Homework Topic 7

1. $f(x) = 5x^4 + 2x^3$

   a. Using Pascal's Triangle and the Binomial Coefficients as a guide, multiply out $f(x+h) = 5(x+h)^4 + 2(x+h)^3$.

   b. Use Fermat's Method and your work from part a) to compute $f'(x)$ for $f(x) = 5x^4 + 2x^3$.

2. For each of the following, use the Power, Constant Multiple and Sum Rules (as appropriate) to determine $f'(x)$. Carefully show your work, don't skip steps. Give your answers without negative exponents.

   a. $f(x) = ax^3 + bx^2 + cx + d$, *a, b, c, d* any real numbers.

   b. $f(x) = \frac{2}{7}x^7 + \frac{1}{3}x^3 + \frac{3}{2}x^2 - 7x + 165$

   c. $f(x) = \sqrt[3]{x} = x^{\frac{1}{3}}$

   d. $f(x) = \frac{3}{x^4}$

   e. $f(x) = \pi + x^{\pi}$