Example 1. Find the derivative of $y = 3.7x^5 - 253x^4 + 10x^2 + 7$; use at most one of the above rules at a time, and indicate which rule this is.
Example 2. We return to Example 1 in Section 2.1 one more time. Recall that the ball had a position given by $p(t) = -4.9t^2 + 3.5t + 2$. Find a formula for the velocity of the ball at time $t$. 

Solution. Recall that velocity is the derivative of position. Thus $v(t) = p'(t)$. Thus $v(t) = -9.8t + 3.5$. 

Example 3. Find the derivative of each of the following functions.
(a) \( y = 3.5x^7 \)
(b) \( y = -2.5x^{-1.5} \)
(c) \( y = 5x^4 + 7x^3 - 12x^2 + 8x + 9 \)
(d) \( f(x) = 2\sqrt{x} \)
(e) \( g(t) = 7\sqrt{t} \)
(f) \( h(z) = \frac{11}{z^3} \)
(g) \( f(x) = 3.5x^2 + \frac{7}{x^2} - 11\sqrt{x} \)
(h) \( g(t) = at^2 + bt + c \) (assume that \( a, b \) and \( c \) are unknown constants).
Example 4. Let \( f(x) = x^4 - 4x^2 \). Calculate \( f'(x) \), \( f''(x) \), and graph \( f(x) \), \( f'(x) \) and \( f''(x) \). Compare your results to Examples 2.2, Ex. 3 and 2.4, Ex 1.
Example 5. Find the equation of the tangent line at $x = 5$ of $f(x) = 2x^2 - x + 3$. 

Solution. We have $a = 5$ and $f(5) = 48$. To find the slope, we take the derivative and plug in $x = 5$:

$$f'(x) = 4x - 1$$

$$m = f'(5) = 4(5)$$

Thus, the equation is $y = 19(x - 5) + 48$. 