

Kalkulus Tbab 7

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Carilah $\frac{dy}{dx}$ dari $y = x^3$

$$\begin{aligned} y' = \frac{dy}{dx} &= \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} \\ &= \lim_{h \rightarrow 0} \frac{(x+h)^3 - x^3}{h} \\ &= \lim_{h \rightarrow 0} \frac{(x^3 + 3x^2h + 3xh^2 + h^3) - x^3}{h} \\ &= \lim_{h \rightarrow 0} \frac{h(3x^2 + 3xh + h^2)}{h} \\ &= \lim_{h \rightarrow 0} 3x^2 \end{aligned}$$

Carilah $\frac{dy}{dx}$ dari $y = \frac{1}{x}$ ~~$x = x^{-1}$~~

$$\begin{aligned} y' = \frac{dy}{dx} &= \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} \\ &= \lim_{h \rightarrow 0} \frac{(x+h)^{-1} - x^{-1}}{h} \\ &= \lim_{h \rightarrow 0} \frac{-1x^{-2} - (-1x^{-2})}{h} = -\frac{1}{x^2} \end{aligned}$$

Dik. $y = \left(\frac{2x-3}{3x+1} \right)^7$

$$y' = 7 \left(\frac{2x-3}{3x+1} \right)^6 \cdot \frac{d}{dx} \left(\frac{2x-3}{3x+1} \right)$$

$$= 7 \left(\frac{2x-3}{3x+1} \right)^6 \cdot \frac{11}{(3x+1)^2}$$

$$y' = 77 \frac{(2x-3)^6}{(3x+1)^8}$$

$$\begin{aligned} y' &= \frac{2(3x+1) - (2x-3)3}{(3x+1)^2} \\ &= \frac{11}{(3x+1)^2} \end{aligned}$$

No.

Date

Soal aturan rantai

$$① \quad y = \sin(x^3)$$

$$y' = 3x^2 \cdot \cos x^3$$

$$② \quad y = \sin^3 x$$

$$y' = 3\sin^2 x \cdot \cos x$$

$$③ \quad y = \tan(x^2 + 4x)$$

$$y' = (2x + 4) \sec^2(x^2 + 4x)$$

$$④ \quad y = \cos(x^2 - 7x)^6$$

$$y' = -6(2x - 7)(x^2 - 7x)^5 \sin(x^2 - 7x)^6$$

$$⑤ \quad y = \cos^6(x^2 - 7x)$$

$$y' = -6(2x - 7) \cos^5(x^2 - 7x) \sin(x^2 - 7x)$$