Calculus Exercises (2.5)

1. Differentiate the following functions.
   
   (1) $y = \cos^2 3x$  
   (2) $y = \frac{2 + 3x}{\sqrt{1 + 4x}}$  
   (3) $y = \sqrt{2x(x^3 + 2)}$  
   (4) $f(x) = \sec(\sin(\tan x))$

2. Find $f''(x)$ if it is known that $\frac{d}{dx} f(2x) = x^2$.

3. Suppose that $f(5) = 1, f'(5) = 6, g(5) = -3, g'(5) = 2,$ and $f'(-3) = 4$, find $(f \circ g)'(5)$.