

3 1/2 each

MAC 1114 Test 3
Fall 2004

Name Key

A calculator may be used on the remainder of the exam, but
EXACT ANSWERS ARE REQUIRED. THERE SHOULD BE NO DECIMAL VALUES ON THIS EXAM.

1-4. Give exact values for the following:

$\frac{\sqrt{6} - \sqrt{2}}{4}$ 1. $\sin(15^\circ)$

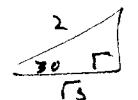
$\sin(45 - 30)$
 $\sin 45 \cos 30 - \cos 45 \sin 30$
 $(\frac{\sqrt{2}}{2})(\frac{\sqrt{3}}{2}) - (\frac{\sqrt{2}}{2})(\frac{1}{2})$

$\frac{\sqrt{2} - \sqrt{6}}{4}$ 2. $\cos(\frac{7\pi}{12})$

$\cos(\frac{4\pi}{12} + \frac{3\pi}{12}) = \cos 60 \cos 45 - \sin 60 \sin 45$
 $\frac{1}{2} \frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} \frac{\sqrt{2}}{2}$

$\frac{-3 - \sqrt{3}}{3 - \sqrt{3}}$ 3. $\tan(-75^\circ)$

$\tan(-45 + -30)$



$\frac{\tan(-45) + \tan(-30)}{1 - \tan(-45)\tan(-30)}$

$\frac{\sqrt{2 + \sqrt{2}}}{2}$ 4. $\cos(22.5^\circ)$

$\cos(\frac{45}{2}) = \pm \sqrt{\frac{1 + \cos 45}{2}}$

$\frac{(-1) + \frac{\sqrt{3}}{3}}{1 - (-1)(\frac{\sqrt{3}}{3})} = \frac{-3 - \sqrt{3}}{3 - \sqrt{3}}$

5-8. Given that $\sin A = \frac{3}{4}$, $\cos B = \frac{2}{3}$, A in Q1, and B in Q4, determine exact values for the following:
 $x = \sqrt{7}$, $y = \sqrt{5}$

$\frac{2\sqrt{7} - 3\sqrt{3}}{12}$ 5. $\cos(A - B)$

$\cos A \cos B + \sin A \sin B$
 $(\frac{\sqrt{7}}{4})(\frac{2}{3}) + (\frac{3}{4})(\frac{-\sqrt{3}}{3})$

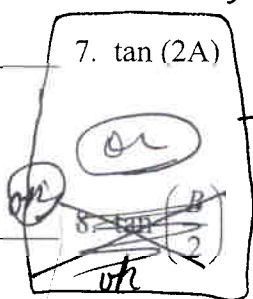
$-\frac{4\sqrt{5}}{9}$ 6. $\sin(2B)$

$2(-\frac{\sqrt{3}}{3})(\frac{2}{3})$

$-3\sqrt{7}$ 7. $\tan(2A)$

$\frac{2(\frac{3}{\sqrt{7}})}{1 - (\frac{3}{\sqrt{7}})^2} = \frac{\frac{6}{\sqrt{7}}}{1 - \frac{9}{7}} = \frac{\frac{6}{\sqrt{7}}}{-\frac{2}{7}} = -\frac{42}{2\sqrt{7}}$

$-\frac{\sqrt{5}}{5}$



$\pm \sqrt{\frac{1 - \frac{2}{3}}{1 + \frac{2}{3}}} = \sqrt{\frac{\frac{1}{3}}{\frac{5}{3}}} = \sqrt{\frac{1}{5}}$

$-\frac{42}{2\sqrt{7}} = -\frac{42\sqrt{7}}{2 \cdot 7} = -\frac{42\sqrt{7}}{14} = -3\sqrt{7}$

skip

9. Given $\cos 2\theta = \frac{\sqrt{3}}{6}$, find $\sin \theta, \theta$ in $Q1$

$$\frac{\sqrt{3}}{6} = 1 - 2\sin^2 \theta$$

10 - 13. Simplify to a single trigonometric term

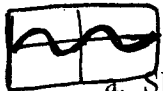
cos 50 10. $\cos^2 25 - \sin^2 25$

tan 86 11. $\frac{2 \tan 43^\circ}{1 - \tan^2 43^\circ}$

sin 78 12. $2 \sin (39^\circ) \cos (39^\circ)$

-cos theta 13. $\cos(\theta + \pi)$
 $\cos \theta \cos \pi - \sin \theta \sin \pi$
 $\quad \quad \quad -1 \quad \quad \quad 0$

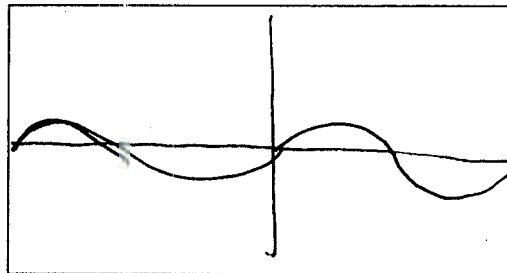
14. Enter $\frac{\tan \theta}{\sec \theta}$ into Y1 on your calculator and graph with zoom trig.



a. Sketch what you see on your screen here

b. Conjecture an identity

$$\frac{\tan \theta}{\sec \theta} = \underline{\sin \theta}$$



~~$(\cos^2 x - \sin^2 x)(\cos^2 x + \sin^2 x)$~~ 15. Factor and simplify: $\cos^4 x - \sin^4 x$

~~$(\cos x - \sin x)(\cos x + \sin x)$~~

or $\cos 2\theta$

$$\frac{-12 - 6\sqrt{3}}{(-3 - \sqrt{3})(3 + \sqrt{3})}$$

$$\frac{6}{-9 - 6\sqrt{3} - 3}$$