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1. a) $$\lim_{x\to\infty} \frac{\ln(4x)}{e^{2x}\sqrt{x}} = \frac{\infty}{\infty}$$

maka gunakan dalil l'hopital

$$\to \lim_{x\to\infty} \frac{\frac{1}{x}}{2e^{2x}\sqrt{x} + \frac{e^{2x}}{2\sqrt{x}}} = \lim_{x\to\infty} \frac{1}{2xe^{2x} + \frac{e^{2x}\sqrt{x}}{2}} = \frac{1}{\infty} = 0$$

2. a) $$\lim_{x\to 0^+} (1+2x)^{\frac{1}{2x}} = \lim_{x\to 0^+} e^{\ln(1+2x)^{\frac{1}{2x}}} = e^{\lim_{x\to 0^+} \frac{\ln(1+2x)}{2x}} = e^1 = e$$

3. b) $$\int_{-\infty}^{2} \frac{dx}{x^2-4x+16} = \lim_{b\to-\infty} \int_b^2 \frac{dx}{x^2-4x+16}$$

$$= \lim_{b\to-\infty} \int_b^2 \frac{dx}{(x-2)^2(+12)} = \lim_{b\to-\infty} \int_b^2 \frac{dx}{(x-2)^2+12}$$

$$= \lim_{b\to-\infty} \left(\frac{1}{\sqrt{12}} \arctan \frac{(x-2)}{\sqrt{12}}\right)\Bigg]_b^2 \to \text{LOOKUP TABLE}$$

$$= \lim_{b\to-\infty} \left(\frac{\arctan 0}{\sqrt{12}} - \frac{\arctan(b-2)}{\sqrt{12}}\right)$$

$$= \left(0 - \left(-\frac{\pi}{2\sqrt{12}}\right)\right) = \frac{\pi}{2\sqrt{12}} = \frac{\pi}{4\sqrt{3}}$$

4. b) $$\frac{3}{\sqrt{81-x^2}} \to \text{fungsi genap}$$

$$\int_{-9}^{9} \frac{3}{\sqrt{81-x^2}}\,dx = 2\int_0^9 \frac{3}{\sqrt{81-x^2}}\,dx \to \text{LOOKUP TABLE}$$

$$\lim_{t\to 9^-} 2\int_0^t \frac{3}{\sqrt{81-x^2}}\,dx = \lim_{t\to 9^-} 6 \arcsin \frac{x}{9}\Bigg]_0^t$$

$$= \lim_{t\to 9^-} 2(3\arcsin 0 - 3\arcsin \frac{t}{9}) = 3\pi$$

5. b) $$\frac{\sin x}{(4-4\cos x)^{\frac{1}{3}}}, \text{ input } -x \to \frac{\sin(-x)}{(4-4\cos(-x))^{\frac{1}{3}}} = -\frac{\sin x}{(4-4\cos x)^{\frac{1}{3}}}$$

maka $\frac{\sin x}{(4-4\cos x)^{\frac{1}{3}}}$ fungsi ganjil.

berdasarkan ~~fung~~ sifat fungsi ganjil, $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\sin x}{(4-4\cos x)^{\frac{1}{3}}} = 0$