Math 1172 Homework #4

6.4* # 8ab

6.6 # 22, 75

6.8 # 15

6.4 # 8a $\log_{10}\sqrt{10} = 1/2$, since $10^{1/2} = \sqrt{10}$

b $\log_{10} 40 + \log_{10} 2.5$

$= \log_{10}(40 \cdot 2.5) = \log_{10} 100 = 2$

6.6 # 22

$$\frac{d}{dx}\tan^{-1}(x^2) = \frac{1}{1+(x^2)^2} \cdot 2x = \frac{2x}{1+x^4}$$

6.6 # 75

$$\int \frac{1}{\sqrt{a^2-x^2}}\,dx = \int \frac{1}{\sqrt{(a^2)\left(1-\frac{x^2}{a^2}\right)}}\,dx$$

$$= \int \frac{1}{a\sqrt{1-(x/a)^2}}\,dx = \frac{1}{a}\int \frac{1}{\sqrt{1-\left(\frac{x}{a}\right)^2}}\,dx$$

$u = x/a$

$du = \frac{1}{a}\,dx$

$a\,du = dx$

$$= \frac{1}{a}\int \frac{1}{\sqrt{1-u^2}} \cdot a\,du = \int \frac{1}{\sqrt{1-u^2}}\,du$$

$$= \sin^{-1} u + C = \sin^{-1}\left(\frac{x}{a}\right) + C$$

6.8 #15

$$\lim_{t\to 0} \frac{e^{2t}-1}{\sin t} \to \frac{e^{2\cdot 0}-1}{\sin 0} = \frac{1-1}{0} = \frac{0}{0}$$

$$= \lim_{t\to 0} \frac{e^{2t}\cdot 2}{\cos t} \to \frac{e^{2\cdot 0}\cdot 2}{\cos 0} = \frac{2}{1} = \boxed{2}$$