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(1) $\lim_{h \to 0} \frac{(3+h)^3 - 27}{h}$

$= \lim_{h \to 0} \frac{(27 + 27h + 9h^2 + h^3 - 27)}{h}$ → $(a+b)^3$

$= \lim_{h \to 0} \frac{(27h + 9h^2 + h^3)}{h}$

$= \lim_{h \to 0} \frac{(h(27 + 9h + h^2)}{h}$ → out factor h

$= \lim_{h \to 0} \frac{(h(27 + 9h + h^2)}{h}$

$= \lim_{h \to 0} (27 + 9h + h^2)$

$= \lim_{h \to 0} (h^2 + 9h + 27)$ → komutatif

$= 0^2 + 9 \times 0 + 27$ → masukin 0

$= 27$

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② $\lim_{x \to 5} \left(\frac{\sqrt{x-1} - 2}{x-5} \right)$

$\lim_{x \to 5} \left(\frac{\sqrt{x-1} - 2}{x-5} \times \frac{\sqrt{x-1} + 2}{\sqrt{x-1} + 2} \right)$ → Conjugate Rasional

$\lim_{x \to 5} \left(\frac{(\sqrt{x-1} - 2) \cdot (\sqrt{x-1} + 2)}{(x-5) \cdot (\sqrt{x-1} + 2} \right)$

$\lim_{x \to 5} \left(\frac{x - 1 - 4}{(x-5)(\sqrt{x-1} + 2)} \right)$ → $(a-b)(a+b)$

$\lim_{x \to 5} \left(\frac{\cancel{x-5}}{(\cancel{x-5})(\sqrt{x-1} + 2)} \right)$

$\lim_{x \to 5} \left(\frac{1}{\sqrt{x-1} + 2} \right)$

$\frac{1}{\sqrt{5-1} + 2}$ → masukin 5

$\frac{1}{4}$

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(3)

$y = \sqrt{\frac{x^2-1}{x^2+1}}$ Gradien fungsi y, pada $x = 2$

$m_{sec} = \frac{F(2+h) - F(2)}{h}$

$= \frac{\sqrt{\frac{2^2-2}{2^2+h+2}} - \sqrt{\frac{2^2-2}{2^2+2}}}{h}$ • Maaf salah masukin $2 = 1$

$= \frac{\sqrt{\frac{4-2}{6+h}} - \sqrt{\frac{4-2}{6}}}{h}$

$= \frac{\sqrt{\frac{2}{6+h}} - \sqrt{\frac{2}{6}}}{h}$

$= \frac{\sqrt{\frac{2}{6+h}} - \sqrt{\frac{1}{3}}}{h}$

$= \frac{\sqrt{\frac{2}{6+h}} - \frac{1}{\sqrt{3}}}{h}$

$= \frac{\sqrt{\frac{6}{6+h}} - 1}{\sqrt{3}\,h}$

$= \frac{\sqrt{\frac{6}{6+h}} - 1}{\sqrt{3}\,h}$

$$= \frac{\sqrt{6}}{\frac{\sqrt{6+h}}{\sqrt{3h}}} - 1$$

$$= \frac{\sqrt{6} - \sqrt{6+h}}{\frac{\sqrt{6+h}}{\sqrt{3h}}}$$

$$= \frac{\sqrt{6} - \sqrt{6+h}}{\sqrt{(6+h)\,3h}}$$

$$= \frac{\sqrt{6} - \sqrt{6+h}}{\sqrt{18+3h}\;h}$$

$$= \frac{\sqrt{6} - \sqrt{6+h}}{\sqrt{18+3h}\;h}$$

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(4) $\lim_{x \to 0^+} \left(\frac{1}{x} - \frac{1+x}{e^x - 1} \right)$

$\lim_{x \to 0^+} \left(\frac{e^x - 1 - x(1+x)}{x(e^x - 1)} \right)$ → Persamaan Penyebut

$\lim_{x \to 0^+} \left(\frac{\frac{d}{dx}\left(e^x - 1 - x(1+x)\right)}{\frac{d}{dx}\left(x(e^x - 1)\right)} \right)$ → Aturan l'hospital

$\lim_{x \to 0^+} \left(\frac{e^x - 1 - 2x}{\frac{d}{dx}\left(x(e^x - 1)\right)} \right)$ → Pemfaktoran

$\lim_{x \to 0^+} \left(\frac{e^x - 1 - 2x}{e^x + xe^x - 1} \right)$ → Pemfaktoran

$\lim_{x \to 0^+} \left(\frac{\frac{d}{dx}\left(e^x - 1 - 2x\right)}{\frac{d}{dx}\left(e^x + xe^x - 1\right)} \right)$

$\lim_{x \to 0^+} \left(\frac{e^x - 2}{\frac{d}{dx}\left(e^x + xe^x - 1\right)} \right)$

$\lim_{x \to 0^+} \left(\frac{e^x - 2}{2e^x + xe^x} \right)$ → Pemfaktoran

$$= \frac{e^0 - 2}{2e^0 + 0e^0} \rightarrow \text{masukin nol}$$

$$= -\frac{1}{2}$$