

The problems on this handout are supplementary to those in 8.3. Problems 1 and 4 are part of HW #8, due 11/21/05.

Use the formulas in 8.3 to find formulas for the derivatives of the following functions. Use the appropriate independent variable name for each. Don't simplify your answers. The answers to all except (1) and (4) are on the back of this sheet.

1. $3t^5 - 7t^2 + \frac{4}{t} - \frac{8}{15}$

2. $3\sqrt{w}$

3. $\sqrt{t}(3t^2 - 5t^6)$ Do this problem two ways: (a) use the product rule; (b) use a fractional exponent and then multiply out the original function before differentiating.

4. $(4z - 7z^{20})(5z^3 + 3z^{11})$ Do this problem two ways: (a) use the product rule; (b) multiply out the original function before differentiating.

5. $\frac{3w^2 + 1}{5w - 1}$

6. $\frac{2x^2 + 1}{\sqrt{x}}$

7. $x^{-1/2}(2x^2 + 1)$

Answers:

$$2. 3 \left(\frac{1}{2} \right) w^{-1/2} = \frac{3}{2} \frac{1}{\sqrt{w}}$$

$$3a. \sqrt{t}(6t - 30t^5) + \frac{1}{2\sqrt{t}}(3t^2 - 5t^6) \text{ [If you convert to positive and negative fractional exponents and then multiply out this answer, you will get the same result as (3b).]}$$

$$3b. \frac{d}{dt} [3t^{5/2} - 5t^{13/2}] = (15/2)t^{3/2} - (65/2)t^{11/2}$$

$$5. \frac{(5w - 1)(6w) - (3w^2 + 1)(5)}{(5w - 1)^2}$$

$$6. \frac{\sqrt{x}(4x) - \frac{1}{2\sqrt{x}}(2x^2 + 1)}{x}$$

$$7. x^{-1/2}(4x) + -\frac{1}{2}x^{-3/2}(2x^2 + 1). \text{ [Same as the answer to (6).]}$$