5. Find the derivatives of the functions below *using the rules discussed in class today.* (Chain rule, quotient rule, product rule not needed!)

(a) $f(x) = 6.1x^3 + \pi x + e^2 + 4e^x$

$f'(x) = 18.3x^2 + \pi + 4e^x$

(b) $f(x) = \frac{8}{x^4} - \frac{x^2}{7} + \frac{\sqrt{5}}{2}$ $= 8x^{-4} - \frac{1}{2}x^2 + \frac{\sqrt{5}}{2}$

$f'(x) = -32x^{-5} - x$

(c) $y = 6x^{5/3} - x^{1/3}$

$y' = \frac{30}{3}x^{2/3} - \frac{1}{3}x^{-2/3}$

(d) $y = \frac{x^2+5\sqrt{x}+1}{\sqrt{x}}$ $= x^{3/2} + 5 + x^{-1/2}$

$y' = \frac{3}{2}x^{1/2} + 0 + \left(-\frac{1}{2}\right)x^{-3/2} = \frac{3}{2}\sqrt{x} - \frac{1}{2}x^{-3/2}$

(e) $y = x(x+1)$ $= x^2 + x$

$y' = 2x + 1$

(f) $y = ax^2 + \frac{b}{x} + c$ $= ax^2 + bx^{-1} + c$ and a, b, c fixed constants

$\frac{dy}{dx} = 2ax - bx^{-2}$