Math 150: Trigonometry
Instructor: Hugh Cassidy
Exam 2
Friday, July 1st, 2005

Instructions: Attempt all questions. You must show your work to receive full credit.

Name:_____

1. Verify the given identities :

(i) $(\cot^2 x + 1)(1 - \cos^2 x) = 1$ (10 points)

(ii) $\dfrac{\sin(a - b)}{\tan a - \tan b} =$ (10 points)

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$\cos(a+b) \qquad 1 - (\tan a)(\tan b)$

(iii) $\cos^2 ({}^{v}/_{2}) = \dfrac{1 + \sec v}{2\sec v}$ (10 points)

2. Find the solutions to the following equations in the interval [0,2π)

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(i) $2\cos u + \tan u = \sec u$ (10 points)

(ii) $\cos 2u + \cos u = 0$ (10 points)

(iii) $2\sin a - \cos^2 a + 1 = 0$ (10 points)

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3. Find the exact values:

(i) $\tan {}^{7\pi}/_{12}$ (Hint: ${}^{7\pi}/_{12} = {}^{3\pi}/_{4} - {}^{\pi}/_{6}$) (5 points)

(ii) $\sin {}^{11\pi}/_{12}$ (Hint: ${}^{11\pi}/_{12} = {}^{2\pi}/_{3} + {}^{\pi}/_{4}$) (5 points)

4. If α and β are acute angles such that csc $\alpha = {}^{13}/_{5}$ and $\cot \beta = {}^{3}/_{4}$
Find:

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(i) $\cos(\alpha + \beta$ (3 points)

(ii) $\sin(\alpha + \beta$ (3 points)

(iii) $\tan(\alpha + \beta$ (4 points)

5. Find the exact value of the following if it is defined:

(i) $\cos^{-1}(\cos(5\pi/4))$ (5 points)

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(ii) $\cos\left(\sin^{-1} {}^{15}/_{17} - \sin^{-1} {}^{8}/_{17}\right)$ (15 points)

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