Precalculus Exam #4

Name _____ **Banner** _____

Note Title 6/28/2006

Follow these instructions or receive a zero.

Use a #2 pencil for the following:

1. Write your name on your parscore.
2. Fill in your banner ID, leaving out the @ symbol. Start from the left and go to the right. Be sure to fill in the corresponding bubbles.
3. This is Test Form A. Fill in this bubble under "Exam Form" on your parscore
4. Make sure you've written your name and banner on this exam at the top of this page.
5. As you take the exam, circle your answers on this test as well as fill in the corresponding bubbles on your parscore.
6. Feel free to write on this exam and to use the scratch paper attached.
7. **There can be more than one answer. This means you can fill in more than one bubble if necessary.**
8. Don't cheat. Read these instructions again to make sure you know what you're doing. Work the easy problems first. Cover your work!

#1 Which of the following are completely true?

a) $\cos(4\theta) = \cos^2(2\theta) - \sin^2(2\theta)$

b) $\cos(4\theta) = \cos(3\theta)\cos\theta - \sin(3\theta)\sin\theta$

c) $\cos(4\theta) = \cos\theta\cos(3\theta) - \sin\theta\sin(3\theta)$

d) $\cos(4\theta) = \cos(7\theta)\cos(3\theta) + \sin(7\theta)\sin(3\theta)$

e) None of the above

#2 Which of the following are completely true?

a) $\sin(4\theta) = 2\sin(2\theta)\cos(2\theta)$

b) $\sin(4\theta) = \sin(10\theta)\cos(6\theta) - \cos(10\theta)\sin(6\theta)$

c) $\sin(4\theta) = \sin\theta\cos(3\theta) + \cos\theta\sin(3\theta)$

d) $\sin(4\theta) = -\cos^2(2\theta) + \sin^2(2\theta)$

e) None of the above

#3 Which of the following are completely true?

a) $\sin^2(17\alpha) + \cos^2(17\alpha) = 17$

b) $\sin\theta = 2\sin(\frac{\theta}{2})\cos(\frac{\theta}{2})$

c) $\cos\theta = \cos^2(\frac{\theta}{2}) - \sin^2(\frac{\theta}{2})$

d) $\sin^2\theta - 1 = \cos^2\theta$

e) None of the above

#4 Which of the following are completely true?

a) If you use the sum/difference formula to find the exact value of $\sin(\frac{\pi}{12})$, you can get $\frac{\sqrt{6}-\sqrt{2}}{4}$.

b) If you use the sum/difference formula to find the exact value of $\cos(\frac{\pi}{12})$, you can get $\frac{\sqrt{6}+\sqrt{2}}{4}$.

c) If you use the half angle formula to find the exact value of $\sin(\frac{\pi}{12})$, you can get $\frac{\sqrt{2-\sqrt{3}}}{2}$

d) If you use the half angle formula to find the exact value of $\cos(\frac{\pi}{12})$, you can get $\frac{\sqrt{2+\sqrt{3}}}{2}$

e) None of the above

#5 $\cos(\tan^{-1}(1/2) + \sin^{-1}(1/4)) =$

a) $\frac{2\sqrt{15}-1}{4\sqrt{5}}$ b) $\frac{2\sqrt{15}+1}{4\sqrt{5}}$

c) $\cos(\tan^{-1}(\frac{1}{2}))\cos(\sin^{-1}(1/4)) - \sin(\tan^{-1}(\frac{1}{2}))\sin(\sin^{-1}(1/4))$

d) $\cos(\tan^{-1}(\frac{1}{2}))\sin(\sin^{-1}(1/4)) + \sin(\tan^{-1}(\frac{1}{2}))\cos(\sin^{-1}(1/4))$

e) None of the above

#6 Which of the following are completely true?

a) All solutions of $\cos\theta = \frac{1}{2}$ are $\theta = \frac{\pi}{3} + 2n\pi$, and $\theta = \frac{2\pi}{3} + 2n\pi$

b) All solutions of $\sin\theta = \frac{1}{2}$ are $\theta = \frac{\pi}{6} + 2n\pi$, and $\theta = \frac{5\pi}{6} + 2n\pi$

c) All solutions of $\cos\theta = 1$ are $\theta = 2n\pi$

d) All solutions of $\sin\theta = 1$ are $\theta = \frac{\pi}{2} + 2n\pi$

e) None of the above

#7 $\cos(80°)\sin(20°) + \sin(80°)\cos(20°) =$

a) $\cos(10°)$ b) $\sin(100°)$ c) $2\sin(50°)\cos(50°)$

d) π e) None of the above

#8 The expression $K - \frac{1}{\sec^2 x} = \sin^2 x$ is an identity when K is equal to

a) 1 b) $\frac{1}{\csc^2 x}$ c) $\tan^2 x \left(\frac{\cos^2 x}{\sin^2 x}\right)$ d) $-\sin^2 x$ e) None of the above

#9 $\frac{\sec^2\theta - 1}{\sec^2\theta} =$

a) $\cos^2\theta$ b) $\sin^2\theta$ c) $\tan^2\theta$ d) $\csc^2\theta$ e) None of the above

#10 Which of the following is NOT true?

a) $\sec\theta + \tan\theta = \frac{\cos\theta}{1+\sin\theta}$ b) $\frac{\sin\theta}{\sin\theta - \cos\theta} = \frac{1}{1-\cot\theta}$

c) $\frac{1+\tan\theta}{1-\tan\theta} = \frac{\cot\theta + 1}{\cot\theta - 1}$ d) $\cos^2\theta = \sin^2\theta - 1$

e) None of the above

#11 & Bonus: Derive the quadratic formula on your scratch sheet. This means: show that the solutions to an equation of the form $ax^2 + bx + c = 0$ are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

This can also be said:

Prove the assertion

$$ax^2 + bx + c = 0 \Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Hint: Reverse engineer (easier) OR use "complete the square"