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 \( h'(1) \).