Quiz 10 - Take Home, Math 1210-009

Instructions: This is a take home quiz. It will be due at the beginning of class on Wednesday, October 18th. You may work in a group, use your book, a calculator, notes, any aids that you would like but keep in mind that you must turn in only your own work - you may not simply copy another individual's quiz. Also, you may want to graph the function BUT only justifications that we've covered in class and in the book are appropriate justifications. For example, stating that $f$ is concave up on $(-\infty, 0)$ because the graph looks that way is not an appropriate justification.

1. Let $f(x) = \frac{x^3}{1 + x^2}$. Fill in the following blanks in reference to the function $f$. You must justify each of your answers with the appropriate reasoning or test. Do not leave any of the following spaces blank - if no such property exists then write in “none”. (Hint: Don't read too much into the grammar of the sentences.)

$$f(x) = \frac{x^3}{1 + x^2}$$

SHOW WORK HERE

$$f'(x) = \frac{\frac{2}{3} x^{-\frac{1}{3}} (1 - \sqrt{2} x)(1 + \sqrt{2} x)}{(1 + x^2)^2}$$

\[ \frac{-1}{\sqrt{2}} \quad 0 \quad \frac{1}{\sqrt{2}} \]

\[ \text{gives } 1^{st} \text{ Der. Test} \]

\[ \text{gives concavity} \]

In the interest of space, I have only given the $x$-coordinate of the pts. of inflection but pts of inflection should always be given in the form $(x_1, y_1)$, not just as the $x$-coordinate.