6. $2x \arctan x = -3 + e^y \qquad \left(1, \ln\left(\frac{\pi}{2}+3\right)\right)$

$$\frac{d}{dx}\left(\underbrace{2x}_{P}\ \underbrace{\arctan x}_{Q}\right) = \frac{d}{dx}(-3) + \frac{d}{dx}\left(e^y\right)$$

$$P' = 2 \qquad Q' = \frac{1}{1+x^2}$$

$$P'Q + PQ'$$

$$2\arctan x + 2x\left(\frac{1}{1+x^2}\right) = 0 + e^y \cdot y'$$

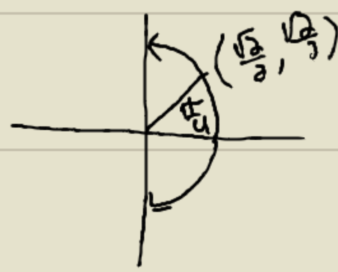
$$2\arctan x + \frac{2x}{1+x^2} = e^y y'$$

$$2(1+x^2)\arctan x + (1+\cancel{x^2})\left(\frac{2x}{1+\cancel{x^2}}\right) = e^y(1+x^2)y'$$

$$2(1+x^2)\arctan x + 2x = e^y(1+x^2)y'$$

$$\frac{2(1+x^2)\arctan x + 2x}{e^y(1+x^2)} = \frac{\cancel{e^y}(1+\cancel{x^2})y'}{\cancel{e^y}(1+\cancel{x^2})}$$

$$\frac{2(1+x^2)\arctan x + 2x}{e^y(1+x^2)} = y'$$



$\rho = \arctan 1$

$\tan\rho = \tan(\arctan 1)$

$\tan\rho = 1$

$\frac{\text{"}y\text{"}}{x}$

$\rho = \frac{\pi}{4}$

$$\frac{2(1+1^2)\arctan 1 + 2(1)}{e^{\ln\left(\frac{\pi}{2}+3\right)}(1+1^2)} = y'$$

$$\frac{4\arctan 1 + 2}{2e^{\ln\left(\frac{\pi}{2}+3\right)}} = y'$$

$$\frac{4\left(\frac{\pi}{4}\right)+2}{2\left(\frac{\pi}{2}+3\right)} = y'$$

$$\boxed{\frac{\pi+2}{\pi+6}} = y'$$