

## Chain Rule Practice

1. Take the derivative of the following functions:

(a)  $f(x) = e^{3x}$

(b)  $f(x) = 3e^{3x}$

(c)  $f(x) = x^3e^x$

(d)  $f(x) = e^{x^3}$

(e)  $f(x) = x^3e^{x^3}$

(f)  $f(x) = x^3 + e^{x^3}$

2. (a)  $f(x) = \sqrt{1+x^3}$ . Calculate  $f'(3)$ .

(b)  $g(z) = z(1+z)$ . Calculate  $g'(1)$  and  $g'(3)$ . Which is bigger, and why?

(c)  $h(x) = e^{4x}x^2$ . Calculate  $h'(1)$ .

3. The radius of a circular oil slick is a function of time:  $r = 3t^2$ . How fast is the the area of the circle increasing at  $t = 6$ ?