Date: 9/20/13.

Instructor: Cody Clifton.

Name: _____

This 10-point quiz, based on Gateway Exam problems, will test your knowledge of fundamental differentiation rules. Read carefully and always show your work. You have 15 minutes... good luck!

Note: for this quiz, it's *not* necessary to simplify your answers.

(1) Differentiate $f(x) = -\frac{2}{3}x^3 + x^2 + 12x + 9$.

Solution. By the Power, Sum, Difference, and Constant Multiple Rules:

$$f'(x) = -2x^2 + 2x + 12.$$

(2) Differentiate $g(t) = t^{2/3} - t^{-1/4} + \pi$.

Solution. By the Power, Sum, Difference, and Constant Multiple Rules:

$$g'(t) = \frac{2}{3}t^{-1/3} + \frac{1}{4}t^{-5/4}.$$

(3) Differentiate $f(t) = 2t^3 + 6t - \frac{4}{t^2}$.

Solution. By the Power, Sum, Difference, and Constant Multiple Rules:

$$f'(t) = 6t^2 + 6 + \frac{8}{t^3}.$$

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

Solution. By the Product Rule:

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

(5) Differentiate $k(x) = \frac{3x - 2}{x - 1}$.

Solution. By the Quotient Rule:

$$k'(x) = \frac{(x - 1)(3) - (3x - 2)(1)}{(x - 1)^2}.$$