SECTION 3.1 DERIVATIVES OF POLYNOMIALS AND e^x

1. Fill in the derivative rules. Then practice using each rule to find y' if y is given.

   (a) $\dfrac{d}{dx}[c] =$ _____ $y = 5$ $y' =$ _____

   (b) $\dfrac{d}{dx}[x^n] =$ _____ $y = x^{50}$ $y' =$ _____

   (c) $\dfrac{d}{dx}[c\,f(x)] =$ _____ $y = 3x^2$ $y' =$ _____

   (d) $\dfrac{d}{dx}[f(x) + g(x)] =$ _____ $y = 5x^6 + x^7$ $y' =$ _____

   (e) $\dfrac{d}{dx}[f(x) - g(x)] =$ _____ $y = 6x^3 - x$ $y' =$ _____

   (f) $\dfrac{d}{dx}[e^x] =$ _____ $y = \frac{1}{2}e^x$ $y' =$ _____

2. Compute derivatives of the following functions using derivative rules. **Do not simplify your answers.** (If you already know what these are, DO NOT USE THE PRODUCT RULE, THE QUOTIENT RULE OR THE CHAIN RULE. If you don't know what they are, presumably you won't be using them either!)

   (a) $f(x) = (x - 2)(2x + 3)$

   (b) $g(x) = \dfrac{x^2}{2} - \dfrac{2}{x^2} + \dfrac{1}{\sqrt{2}}$

(c) $f(t) = \sqrt{t} - e^t + t^{0.3}$

(d) $f(x) = \dfrac{x^2 + x - 1}{\sqrt{x}}$

(e) $V(r) = \dfrac{4}{3}\pi r^3$

(f) $f(x) = e^{x-3}$

(g) $H(r) = a^2r^2 + br + c$

3. At what point(s) on the curve $y = 3x + x^3$ is the tangent to the curve parallel to the line $y = 6x - 5$?