

Багуарин 16

Баименко Игорь

N 4

$$2) y = (\sqrt{x^2 + 10x})^{\arctg(x+x^2)}$$

$$\ln y = \ln(\sqrt{x^2 + 10x})^{\arctg(x+x^2)} \Rightarrow$$

$$\Rightarrow \frac{y'}{y} = \arctg(x+x^2) \cdot \ln(\sqrt{x^2 + 10x}) \Rightarrow$$

$$\Rightarrow \left[\ln(\sqrt{x^2 + 10x}) = \ln(x^2 + 10x)^{\frac{1}{2}} = \frac{\ln(x^2 + 10x)}{2} \right] \Rightarrow$$

$$\Rightarrow \frac{y'}{y} = \frac{\arctg(x+x^2) \cdot \ln(x^2 + 10x)}{2} \Rightarrow$$

$$y' = y \cdot \frac{\arctg(x+x^2) \cdot \ln(x^2 + 10x)}{2}$$

$$\Rightarrow \frac{y'}{y} = \frac{(\arctg(2+x^2))' \ln(x^2+10x) + \arctg(x+x^2) (\ln(x^2+10x))'}{2} \Rightarrow$$

$$\Rightarrow \left[(\arctg x)' = \frac{1}{1+x^2} ; (\ln x)' = \frac{1}{x} \right] \Rightarrow$$

$$\Rightarrow \frac{y'}{y} = \frac{(\arctg(2+x^2))' \ln(x^2+10x)}{2} + \frac{\arctg(x+x^2) (\ln(x^2+10x))'}{2} \Rightarrow$$

$$\Rightarrow \frac{y'}{y} = \frac{(2+x^2)' \ln(x^2+10x)}{2(1+(2+x^2)^2)} + \frac{\arctg(x+x^2) (2^2+10x)'}{2(2^2+10x)} \Rightarrow$$

$$\Rightarrow \frac{y'}{y} = \frac{(1+2x) \ln(x^2+10x)}{2(1+(2+x^2)^2)} + \frac{(2x+10) \arctg(2+x^2)}{2(2^2+10x)} \Rightarrow$$

$$\Rightarrow y' = y \left(\frac{(1+2x) \ln(x^2+10x)}{2(1+(2+x^2)^2)} + \frac{(2x+10) \arctg(x+x^2)}{2(x^2+10x)} \right) \Rightarrow$$

$$\Rightarrow y' = (\sqrt{x^2+10x})^{\arctg(x+x^2)} \left(\frac{(1+2x) \ln(x^2+10x)}{2(1+(2+x^2)^2)} + \frac{(2x+10) \arctg(2+x^2)}{2(x^2+10x)} \right)$$