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.

Example 3. Find the derivative of each of the following functions.

(a) $y = 3.5x^7$

(b) $y = -2.5x^{-11.5}$

(c) $y = 5x^4 + 7x^3 - 12x^2 + 8x + 9$

(d) $f(x) = 2\sqrt{x}$

(e) $g(t) = 7\sqrt[5]{t}$

(f) $h(z) = \dfrac{11}{z^3}$

(g) $f(x) = 3.5x^2 + \dfrac{7}{x^2} - 11\sqrt{x}$

(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 $f(x) = 2x^2 - x + 3$.