Calculus 12
6-3 Questions

1. Use the Product Rule to find the derivative. Do not simplify your answer.

a) $f(x) = (2x-1)(x^2+1)$

b) $f(x) = x(3x-8)$

c) $y = x^2(1+x-3x^2)$

d) $y = (x^3+x^2+1)(x^2+2)$

e) $f(t) = (t^4+t^2-1)(t^2-2)$

f) $f(t) = \sqrt[3]{t}(1-t)$

g) $F(y) = \sqrt{y}(y-2\sqrt{y}+2)$

h) $G(y) = (y-y^2)\left(2y-y^{\frac{4}{3}}\right)$

2. Use the Product Rule to differentiate each function. Simplify your answer.

a) $y = x^3(x^2+2x+3)$

b) $y = x^{-2}(x^3-3x^2+6)$

c) $f(x) = (1-x^2)(2-x^3)$

d) $f(x) = (3x^3+4)(1-2x^3)$

e) $f(t) = (6+t^{-2})(8t^{10}-5t^3)$

f) $f(t) = (at+b)(ct^2-d)$

g) $g(u) = \sqrt{u}(2-u^2+5u^4)$

h) $g(v) = (v-\sqrt{v})(v^2+\sqrt{v})$

3. Find the slope of the tangent to the given curve at the point whose x-coordinate is given.

a) $y = (1-2x)(3x-4),\ x = 2$

b) $y = (1-x+x^2)(x-2),\ x = 1$

c) $y = x^4(4x^3+2),\ x = -1$

d) $y = (1+x-2x^2)(3x^3+x-1),\ x = 1$

e) $y = x^{-5}(1-x^{-1}),\ x = 1$

f) $y = (2-3\sqrt{x})(4-\sqrt{x}),\ x = 4$

4. If $f(x) = (6x^4-3x^2+1)(2-x^3)$, find $f'(1)$ by two methods:

a) by using the Product Rule;

b) by expanding $f(x)$ first.