

You may use a calculator and your homework, but not your books or notes. There are three (3) problems worth 10 points each. **Show all of your work to receive full/partial credit.**

- 1) (#46 from 2.2) Find the derivative of the function.

$$h(x) = \frac{4x^3 + 2x + 5}{x}$$

Rewrite: $h(x) = \frac{4x^3}{x} + \frac{2x}{x} + \frac{5}{x} = 4x^2 + 2 + 5x^{-1}$

$$h'(x) = 8x - 5x^{-2} = 8x - \frac{5}{x^2}$$

- 2) Find the derivative of the function.

$$f(x) = x^2 \tan x$$

Product Rule:

$$f'(x) = 2x \tan x + x^2 \sec^2 x$$

(#32 from 2.4) Find the derivative of the function.

$$g(x) = \left(\frac{3x^2 - 2}{2x + 3} \right)^3$$

$$g'(x) = 3 \left(\frac{3x^2 - 2}{2x + 3} \right)^2 \left[\frac{(2x + 3)(6x) - (3x^2 - 2)(2)}{(2x + 3)^2} \right]$$

Simplify (not necessary):

$$g'(x) = 3 \left(\frac{3x^2 - 2}{2x + 3} \right)^2 \left[\frac{12x^2 + 18x - 6x^2 + 4}{(2x + 3)^2} \right]$$

$$= 3 \left(\frac{3x^2 - 2}{2x + 3} \right)^2 \left[\frac{6x^2 + 18x + 4}{(2x + 3)^2} \right]$$

$$= \frac{6(3x^2 - 2)^2 (3x^2 + 9x + 2)}{(2x + 3)^4}$$