Implicit, e, ln, Derivative Rules Competition

One Point Questions:

1. $f(x) = e^{(x^2-2x)}$ Find $f'(x)$

2. $x^3 - y^3 = 2x$

3. $f(x) = 6^{\cos x}$ Find $f'(x)$

4. $f(x) = \ln(3x - 4x^3)$ Find $f'(x)$

5. $f(x) = (\tan x)(\ln x)$ Find $f'(x)$

6. $f(x) = \dfrac{e^x}{x}$ Find $f'(x)$

7. $f(x) = \log_2(3x^2)$ Find $f'(x)$ (simplify)

Two Point Questions:

8. $2x + xy - 4y^2 = 2x^2 - 5$ Find $\dfrac{dy}{dx}$

9. $x^3 - xy + y^2 = 4$ Find $\dfrac{dy}{dx}$ at (0, -2)

10. $y = x^2 - \ln(3x)$ find the equation of the tangent line at x = 4

11. $y = \ln\left(\dfrac{(\sin x)(2x-1)^3}{\sqrt{x^2+x+1}}\right)$

Find $\dfrac{dy}{dx}$ by first simplifying the expression

12. $y = \ln(x \sec x)$ Find $f'(x)$ (simplify)

13. $xe^y + 8x - 3y = 0$ Find $\dfrac{dy}{dx}$

Answers:

1. $f'(x) = e^{(x^2-2x)}(2x-2)$

2. $\dfrac{dy}{dx} = \dfrac{2-3x^2}{-3y^2}$

3. $f'(x) = 6^{\cos x}(-\sin x)\ln(6)$

4. $f'(x) = \dfrac{3-12x^2}{3x-4x^3}$

5. $f'(x) = (\tan x)\left(\dfrac{1}{x}\right) + (\ln(x))(\sec^2 x)$

6. $f'(x) = \dfrac{xe^x - e^x}{x^2}$ or $\dfrac{e^x(x-1)}{x^2}$

7. $f'(x) = \dfrac{6x}{3x^2}\left(\dfrac{1}{\ln 2}\right) = \dfrac{2}{(\ln 2)x}$

8. $\dfrac{dy}{dx} = \dfrac{4x-2-y}{x-8y}$

9. $\dfrac{1}{2}$

10. $y - (16 - \ln 12) = \dfrac{31}{4}(x-4)$

11. $f'(x) = \dfrac{\cos x}{\sin x} + \dfrac{6}{2x-1} - \dfrac{2x+1}{2(x^2+x+1)}$

12. $f'(x) = \dfrac{x\tan x + 1}{x}$ or $f'(x) = \tan x + \dfrac{1}{x}$

13. $\dfrac{dy}{dx} = \dfrac{-8-e^y}{xe^y - 3} = \dfrac{e^y + 8}{3 - xe^y}$

14. $f(x)=\dfrac{\ln(x^3-x)}{2x^2-1}$ Find $f'(x)$ (do not simplify)

15. $3x^2+2y+\tan y=1$ Find $\dfrac{dy}{dx}$ at (2, 0)

Three Point Questions:

16. $f(x)=(x^3-2x)^{\cos x}$ Find $f'(x)$

17. $\ln(xy)=\tan y$ Find $\dfrac{dy}{dx}$ (do not simplify)

14. $$\frac{(2x^2-1)\left(\dfrac{3x^2-1}{x^3-x}\right)-\ln(x^3-x)(4x)}{(2x^2-1)^2}$$

15. -4

16. $$f'(x)=\left(\frac{(\cos x)(3x^2-2)}{x^3-2x}-\ln(x^3-2x)(\sin x)\right)(x^3-2x)^{\cos x}$$

17. $$\frac{dy}{dx}=\frac{\dfrac{-1}{x}}{\dfrac{1}{y}-\sec^2 y}$$