

Partial #2

Robert Lu Zheng
Calculus I

11/7/02

3-750-1980

6) $y = \sin(2x)$

$$y' = -\cos(2x)(2)$$

$$y' = -2\cos(2x)$$

8) $y = x^4$

$$y' = 4x^3$$

ii) a) $f(x) = 7x^3 - 3x^2 + 3x - 12$
 $f'(x) = 21x^2 - 6x + 3$

b) $y = \tan 6x$
 $y' = \sec^2 6x \cdot 6x'$
 $y' = 6\sec^2 6x$

c) $y = (\ln 5x)^3$
 $y' = 3(\ln 5x)^2 \cdot \frac{5}{5x}$
 $y' = \frac{3(\ln 5x)^2}{x}$

d) $y = e^{-2x^3}$
 $y' = (-2x^3)' e^{-2x^3}$
 $= -6x^2 e^{-2x^3}$

e) $y = \frac{x^4}{9}$
 $y' = \frac{x^4 \cdot 9 - 9 \cdot x^4}{81}$
 $y' = \frac{4x^3 \cdot 9}{81}$
 $y' = \frac{4x^3}{9}$

12) $\frac{d^2 y}{dx^2} y = 5(2-7x)^4$
 $y' = 20(2-7x)^3 \cdot (-7)$
 $y' = -140(2-7x)^3$
 $y'' = -140(3)(2-7x)^2 \cdot (-7)$
 $y'' = 2940(2-7x)^2$

13) $y = \ln\left(\frac{2x}{x+3}\right)$
 $y' = \frac{\left(\frac{2x}{x+3}\right)'}{\frac{2x}{x+3}}$
 $y' = \frac{x+6-2x}{(x+3)^2} \cdot \frac{x+3}{2x}$
 $y' = \frac{6}{2x(x+3)^2}$
 $y' = \frac{6}{2x(x+3)}$
 $y' = \frac{6}{2x^2+6x}$
 $y' = \frac{6}{2(x^2+3x)}$
 $y' = \frac{3}{x^2+3x}$

$$i4) \quad x e^y - 10x + 3y = 0$$

$$x \cdot e^y + e^y x' - 10x' + 3y' + y' \cdot 3 = 0$$

$$e^y + y' e^y x - 10 + 3y' = 0$$

$$y' e^y x + 3y' = 10 - e^y$$

$$y' (e^y x + 3) = 10 - e^y$$

$$y' = \frac{10 - e^y}{x e^y + 3}$$