

NAMA: RIZKI PRATAMA

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Tugas

A. tentukan nilai a dan b agar fungsi berikut di kontinuasikan di titik yg di berikan

$$1. F(x) \begin{cases} ax+b & : x \leq 2 \\ 2x^2 - 1 & : x \geq 2 \end{cases}$$

$$2. F(x) \begin{cases} x^2 - 1 & : x < 3 \\ 2x + b & : x \geq 3 \end{cases}$$

Jawab.

$$1. F'(c) = \lim_{x \rightarrow c} \frac{F(x) - F(c)}{x - c}$$

$$F'(2) = \lim_{x \rightarrow 2} \frac{ax+b - (a \cdot 2 + b)}{x - 2}$$

$$= \lim_{x \rightarrow 2} \frac{ax - b - 2a + b}{x - 2}$$

$$= \lim_{x \rightarrow 2} \frac{ax - 2a}{x - 2}$$

$$F'(2) = \lim_{x \rightarrow 2} \frac{a(x - 2)}{x - 2} = a$$

$$* F'_+(c) = \lim_{x \rightarrow c} \frac{F(x) - F(c)}{x - c}$$

$$F'_+(2) = \lim_{x \rightarrow 2^+} \frac{2x^2 - 1 - (2 \cdot 2^2 - 1)}{x - 2}$$

$$= \lim_{x \rightarrow 2^+} \frac{2x^2 - 1 - 8 + 1}{x - 2}$$

$$= \lim_{x \rightarrow 2^+} \frac{(x-2)(2x+4)}{x-2}$$

$$\checkmark \lim_{x \rightarrow 2} 2x + 4 = 2 \cdot 2 + 4$$

$$x \rightarrow 2 \quad = 8$$

Allai A = 8

$$\begin{aligned} & \underset{x \rightarrow c}{\lim} f(x) = c \\ & \underset{x \rightarrow c^+}{\lim} f(x) = f(c) \\ & = a \cdot c^2 - b = \underset{x \rightarrow c^+}{\lim} 2x^2 - 1 = f(c) \end{aligned}$$

$$= a \cdot 2^2 - 1 = 2 \cdot 2^2 - 1$$

$$= 2a - b = 2 \cdot 2^2 - 1$$

$$2a - b = 2 \cdot 4 - 1$$

$$16 - b = 8$$

$$16 - 7 = 9$$

$$16 - 7 = 9$$

$$b = 9 \text{ maka } b = 9$$

Jadi nilai $a = 8$ dan nilai $b = 9$

$$2. f(x) \text{ dikatakan di terenssi di } c \text{ jika } [f(c) : f'(c)]$$

$$= f'(c) = \underset{x \rightarrow c}{\lim} \frac{f(x) - f(c)}{x - c}$$

$$= f'(3) : \underset{x \rightarrow 3}{\lim} \frac{x^2 - 1 - (3^2 - 1)}{x - 3}$$

$$: \underset{x \rightarrow 3^-}{\lim} \frac{x^2 - 1 - 9 + 1}{x - 3}$$

$$: \underset{x \rightarrow 3^-}{\lim} \frac{(x-3)(x+3)}{(x-3)}$$

$$= 3 + 3$$

$$= 6$$

$$\Rightarrow f'(c) = \underset{x \rightarrow c}{\lim} \frac{f(x) - f(c)}{x - c}$$

