232 Quiz R

September 2, 2011

Section: _____   Name: _____ *KEY*   V1

Work individually. No technology, Notebooks, or other material allowed.

You do NOT need to show work for any of these problems.

1. Find the derivative of $f(x) = (4x^2 + 1)^3(2x - 5)^2$.

$$f'(x) = \boxed{3(4x^2+1)^2(8x)(2x-5)^2 + (4x^2+1)^3(2)(2x-5)(2)}$$

2. If $f'(x) = 2x + 1$ and $f(0) = 5$, find $f(x)$.

$$f(x) = x^2 + x + C$$
$$f(0) = 5 \implies 5 = 0^2 + 0 + C \implies C = 5$$
$$\text{So } \boxed{f(x) = x^2 + x + 5}.$$

3. Find $\displaystyle\lim_{x \to \infty} \frac{(x+2)(4x+1)}{3x^2 - 1}$.

balanced rational fncn

$$\text{So} \to \boxed{\frac{4}{3}} \quad \text{(ratio of leading coeff.)}$$

4. Find the interval(s) on which the function $f(x) = x^3 - 6x^2 + 2$ is increasing.

$$f'(x) = 3x^2 - 12x = 0$$
$$3x(x-4) = 0$$

$$\begin{array}{ccccc} + & & - & & + \\ \hline & 0 & & 4 & \end{array} \quad f'$$

So f increasing on $\boxed{(-\infty, 0) \text{ and } (4, \infty)}$