

# Rumus turunan

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$$f(x) = x^{\frac{1}{2}} + x^{\frac{2}{3}} + 1$$

$$f'(x) = \frac{1}{2}x^{\frac{1}{2}-1} + \frac{2}{3}x^{\frac{2}{3}-1} + 0 = \frac{1}{2}x^{-\frac{1}{2}} + \frac{2}{3}x^{-\frac{1}{3}}$$

1.  $\frac{d(x^n)}{dx} = nx^{n-1}; n \in \mathbb{R}$

1.  $f(x) = x^{1/2} + \sqrt[3]{x^2} + 1$

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

3.  $f(x) = \frac{x+1}{x-1}$

4.  $f(x) = \frac{x}{x^2-1}$

5.  $f(x) = \frac{x^2-1}{x^2+1}$

2.  $\frac{d(f(x)+g(x))}{dx} = \frac{d(f(x))}{dx} + \frac{d(g(x))}{dx}$

3.  $\frac{d(f(x)g(x))}{dx} = g(x)\frac{d(f(x))}{dx} + f(x)\frac{d(g(x))}{dx}$

4.  $\frac{d\left(\frac{f(x)}{g(x)}\right)}{dx} = \frac{g(x)d(f(x)) - f(x)d(g(x))}{g^2(x)}$

$y = x^{10} \rightarrow y' = 10x^9$

$y = \frac{1}{\sqrt{x}} = x^{-\frac{1}{2}} \rightarrow y' = -\frac{1}{2}x^{-\frac{1}{2}-1} = -\frac{1}{2}x^{-\frac{3}{2}}$

$y = f(x)g(x) \rightarrow y' = f'(x)g(x) + f(x)g'(x)$

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

$f(x) = x+1 \rightarrow f'(x) = 1$   
 $g(x) = x^3 + 2x + 1 \rightarrow g'(x) = 3x^2 + 2$   
 $y' = 1(x^3 + 2x + 1) + (x+1)(3x^2 + 2)$

$y = \frac{f(x)}{g(x)} \rightarrow y' = \frac{f'(x)g(x) - g'(x)f(x)}{(g(x))^2}$

Contoh  $\rightarrow y = \frac{2x}{x^2+1}$   
 $f(x) = 2x \rightarrow f'(x) = 2$   
 $g(x) = x^2+1 \rightarrow g'(x) = 2x$   
 $y' = \frac{2(x^2+1) - 2x(2x)}{(x^2+1)^2}$