AP Calculus

Name_____ Pd.____

Derivatives Using Implicit

(D2) Day 3

6: Use logarithmic differentiation to fine the derivative of the function.

1. $y=(x+2)^2(x^4+4)^4$

$$f'(x)=\left[\frac{2}{x+2}+\frac{16x^3}{x^4+4}\right]\left[(x+2)^2(x^4+4)^4\right]$$

2. $y=\sqrt{\frac{x-1}{x^4+1}}$

$$f'(x)=\left[\frac{1}{2(x-1)}-\frac{4x^3}{2(x^4+1)}\right]\left[\frac{\sqrt{x-1}}{\sqrt{x^4+1}}\right]$$

3. $y=x^x$

$$y'=[1+\ln x]\cdot x^x$$

4. $y=x^{\cos x}$

$$y'=\left[\frac{\cos x}{x}-\sin x\ln x\right]\cdot x^{\cos x}$$

5. $y=x^{\sin x}$

$$y'=\left[\frac{\sin x}{x}+\ln x\cdot\cos x\right]\cdot x^{\sin x}$$

6. $y=\sqrt{x}^x$

$$y'=\left[\frac{1}{2}+\frac{\ln x}{2}\right]\cdot\sqrt{x}^x$$

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7. $f(x)=\dfrac{(3x+2)^6(x^2-1)^5}{\sqrt{2x+1}}$

$y'=\left[\dfrac{18}{3x+2}+\dfrac{10x}{x^2-1}-\dfrac{1}{2x+1}\right]\left[\dfrac{(3x+2)^6(x^2-1)^5}{\sqrt{2x+1}}\right]$

8. $y=x^{x+1}$

$y'=\left[\dfrac{x+1}{x}+\ln x\right]\cdot x^{x+1}$

9. $f(x)=(2x-3)^x$

$f'(x)=\left[\dfrac{2x}{2x-3}+\ln(2x-3)\right](2x-3)^x$

10. $y=(\sin x)^{x+1}$

$y'=\left[(x+1)\cot x+\ln\sin x\right](\sin x)^{x+1}$

11. $y=(2x-5)^{3x+2}$

$y'=\left[\dfrac{6x+4}{2x-5}+3\ln(2x-5)\right](2x-5)^{3x+2}$

12. $f(x)=\sqrt[3]{(3x^2-5)^5}\cdot\dfrac{(x-3)^4}{(4x+7)^3}$

$f'(x)=\left[\dfrac{10x}{3x^2-5}+\dfrac{4}{x-3}-\dfrac{12}{4x+7}\right]\left[\sqrt[3]{(3x^2-5)^5}\cdot\dfrac{(x-3)^4}{(4x+7)^3}\right]$