



مدونة المناهج السعودية

<https://eduschool40.blog>

الموقع التعليمي لجميع المراحل الدراسية

في المملكة العربية السعودية

تفاضل الدوال
اللوغاريتمية

①

$$y = \log_2 (x^2 - 2)$$

$$\frac{dy}{dx} = \frac{2x}{(x^2 - 2) \ln 2}$$

$$y = \log_4 (3x - 2)$$

$$\frac{dy}{dx} = \frac{3}{(3x - 2) \ln 4}$$

$$y = \log_2 (2 - 3x)$$

$$\frac{dy}{dx} = \frac{-3}{(2 - 3x) \ln 2}$$

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

$$= \ln(x^2 + 1) - \ln(x^3 + 3)$$

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

$$f(x) = \log_2 (4x - 2)$$

$$f'(x) = \frac{4}{(4x - 2) \ln 2}$$

(2)

$$y = \ln \sqrt{x^2+1}$$

$$y = \ln (x^2+1)^{\frac{1}{2}}$$

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

$$= \frac{1}{2} \frac{2x}{x^2+1} = \frac{x}{x^2+1}$$

$$y = \log_4 x^2$$

$$\frac{dy}{dx} = \frac{2x}{x^2 \ln 4}$$

$$f(x) = \ln \sqrt{\frac{x^2+1}{x^2+1}} = \ln \left(\frac{x^2+1}{x^2+1} \right)^{\frac{1}{2}}$$

$$\frac{1}{2} [\ln(x+1) - \ln(x^2+1)]$$

$$\frac{1}{2} \frac{1}{x+1} - \frac{1}{2} \frac{2x}{x^2+1}$$

$$\frac{1}{2(x+1)} - \frac{x}{x^2+1}$$

$$y = \ln \sqrt[3]{x^3+3x^2-6} = \ln (x^3+3x^2-6)^{\frac{1}{3}}$$

$$\frac{dy}{dx} = \frac{1}{3} \frac{3x^2+6x}{x^3+3x^2-6}$$

$$= \frac{x^2+2x}{x^3+3x^2-6}$$

(3)

$$y = \log_4 \{3 - 5x\}$$

$$\frac{dy}{dx} = \frac{-5}{(3-5x) \ln 4}$$

$$y = \ln \sqrt[4]{x^4 + 4x^3}$$

$$\frac{1}{4} \ln (x^4 + 4x^3)$$

$$f'(x) = \frac{1}{4} \frac{4x^3 + 12x^2}{x^4 + 4x^3} = \frac{x^3 + 3x^2}{x^4 + 4x^3}$$

$$y = \ln \left(\frac{7x+6}{x^2+2} \right)$$

$$y = \ln (7x+6) - \ln (x^2+2)$$

$$= \frac{7}{7x+6} - \frac{2x}{x^2+2}$$

$$y = \log_3 \sqrt{x^2+2x}$$

$$= \log_3 (x^2+2x)^{\frac{1}{2}}$$

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

(4)

$$y = \ln \sqrt[4]{2x^2+1}$$

$$y = \frac{1}{4} \ln (2x^2+1)$$

$$\frac{1}{4} \frac{4x}{2x^2+1} = \frac{x}{2x^2+1}$$

$$y = \log_3 (10x^2+4)$$

$$y' = \frac{20x}{(10x^2+4)(\ln 3)}$$

$$y = \log_5 (x^2+2x)$$

$$\frac{dy}{dx} = \frac{2x+2}{(x^2+2x)\ln 5}$$

$$y = \ln \left(\frac{x+1}{x^2+1} \right)$$

$$y = \ln(x+1) - \ln(x^2+1)$$

$$\frac{1}{x+1} - \frac{2x}{x^2+1}$$

$$y = \log_4 \sqrt[3]{x+5}$$

$$y = \frac{1}{3} \log_4 (x+5) = \frac{1}{3} \frac{1}{(x+5)\ln 4}$$

(5)

$$y = \ln \left(\frac{x}{x+1} \right)$$
$$= \ln x - \ln(x+1)$$
$$\frac{1}{x} - \frac{1}{x+1}$$

$$y = \log \{ x^2 + x^4 \}$$

$$\frac{dy}{dx} = \frac{2x + 4x^3}{x^2 + x^4}$$

$$y = \log_4 (x^2 - x)$$

$$y' = \frac{2x - 1}{(x^2 - x) \ln 4}$$

$$y = \ln (x^2 + 1)(x^4 + 1)$$

$$\ln (x^2 + 1) + \ln (x^4 + 1)$$

$$\frac{2x}{x^2 + 1} + \frac{4x^3}{x^4 + 1}$$

$$y = \log_3 (4x + 2)$$

$$\frac{4}{(4x + 2) \ln 3}$$