

Math 1a. §3.5 Worksheet

The Chain Rule

Fall 2005

1. Differentiate each of the following functions.

(a) $y = (x^3 - x + 1)^5$

(b) $f(t) = \sqrt[3]{1 + \tan t}$

(c) $y = a^3 + \sin^3 x$

(d) $y = \sin(a^3 + x^3)$

2. If $r(x) = f(g(h(x)))$ and

$$h(1) = 2$$

$$h'(1) = 4$$

$$g(2) = 3$$

$$g'(2) = 5$$

$$f'(3) = 6,$$

find $r'(1)$.

3. If g is a twice differentiable function and $f(x) = xg(x^2)$, find f'' in terms of g , g' , and g'' .

4. Show that $y = Ae^{-x} + Bxe^{-x}$ satisfies the differential equation

$$y'' + 2y' + y = 0.$$