

October 23, 2003

THE UNIVERSITY OF MANITOBA

MIDTERM EXAMINATION

PAPER NO. _____

PAGE NO: 3 of 7

DEPARTMENT & COURSE NO: 136.151

TIME: 1 HOUR

EXAMINATION: Applied Calculus I

EXAMINERS: Various

Values

2. Find the derivative of the function. Do not simplify your answer.

[6] (a) $f(x) = \frac{(3x+1)^{1/3}}{1+\sqrt{2x-1}}$

$$\begin{aligned} f'(x) &= \frac{[(3x+1)^{1/3}]' \cdot (1+\sqrt{2x-1}) - (3x+1)^{1/3} \cdot (1+\sqrt{2x-1})'}{(1+\sqrt{2x-1})^2} \\ &= \frac{\frac{1}{3}(3x+1)^{-2/3} \cdot 3(1+\sqrt{2x-1}) - (3x+1)^{1/3} \cdot \frac{1}{2\sqrt{2x-1}} \cdot 2}{(1+\sqrt{2x-1})^2} \end{aligned}$$

[6] (b) $y = \left(\pi + \frac{1}{x}\right)^{10} (x^2 - 10)^{50}$

$$\begin{aligned} y' &= \left[\left(\pi + \frac{1}{x}\right)^{10}\right]' (x^2 - 10)^{50} + \left(\pi + \frac{1}{x}\right)^{10} \cdot [(x^2 - 10)^{50}]' \\ &= 10\left(\pi + \frac{1}{x}\right)^9 \cdot \left(-\frac{1}{x^2}\right)(x^2 - 10)^{50} + \left(\pi + \frac{1}{x}\right)^{10} \cdot 50(x^2 - 10)^{49} \cdot 2x \end{aligned}$$