

Math 181 Honors Homework 7 Worksheet Version A

1. Use the limit definition of derivative to show the following:

(i) If $u(x) = \sqrt{g(x)}$ then $u'(x) = \frac{g'(x)}{2\sqrt{g(x)}}$.

(ii) If $v(x) = f(x^2)$ $v'(x) = f'(x^2)2x$.

(iii) If $w(x) = f(g(x))$ then $w'(x) = f'(g(x))g'(x)$.

2. Use the rules for differentiating functions to find the following derivatives:

(i) Find $f'(x)$ where $f(x) = 3x^4 + x^3 + x^2 + 17x - 5$.

(ii) Find $g'(x)$ where $g(x) = \frac{x^2 - 1}{x^2 + 1}$.

(iii) Find $u'(x)$ where $u(x) = \frac{1}{\sqrt{\sin(x)}}$.

(iv) Find $v'(x)$ where $v(x) = \cos(x^2)$.

(v) Find $w'(x)$ where $w(x) = \sin(x - 1) \cos(x + 1)$

3. Work problems 1, 2, 8 13 from Lang page 56.

4. Work problems 3, 5, 10 from Lang page 56.

5. Work problems 27, 38, 40, 44, 55, 56 from Ayres and Mendelson page 87.