SECTION 3.4 CHAIN RULE

1. Complete the Chain Rule (using both types of notation)

   - If $F(x) = f(g(x))$,

     then $F'(x) =$

   - If $y = f(u)$ and $u = g(x)$,

     then $\frac{dy}{dx} =$

2. For each function below, write it as a nontrivial composition of functions in the form $f(g(x))$. Then use the chain rule to compute the derivative.

   (a) $H(x) = \sqrt[3]{4 - 2x}$

   outside $= f(x) =$

   inside $= g(x) =$

   (b) $H(x) = \tan(2 - x^4)$

   outside $= f(x) =$

   inside $= g(x) =$

   (c) $H(x) = e^{2-2x^3}$

   outside $= f(x) =$

   inside $= g(x) =$

   (d) $H(x) = \frac{4}{x+\sin(x)}$

   outside $= f(x) =$

   inside $= g(x) =$

3. For each problem below, find the derivative.

(a) $z(t) = (2x^3 - 5x)^7$

(b) $x(\theta) = (\cos(\theta))^3$

(c) $y = x^2 - 3\sin(x^3)$

(d) $y = 10e^{\sqrt{t}}$

(e) $f(x) = \dfrac{\sqrt{2}}{\sqrt{x^2 - 4}}$

(f) $g(x) = \dfrac{\sec(x^2 + 2)}{12}$

(g) $k(s) = \dfrac{A^2}{B + Cs}$ (A, B, C are constants!)