I(6). Find y' if

(a) $y = x^x \sin^{-1}(x)$

(b) $y = \Big(\log_{10} x^2\Big)\Big(\tan^{-1}(x)\Big)^{x+1}$

II. (a)(4) Find the inverse function of $y = \dfrac{x-2}{x+2}$

(b)(4) Find the domain and range of the inverse function.

III(9). Evaluate

(a) $\lim\limits_{x\to\infty} \dfrac{\sin x - x}{x^3}$

(b) $\lim\limits_{x\to\infty} \left(1 + \dfrac{3}{x} + \dfrac{5}{x^2}\right)^{x+1/x}$

(c) $\lim\limits_{x\to 1^+} \tan^{-1}\left(\dfrac{x+1}{x-1}\right)$

IV(9). Evaluate

(a) $\displaystyle\int_0^{\frac{\sqrt{3}}{4}} \frac{1}{1+16x^2}dx$

(b) $\displaystyle\int \frac{x}{\sqrt{1-x^4}}dx$

(c) $\displaystyle\int_e^{2e} \frac{1}{x\Big(\ln(x)\Big)^3}dx$

V (8) A solid is formed by rotating the region bounded by $y = x$, $y = 4x - x^2$ about the line $x = 7$. Find its volume.