Урок 6, задание 6

$\operatorname{arctg}(x)$ - обратная тригонометрическая функция

$y = \operatorname{arctg} x \to x = \operatorname{tg} y$

$$y'_x = \frac{1}{x'_y}$$

$$x'_y = \lim_{\Delta y \to 0} \frac{\operatorname{tg}(y+\Delta y) - \operatorname{tg} y}{\Delta y} = \frac{\frac{\sin(y+\Delta y - y)}{\cos(y+\Delta y)\cos y}}{\Delta y} =$$

$$= \frac{\sin \Delta y}{\Delta y \cos(y+\Delta y)\cos y} = \frac{1}{\cos^2 y}$$

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

$$y'_x = \frac{1}{x'_y} = \frac{1}{1+\operatorname{tg}^2 y} = \frac{1}{1+x^2}$$