Exponentials

For all of these problems, assume as fact that

\[ \lim_{h \to 0} \frac{e^h - 1}{h} = 1 \]

1. For \( f(x) = e^x \), find the following derivatives. Do each problem via secant slope, factor (as far as you can), and limit.
   
   (a) \( f'(0) \)
   (b) \( f'(5) \)
   (c) \( f'(-2) \)
   (d) \( f'(x) \)

2. For \( y = 3x^7 - 4x^{-1/3} + 17e^x \), find \( y' \).

3. For \( g(x) = e^{3x} \), compute the following. Do each problem via secant slope, factor (as far as you can) and limit.
   
   (a) \( g'(0) \)
   (b) \( g'(5) \)
   (c) \( g'(x) \)

4. For \( h(x) = x^2e^x \), compute the following. Do each problem via secant slope, factor (as far as you can) and limit.
   
   (a) \( h'(3) \)
   (b) \( h'(-2) \)
   (c) \( h'(x) \)