Honors Trigonometry

Name _____

Copy original problem.

Per _____   Date _____

Convince *me* that **you** understand the concept*!*

No Calculators!

Chapter 4 Exam

I State the Domain and Range, show a sketch of the function and
show the "memory device" for each of the following: (20 pts tot)

a) $a(x) = \cos^{-1} x$ b) $b(x) = \sin^{-1} x$ c) $c(x) = \tan^{-1} x$

d) $d(x) = \sec^{-1} x$ e) $e(x) = \csc^{-1} x$ f) $f(x) = \cot^{-1} x$

II Given the constant k such that $0 \le k \le \pi$ and $\cos^{-1} x + \sin^{-1} x = k$.

Determine the exact value of k .   (15 pts)

III Solve $\forall \ x \ \varepsilon \ [0, 2\pi)$ (i.e. $0 \le x < 2\pi$).
Use proper set notation and include "circle solutions" where appropriate.   (15 pts ea.)

a) $\cos 2x + 2\sin^2 \dfrac{x}{2} = 1$

c) $\tan 2x \tan x = 1$

d) $\sin x + \cos x - 1 = 0$

III Given: $\cot^{-1} x = \begin{cases} \tan^{-1} \dfrac{1}{x} + \pi & \text{for } x < 0 \\ \\ \tan^{-1} \dfrac{1}{x} & \text{for } x > 0 \end{cases}$.

For the following two parts, be *very* clear in your explanations.

a)   Prove the $x > 0$ case.   (15 pts)

b)   Prove the $x < 0$ case.   (5 pts)

Extra Credit --------------------------------- **5 pts** --

Given $\sin 2x = \dfrac{1}{7}$, find the exact value of $\sin^4 x + \cos^4 x$.