yohandi - quiz 12

1a. $\int \frac{16x^3}{4x^2-4x+1}\,dx$

$= \int 4x + \frac{16x^2-4x}{4x^2-4x+1}\,dx$

$= \int 4x+4 + \frac{12x-4}{4x^2-4x+1}\,dx$

$= \int 4x+4 + \frac{\frac{3}{2}(8x-4)}{4x^2-4x+1} + \frac{2}{(2x-1)^2}\,dx$

$= 2x^2+4x+\frac{3}{2}\ln|4x^2-4x+1| - \frac{1}{(2x-1)} + C$

$= 2x^2+4x+3\ln|2x-1| - \frac{1}{2x-1} + C$

b. $\int_0^{\infty} \frac{1}{(1+x)\sqrt{x}}\,dx$

let $\sqrt{x} = \tan\theta$. $\quad x=0 \Rightarrow \theta = 0$ $\quad x=\infty \Rightarrow \theta = \frac{\pi}{2}$

$\frac{1}{2\sqrt{x}} = \sec^2\theta \cdot \frac{d\theta}{dx}$

$= \int_0^{\frac{\pi}{2}} \frac{2\sec^2\theta}{\sec^2\theta}\,d\theta$

$= 2\theta \Big|_{\theta=0}^{\pi/2}$

$= \pi$

2. False

3. T_5, I, M_5