$\boxed{3.3}$ Найти производную:

$$\left(\ln\frac{\sin x\,(x+1)^3}{(x-4)^5}\right)' = \left(\frac{\sin x\,(x+1)^3}{(x-4)^5}\right)^{-1}\left(\frac{\sin x\,(x+1)^3}{(x-4)^5}\right)' =$$

$$= \frac{(x-4)^5}{(x+1)^3\sin x}\;\frac{\left(\sin x\,(x+1)^3\right)'(x-4)^5 - \sin x\,(x+1)^3\left((x-4)^5\right)'}{\left((x-4)^5\right)^2} =$$

$$= \frac{(x-4)^5}{(x+1)^3\sin x}\;\frac{\left((\sin x)'(x+1)^3 + \sin x\left((x+1)^3\right)'\right)(x-4)^5 - \sin x\,(x+1)^3\left((x-4)^5\right)'}{(x-4)^{10}} =$$

$$= \frac{(x-4)^5}{(x+1)^3\sin x}\;\frac{\left(\cos x\,(x+1)^3 + \sin x\,3(x+1)^2\right)(x-4)^5 - \sin x\,(x+1)^3\,5(x-4)^4}{(x-4)^{10}} =$$

$$= \frac{(x-4)^5}{(x+1)^3\sin x}\;\frac{(x-4)^5\left((x+1)^3\cos x + 3(x+1)^2\sin x\right) - 5(x-4)^4(x+1)^3\sin x}{(x-4)^{10}} =$$

$$= \frac{(x-4)^5}{(x+1)^3\sin x}\;\frac{(x-4)^5(x+1)^2\left((x+1)\cos x + 3\sin x\right) - 5(x-4)^4(x+1)^3\sin x}{(x-4)^{10}} =$$

$$= \frac{(x-4)^5}{(x+1)^3\sin x}\;\frac{(x-4)^4(x+1)^2}{(x-4)^{10}}\left((x-4)\left((x+1)\cos x + 3\sin x\right) - 5(x+1)\sin x\right) =$$

$$= \frac{(x-4)(x+1)\cos x + 3(x-4)\sin x - 5(x+1)\sin x}{(x+1)(x-4)\sin x} =$$

$$= \frac{(x+1)(x-4)\cos x + \left(3(x-4) - 5(x+1)\right)\sin x}{(x+1)(x-4)\sin x} =$$

$$= \frac{(x+1)(x-4)\cos x + (-2x-17)\sin x}{(x+1)(x-4)\sin x} =$$

$$= \frac{(x+1)(x-4)\cos x - (2x+17)\sin x}{(x+1)(x-4)\sin x} =$$

$$= \frac{\cos x}{\sin x} - \frac{2x+17}{(x+1)(x-4)} =$$

$$= \operatorname{ctg} - \frac{2x+17}{(x+1)(x-4)}$$

$$\left(\ln \frac{\sin x (x+1)^3}{(x-4)^5}\right)' = \left(\ln \sin x + \ln (x+1)^3 - \ln (x-4)^5\right)' =$$

$$= \left(\ln \sin x + 3\ln (x+1) - 5\ln (x-4)\right)' =$$

$$= (\ln \sin x)' + 3(\ln (x+1))' - 5(\ln (x-4))' =$$

$$= \frac{(\sin x)'}{\sin x} + 3\frac{(x+1)'}{x+1} - 5\frac{(x-4)'}{x-4} =$$

$$= \frac{\cos x}{\sin x} + \frac{3}{x+1} - \frac{5}{x-4} =$$

$$= ctg\, x + \frac{3(x-4) - 5(x+1)}{(x+1)(x-4)} =$$

$$= ctg\, x + \frac{-2x-17}{(x+1)(x-4)} =$$

$$= ctg\, x - \frac{2x+17}{(x+1)(x-4)}$$

Imlem:

$$\boxed{\left(\ln \frac{\sin x (x+1)^3}{(x-4)^5}\right)' = ctg - \frac{2x+17}{(x+1)(x-4)}}$$