Math 121 Fall 2011 Exam 3 Prof Doyle

Read and follow the following directions.

1. Write your name, your TA's name, and your Tu/Th discussion time in the box on the front of the answer booklet.
2. SIGN your name in the box on the front of the answer booklet.
3. ALL WORK MUST BE SHOWN in the booklet for full credit.
4. There is NO SHARING OF CALCULATORS; forfeiture of exam is the penalty.
5. Keep your eyes on your own paper, cheating will be dealt with severely.
6. Place your exam question sheet INSIDE the booklet when you hand in your exam TO YOUR TA.

1. SHOW WORK in finding EXACT(no decimals) values of each of the following: 7pts each

a) $\sec\left[\sin^{-1}\left(\frac{-5}{13}\right)\right]$ b) $\cos\left[\tan^{-1}\left(\frac{4}{3}\right)-\sin^{-1}\left(\frac{-12}{13}\right)\right]$ c) $\csc\left[2\cos^{-1}\left(\frac{-7}{25}\right)\right]$

2. Solve the equations for the requested solution style, leaving all answers in fractions of π. 8pts each

a) $4\cos^2\theta = 3$ ALL solutions b) $\sec 2\theta = -\sqrt{2}$ *on* $[0, 2\pi)$

3. Use an appropriate $\alpha \pm \beta$ formula to find an EXACT value of $\cos 105^o$ 12pts

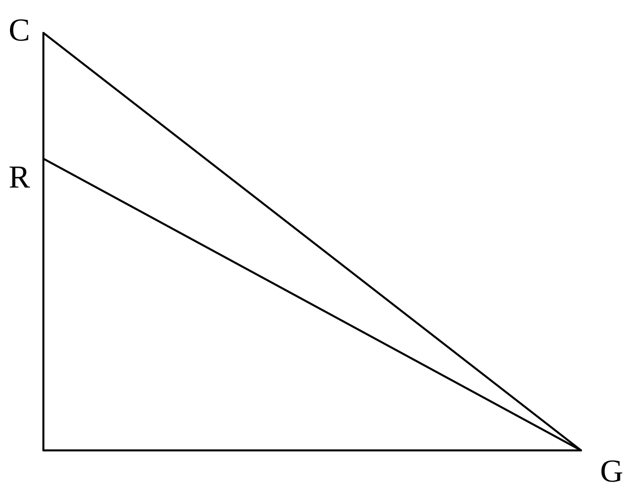
4. Copy the Identity into your booklet and prove it by working on ONE SIDE ONLY. 13pts

$$\frac{1}{\tan\theta - \sec\theta} + \frac{1}{\tan\theta + \sec\theta} = -2\tan\theta$$

5. Solve the Right triangle with: $b = 25.3$, $a = 17.9$, $C = 90^o$. Round to the nearest tenth. 10pts

6. **Solve** the triangle with side lengths of 15.6, 18.2, and 28.7, rounding to the nearest tenth. **Also, find its Area**. Round to the nearest tenth. 16 pts

7. A cliff(point C) on a mountain is at an unknown height. One person hangs a rope of length 250 feet from the cliff down to point R. Another person on the ground(G) measures the angles of elevation to the rope at 18.2^o and to the cliff at 23.7^o. Find the height of the cliff to the nearest tenth of a foot. 12pts
REDRAW THIS FIGURE IN YOUR BOOKLET AND LABEL ANY "PARTS" YOU USE.



$$\sin(\alpha+\beta)=\sin\alpha\cos\beta+\cos\alpha\sin\beta$$
$$\sin(\alpha-\beta)=\sin\alpha\cos\beta-\cos\alpha\sin\beta$$
$$\cos(\alpha+\beta)=\cos\alpha\cos\beta-\sin\alpha\sin\beta$$
$$\cos(\alpha-\beta)=\cos\alpha\cos\beta+\sin\alpha\sin\beta$$
$$\tan(\alpha+\beta)=\frac{\tan\alpha+\tan\beta}{1-\tan\alpha\tan\beta}$$
$$\tan(\alpha-\beta)=\frac{\tan\alpha-\tan\beta}{1+\tan\alpha\tan\beta}$$
$$\sin 2\theta=2\sin\theta\cos\theta$$
$$\cos 2\theta=2\cos^2\theta-1=\cos^2\theta-\sin^2\theta=1-2\sin^2\theta$$
$$\tan 2\theta=\frac{2\tan\theta}{1-\tan^2\theta}$$
$$\sin\frac{\theta}{2}=\pm\sqrt{\frac{1-\cos\theta}{2}} \qquad \cos\frac{\theta}{2}=\pm\sqrt{\frac{1+\cos\theta}{2}}$$
$$\tan\frac{\theta}{2}=\pm\sqrt{\frac{1-\cos\theta}{1+\cos\theta}}=\frac{1-\cos\theta}{\sin\theta}=\frac{\sin\theta}{1+\cos\theta}$$

Law of Sines: $\dfrac{\sin A}{a}=\dfrac{\sin B}{b}=\dfrac{\sin C}{c}$

Law of Cosines: $a^2=b^2+c^2-2bcCosA$

$b^2=a^2+c^2-2acCosB$

$c^2=a^2+b^2-2abCosC$

Area: $A=\frac{1}{2}abSinC=\frac{1}{2}acSinB=\frac{1}{2}bcSinA$

$A=\sqrt{s(s-a)(s-b)(s-c)} \qquad s=\dfrac{a+b+c}{2}$