Д/з 5

1. a) $(\sin x \cdot \cos x)' = \cos x \cdot \cos x + (-\sin x) \cdot \sin x =$
$= \underline{\cos^2 x - \sin^2 x}$

b) $(\ln(2x+1)^3)' = 3\ln(2x+1) = \frac{3}{(2x+1)} \cdot 2 =$
$= \underline{\frac{6}{2x+1}}$

c) $\left(\sqrt{\sin^2(\ln(x^3))}\right)' = \frac{1}{2} \cdot (\sin^2(\ln(x^3)))^{-\frac{1}{2}} \cdot 2\sin(\ln(x^3)) \cdot$
$\cdot \cos(\ln(x^3)) \cdot \frac{1}{x^3} \cdot 3x^2 = \frac{\cancel{2}\sin(\ln(x^3))}{\cancel{2}\sqrt{\sin^2(\ln(x^3))}} \cdot$
$\cdot \cos(\ln(x^3)) \cdot \frac{3x^2}{x^3} =$
$= \underline{\frac{\sin(\ln(x^3))}{\sqrt{\sin^2(\ln(x^3))}} \cdot \cos(\ln(x^3)) \cdot \frac{3}{x}}$

d) $\left(\frac{x^4}{\ln(x)}\right)' = \frac{4x^3 \cdot \ln(x) - x^4 \cdot 1/x}{(\ln(x))^2} =$
$= \underline{\frac{4x^3 \cdot \ln(x) - x^3}{(\ln(x))^2}}$

2

$$f(x) = \cos(x^2+3x), \quad x_0 = \sqrt{\pi}$$

$$f'(x) = -\sin(x^2+3x)\cdot(2x+3)$$

$$f'(\sqrt{\pi}) = \underline{-\sin((\sqrt{\pi})^2 + 3\sqrt{\pi})\cdot(2\cdot\sqrt{\pi}+3)}$$

3

$$f(x) = \frac{x^3 - x^2 - x - 1}{1+2x+3x^2-4x^3}, \quad x_0 = 0$$

$$f'(x) = \frac{(3x^2-2x-1)\cdot(1+2x+3x^2-4x^3) - (2+6x-12x^2)\cdot}{(1+2x+3x^2-4x^3)^2}$$

$$\underline{\cdot(x^3-x^2-x-1)}$$

$$f'(0) = \frac{-1+2}{1} = \underline{1}$$

4

$$f(x) = \sqrt{3x}\cdot\ln x, \quad x_0 = 1$$

$$f'(x) = \frac{\ln(x)}{2\cdot\sqrt{3x}} + \frac{\sqrt{3x}}{x}$$

$$f'(1) = \frac{\overbrace{\ln 1}^{=0}}{2\cdot\sqrt{3\cdot 1}} + \frac{\sqrt{3\cdot 1}}{1} = \sqrt{3}$$

$$tg\,\alpha = \sqrt{3}$$

$$\alpha = arctg\sqrt{3} = \underline{60^\circ}$$