Math 131 Homework Quiz V: (Stewart Calculus Ed. 6) August 25, 2008.

Open notes open book, no group work. Show work where appropriate.

1.3#2) Given $f(x) = x - 2$ and $g(x) = x^2 + 3x + 4$ find the formulas for the following functions

a.) $f \circ g$

$$(f \circ g)(x) = f(g(x)) = f(x^2+3x+4) = \boxed{x^2+3x+4-2.}$$

b.) $g \circ g$

$$(g \circ g)(x) = g(g(x)) = g(x^2+3x+4) = \boxed{(x^2+3x+4)^2 + 3(x^2+3x+4) + 4.}$$

7.2# 17) Given that $f(x) = Ca^x$ and the points (1,6) and (3,24) are on the graph $y = f(x)$ find the values of the constants $C$and a.

$f(1) = Ca^1 = 6 \longrightarrow C = 6/a \longrightarrow \left(\frac{6}{a}\right)a^3 = 24$

$f(3) = Ca^3 = 24$

$a^2 = 4$

$a = \pm 2$ choose 2.

So $C = 6/2 = 3$

$\boxed{f(x) = 3 \cdot 2^x}$

7.6#11) Prove that $\cos(\sin^{-1} x) = \sqrt{1 - x^2}$.

Note $x \in [-1, 1] = \text{dom}(\sin^{-1}(x))$ so $\cos(\sin^{-1}(x)) > 0$.

Since $\cos\theta \geq 0$ for $-\pi/2 \leq \theta \leq \pi/2$ $\left(\frac{\pi}{2} \cong 1.57\ldots\right)$

Let $Y = \cos(\sin^{-1}(x))$. Notice

$$\cos^2(\sin^{-1}(x)) + \sin^2(\sin^{-1}(x)) = 1$$

$$\Rightarrow Y^2 + [\sin(\sin^{-1}(x))]^2 = 1$$

$$Y^2 + x^2 = 1$$

$$Y = \pm\sqrt{1 - x^2}$$

But, $Y = \cos(\sin^{-1}(x)) > 0$ so choose (+)

$$Y = \sqrt{1 - x^2}$$

$\therefore$ $\boxed{\cos(\sin^{-1}(x)) = \sqrt{1 - x^2}}$