Precalculus Test Sections 5.1 – 5.2 Name _____

1 – 5. Multiple Choice. Show work.

_____ 1. Given csc(x) = -3 and tan x >0, determine cos(x)

A. $\frac{-2\sqrt{2}}{3}$ B. $\frac{-3\sqrt{2}}{2}$ C. $\frac{2\sqrt{2}}{3}$ D. $\frac{3\sqrt{2}}{2}$ E. None of these

_____ 2. Simplify $\frac{\cos^4 x - \sin^4 x}{\cos^2 x - \sin^2 x}$

A. $1 - 2\sin^2 x$ B. $\cos^2 x - \sin^2 x$ C. -1 D. 1
E. None of these

_____ 3. Simplify: $\frac{\csc(x)}{\tan(x) + \cot(x)}$

A. cos(x) B. $\sin^2 x + \cos x$ C. $\csc^2 x \sec x$
D. cos(x) + tan(x) E. None of these

_____ 4. Factor and simplify: $\cot^4 x + 2\cot^2 x + 1$

A. $\tan^4 x$ B. $\csc^4 x$ C. $\sec^4 x$ D. $\csc^2 x$
E. None of these

_____ 5. Perform the subtraction and simplify: $\frac{\sec x}{\sin x} - \frac{\sin x}{\cos x}$

A. csc(x) B. tan(x) C. $\cos^2 x$ D. cot(x)
E. None of these

6 – 11. Free Response. Show ***all work*** on your own paper.
Prove each of the following identities:

6. $\sec^2 x - \sec^2 x \sin^2 x = 1$

7. $\cos x (\sec x - \cos x) = \sin^2 x$

8. $\csc(x) - \sin(x) = \cot(x) \cos(x)$

9. Choose ***one*** of the following identities to prove:

   A. $\sin^3 A \cos^2 A = \sin^3 A - \sin^5 A$

   B. $(1 + \sin\theta)(1 - \sin\theta) = \cos^2\theta$

10. Choose ***one*** of the following identities to prove:

   A. $\dfrac{\sin^3 A + \cos^3 A}{\sin A + \cos A} = 1 - \sin A \cos A$

   B. $\dfrac{1}{\cot^2 y} = \dfrac{1}{\cos^2 y} - 1$

11. Choose ***one*** of the following identities to prove:

   A. $\dfrac{\tan^2 x + 6\tan x + 5}{\sec^2 x - 2} = \dfrac{\tan x + 5}{\tan x - 1}$

   B. $\sec x + \tan x = \dfrac{1}{\sec x - \tan x}$

12. *Extra Credit*

   Prove : $\dfrac{1 + \sin x + \cos x}{1 - \sin x + \cos x} = \dfrac{1 + \sin x}{\cos x}$