

Производные
стр 102 § 3.1

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$$1) y = x^{\operatorname{tg} x}$$

$$\ln y = \operatorname{tg} x \ln x$$

$$(\ln y)' = (\operatorname{tg} x \ln x)'$$

$$\frac{y'}{y} = \frac{1}{\cos^2 x \ln x} x + \operatorname{tg} x \cdot \frac{1}{x}$$

$$y' = x^{\operatorname{tg} x} \cdot \frac{1}{\cos^2 x \ln x} x + \frac{\operatorname{tg} x}{x}$$

$$2) y = (\cos x)^x$$

$$\ln y = x \ln \cos x$$

$$(\ln y)' = (x \ln \cos x)'$$

$$\frac{y'}{y} = 1 \cdot \ln \cos x + x \cdot \left(-\frac{\sin x}{\cos^2 x} \right)$$

$$y' = (\cos x)^x \cdot \ln \cos x - x \frac{\sin x}{\cos^2 x}$$

$$3) y = (\ln x)^{\arcsin 2x}$$

$$\ln y = \arcsin 2x \ln x$$

$$(\ln y)' = (\arcsin 2x \ln x)'$$

$$\frac{y'}{y} = \frac{2 \ln x}{\sqrt{1-4x^2}} + \frac{\arcsin 2x}{\ln x}$$

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

$$4) y = \frac{(x-2)^2}{e^{5x} \cdot \sqrt{x}}$$

$$\ln y = 2 \ln(x-2) - 5 + \ln e - \ln 5\sqrt{x}$$

$$\frac{y'}{y} = \frac{2}{\ln x - 2} - 5 \ln e - \frac{1}{5 \ln x}$$

$$y' = \frac{(x-2)^2}{e^{5x} \cdot \sqrt{x}} \cdot \left(\frac{2}{\ln x - 2} - 5 \ln e - \frac{1}{5 \ln x} \right)$$

$$5) y = x^{x^2}$$

$$\ln y = x^2 \ln x$$

$$(\ln y)' = (x^2 \ln x)'$$

$$\frac{y'}{y} = 2x \ln x + \frac{x^2}{\ln x}$$

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

N 3 (37)

$$1) f(x) = 4x + 10 - \frac{1}{\sqrt{x}} + \frac{5}{5\sqrt{x}} - \frac{4}{x}$$

$$f(x)' = 4 + \frac{1}{x\sqrt{x}} - \frac{10}{3x\sqrt{x}} + \frac{4}{x^2}$$

$$f(1)' = 4 + 1 - 3\frac{1}{3} + 4 - 1 = \frac{2}{3}$$

$$2) f(x) = (x-1)(\sqrt{x^2-1})$$

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

$$f(2) = \sqrt{3} + 2$$

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

$$f(2)' = \frac{1}{2\sqrt{2^2+1}} \cdot 2 \cdot 2 = \frac{1}{\sqrt{2^2+1}} \cdot 1$$

$$f(2)' = \frac{1}{\sqrt{5}}$$

$$f(\sqrt{3})' = -\frac{1}{3}$$

$$4) f(x) = 3\sqrt[3]{\ln x + 3}$$

$$f(x)' = 3 \cdot \frac{1}{3\sqrt[3]{\ln x + 3}} \cdot e^{\ln x + 3} \cdot \frac{1}{x}$$

$$f(x)' = e^{\frac{\ln x + 3}{3}}$$

$$f(0)' = e^{\frac{3}{3}} = e$$

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

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

$$f(2)' = \frac{1}{\ln 5} \cdot \frac{16}{20}$$

2.2 (38)

$$1) f(x) = \cos^2 x$$

$$f(x)' = -2 \cdot \sin x \cdot \cos x$$

$$f\left(\frac{\pi}{4}\right)' = -2 \cdot 0 \cdot \cos x = 0$$

$$2) f(2) = \ln \sin 2$$

$$f(2)' = (\ln \sin 2)' = (\sin 2)' \cdot \frac{1}{\sin 2} = \cos 2 \cdot \frac{1}{\sin 2} = \frac{\cos 2}{\sin 2}$$

$$f\left(\frac{\pi}{6}\right)' = \frac{\frac{\sqrt{3}}{2}}{0} = \text{unbestimmt}$$

$$3) f(x) = \cos x + \sin^2 x$$

$$f(x)' = 2 \sin x \cdot \cos x - \sin x$$

$$f(0)' = 2 \cdot 0 \cdot 1 - 0 = 0$$

$$u) f(x) = \ln \csc x$$

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

$$f\left(\frac{\pi}{4}\right)' = \text{perlu cari hem}$$

$$3) f(y) = e^{\cos 2y}$$

$$f(y)$$

$$f'(y) = -2 \sin 2y$$

$$f(y)' = -2 \sin 2y \cdot e^{\cos 2y}$$

$$f\left(\frac{\pi}{4}\right)' = 0$$