = -\frac{4}{7}$ and $90^\circ < A < 180^\circ$, find EXACTLY: a) $\sin 2A$ b) $\cos\frac{A}{2}$

10. Find EXACTLY: a) $\sin(-22.5^\circ)$ b) $\tan\left(-\frac{\pi}{12}\right)$

BONUS QUESTIONS:

(B1) Graph $f(t) = -5 + 3\cot(3t + \frac{\pi}{4})$ over a two-period interval (at least).

(B2) Graph $h(v) = \frac{5}{2}sec\left(\frac{2}{5}v - \frac{\pi}{2}\right)$ over a two-period interval (at least).

(B3) Is each of the following functions even, odd, or neither (show work to justify answer):

a) $f(x) = x^{25}$ b) $g(z) = 10 - 3z^8$ c) $h(w) = 4 + w^{9267}$