$$= f'(3) = \underset{x \rightarrow 3^+}{\lim} \frac{2ax+b - (2a(3)+b)}{x - 3}$$

$$\lim_{x \rightarrow 3^+} 2ax+b - \cancel{(a^2 a(3) + b)}_{x-3}$$

$$\lim_{x \rightarrow 3^+} 2ax+b - \cancel{(2a(x) + b)}_{x-3}$$

$$\lim_{x \rightarrow 3^+} 2ax+b - \cancel{6a}_{x-3}$$

$$\lim_{x \rightarrow 3^+} 2a(x) - \cancel{6a}_{x-3}$$

$$= 2a$$

$$= 6 = 2a \quad \frac{6}{2} = a = a = 3 \quad \text{nilai } a = 3$$

Syarat cari $\rightarrow F(x)$ kontinu di $x=c$: $|c = x = 3|$

$$\lim_{x \rightarrow 3^-} F(x) = \lim_{x \rightarrow 3^+} F(x) = F(c)$$

$$x \rightarrow 3^- \quad x \rightarrow 3^+$$

$$\lim_{x \rightarrow 3^-} x^2 - 1 = \lim_{x \rightarrow 3^+} x^2 - 1$$

$$= 3^2 - 1 = 2a(3) + b = 2a(3) + b$$

$$9 - 1 = 6a + b = 6a + b$$

$$8 = 6(3) + b$$

$$8 = 18 + b$$

$$8 - 18 = b$$

$$b = 10$$

Jadi nilai $a = 3$

dan nilai $b = 10$

(B)

Centukan fungsi turunan pertama datar.

1. $F(x) = (x+1)(x^3+2x+1)$

2. $F(x) = \frac{x+1}{x-1}$

3. $y = (2x-3)^{10}$

4. $y = \sin^3 x$

5. $y = \cos^4(4x^2 - x)$

Jawab

1. $F(x) = (x+1)(x^3+2x+1)$

$= F(x) = \frac{d}{dx} [(x+1)(x^3+2x+1)]$

$= F'(x) = \frac{d}{dx} (x^4 + 2x^2 + x + x^3 + 2x^2 + 1)$

$= F'(x) = \frac{d}{dx} (x^4 + 2x^2 + 3x^3 + x^2 + 1)$

$= F'(x) = 4x^3 + 2x^2 + x + 3x^2 + 0$

$= F'(x) = 4x^3 + 3x^2 + 3x^2 + 4x + 3$

2. $F(x) = \frac{x+1}{x-1}$

$= F(x) = \frac{u(x)}{v(x)}$

$= F'(x) = \frac{u'(x)v(x) - u(x)v'(x)}{(v(x))^2}$

$= u(x) = x+1$

$= v(x) = x-1$

$= F'(x) = \frac{i(x-1) - (x+1)}{(x-1)^2} = \frac{x-1-x-1}{(x-1)^2}$

$= F'(x) = \frac{-2}{(x-1)^2} = -2(x-1)^{-2}$

$= F(x) = -2(-2)(x-1)^{-2-1} \left(\frac{d}{dx}(x-1) \right)$

$$F'(x) = 4(x-1)^{-3}$$

$$F'(x) = -4\underline{(x-1)^{-3}}$$

$$3. y \Delta (2x-3)^{10}$$

$$\therefore y' = \frac{d}{dx} [(2x-3)^{10}]$$

$$= y' = \frac{d}{dx} [(10) \times \underline{(2x-3)^9}]$$

$$= y' = 10 \underline{g^9} x^2$$

$$= y' = 10 (2x-3)^9 \cdot x^2$$

$$= y' = 20 (2x-3)^9$$

$$4. y = \sin^3 x \quad (y = \sin x \rightarrow y' = \cos x)$$

$$\therefore y' = 3 \sin^{3-1} x \cdot \cos x$$

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

Jadi turunan pertamanya adalah.

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

$$5. y = \cos^4 (4x^2 - x)$$

$$y = [\cos (4x^2 - x)]^4$$

$$y' = 4 (\cos (4x^2 - x))^3 \frac{d}{dx} [\cos (4x^2 - x)] \frac{d}{dx} (4x^2 - x)$$

$$= 4 \cos^3 (4x^2 - x) \cdot -\sin (4x^2 - x) \cdot (8x - 1)$$

$$= 4(8x-1) \cos^3 (4x^2 - x) \sin (4x^2 - x)$$

$$= 2(8x-1) \cdot 2 \sin (4x^2 - x) \cdot -\cos (4x^2 - x) \cos^2 (4x^2 - x)$$

$$= 2(8x-1) \cdot -\sin (2(4x^2 - x)) \cdot \cos^2 (4x^2 - x)$$

$$= 2(8x-1) \cdot \sin (8x^2 - 2x) \cdot \cos^2 (4x^2 - x)$$