Quiz 5 **Calculus 1** **7/19/2005**

Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. Find the maximum **value** of the function $f(x) = -x^2 + 5x - 7$.

$f(x) = -1(x^2 - 5x + 7)$

$f'(x) = -1(2x - 5)$

$0 = -2x + 5$

$2x = 5$

$x = 5/2$

$y = -(5/2)^2 + 5(5/2) - 7$

$= -25/4 + 25/2 - 7$

$= -25/4 + 50/4 - 28/4$

$= -3/4$ occurs at $x = 5/2$

Yes.

2. Find the **exact coordinates** of the inflection point of the function $g(x) = x^3 + 2x^2 - 1$.

At an inflection point g'' will be zero...

$g'(x) = 3x^2 + 4x$

$g''(x) = 6x + 4$

$0 = 6x + 4$

$-4 = 6x$

$x = -\frac{2}{3}$ is the x value, and

$g(\frac{-2}{3}) = (\frac{-2}{3})^3 + 2(\frac{-2}{3})^2 - 1 = \frac{-8}{27} + \frac{8}{9} - 1 = \frac{-8}{27} + \frac{24}{27} - \frac{27}{27}$

$= \frac{-11}{27}$ is the y value, so

$\left(\frac{-2}{3}, \frac{-11}{27}\right)$ is the actual point of inflection

(it's easy to tell from a calculator that the graph does change concavity there.)