Class prep quiz on section 3.2, Stewart's Calculus (8th ed.)

1. Suppose $f(x)$ and $g(x)$ are differentiable functions, and suppose we know formulas for $f(x)$, $g(x)$, $f'(x)$, and $g'(x)$. For which of the following functions $h_n(x)$ can we **NOT** find a formula for $h_n'(x)$, using only the rules we have learned through section 3.2?

   (a) $h_1(x) = \dfrac{f(x)}{g(x)}$ (b) $h_2(x) = f(g(x))$

   (c) $h_3(x) = f(x) + g(x)$ (d) $h_4(x) = f(x)g(x)$

2. Let $f(x) = e^{x/2}(x^3+7x^6)$. Using only the derivative laws we have learned so far (up through product and quotient rule), what is $f'(x)$?

   (a) $e^{x/2}(x^3 + 7x^6) - e^{x/2}(3x^2 + 42x^5)$

   (b) $e^{x/2}(3x^2 + 42x^5)$

   (c) $e^{x/2}(x^3 + 7x^6) + e^{x/2}(3x^2 + 42x^5)$

   (d) $f'(x)$ cannot be calculated using only rules we have learned so far

3. Let $g(x) = \dfrac{5e^x + x^3}{x^2 + 13}$. Using only the derivative laws we have learned so far (up through product and quotient rule), what is $g'(x)$?

   (a) $\dfrac{(x^2 + 13)(5e^x + 3x^2) - (5e^x + x^3)(2x)}{(x^2 + 13)^2}$

   (b) $\dfrac{(5e^x + x^3)(2x) - (x^2 + 13)(5e^x + 3x^2)}{(x^2 + 13)^2}$

   (c) $\dfrac{5e^x + 3x^2}{2x}$

   (d) $g'(x)$ cannot be calculated using only rules we have learned so far

4. Let $h(x) = (x^2 - 3\sqrt{x})(e^x + 7)$. Using only the derivative laws we have learned so far (up through product and quotient rule), what is $h'(x)$?

   (a) $\left(2x - \dfrac{3}{2\sqrt{x}}\right) e^x$

   (b) $(x^2 - 3\sqrt{x})e^x + \left(2x - \dfrac{3}{2\sqrt{x}}\right)(e^x + 7)$

   (c) $(x^2 - 3\sqrt{x})e^x - \left(2x - \dfrac{3}{2\sqrt{x}}\right)(e^x + 7)$

   (d) $h'(x)$ cannot be calculated using only rules we have learned so far