Class prep quiz on section 3.4, Stewart's Calculus (8th ed.)

1. Suppose $f(x)$ is a differentiable function, and suppose $g(x) = \sin(f(x))$. What is $g'(x)$?

   (a) $\cos(f'(x))$ (b) $\cos(f(x))$
   (c) $\sin(f(x))f'(x)$ (d) $\cos(f(x))f'(x)$

2. Suppose $f(x)$ and $g(x)$ are differentiable functions such that:

x	2	5	7
$f(x)$	5	7	2
$f'(x)$	-5	13	-4
$g(x)$	7	2	5
$g'(x)$	3	11	-19

   Suppose $h(x) = g(f(x))$. What is $h'(2)$?

   (a) -55 (b) 143 (c) -15 (d) None of the above

3. Let $f(x) = \sqrt{e^{2x} + 1}$. What is $f'(x)$?

   (a) $\dfrac{2e^{2x}}{2\sqrt{e^{2x}+1}}$ (b) $\dfrac{1}{2x^{1/2}}(2e^{2x})$ (c) $\dfrac{e^{2x}}{2\sqrt{e^{2x}+1}}$ (d) $\dfrac{1}{2\sqrt{2e^{2x}}}$

4. Consider the following functions $f_n(x)$. For which function $f_n(x)$ ($n = 1, 2, 3$) can we **NOT** find a formula for $f_n'(x)$, using only the rules we have seen so far?

   (a) $f_1(x) = \dfrac{13^x - e^{\sin x}}{\sqrt{x^3 - 55\tan(13x)}}$
   (b) $f_2(x) = \left[\sqrt[3]{x^7 - 55e^x} + 13\sin(\cos^2(25x) + 167)\right]^{265}$
   (c) $f_3(x) = (e^x + x^e + (\sin x)^e + 7^{\cos x})(1234x^{-124} + \tan(x^2 + 1))$
   (d) Trick question: We can find formulas for all $f_n'(x)$.