Review Assignment Chapter 3

1) Find c such that the mean value theorem applies to the function f and write the equation of the tangents line to the curve at $x = c$. $f\left(x\right) = x^3$, $\left[0,1\right]$

2). Find absolute extrema for the function $f\left(x\right) = x^3 - 3x + 2$ on the interval $\left[-3,2\right]$ and justify.

3). Find f ' and f '', draw sign lines and answer the following questions about the function $f(x) = x^3 - 3x + 2$.

CP's

f increasing/decreasing
justification

Rel Extrema
justification (1st der test)
justification (2nd der test)

f is CU/CD
justification

P of I
justification

End behavior
$\lim_{x \to \pm\infty} f(x)$

4) Given the function g and it's 1st and 2nd derivatives

a) graph the function finding zeros, undefined and signs and end behavior of g.

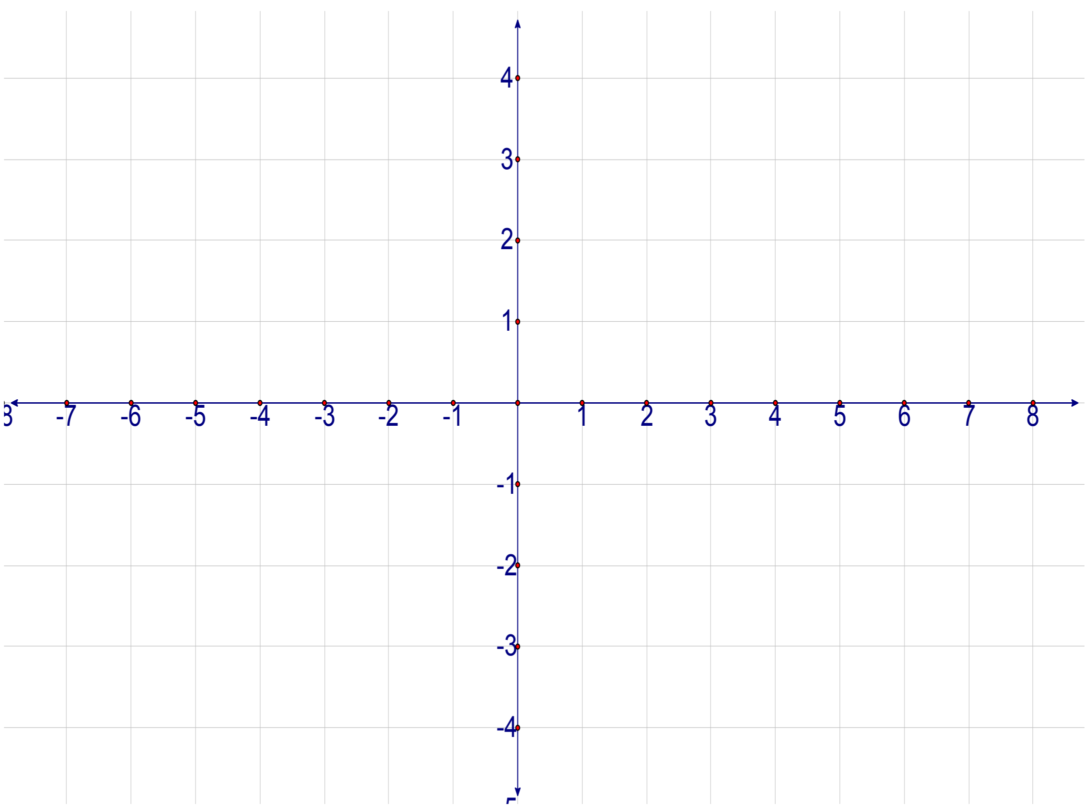
$$g(x)=\frac{x}{x^2+1}$$

b) improve on the graph using g ' to find coordinates of relative extrema and inc/dec. (mark slopes of zero with a horizontal bar -)

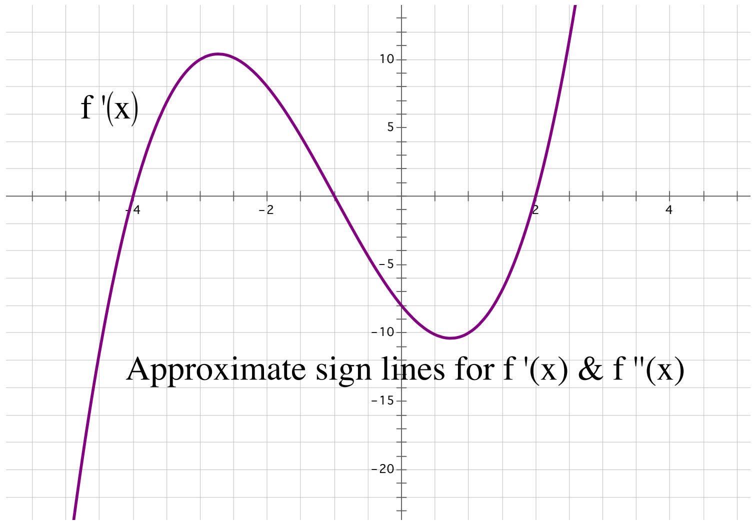
$$g'(x)=\frac{1-x^2}{\left(x^2+1\right)^2}$$

c) improve more on the graph using g '' to find coordinates of P of I on g and CU/CD (mark P of I's with a slanted bar /)

$$g''(x)=\frac{2x\left(x^2-3\right)}{\left(x^2+1\right)^3}$$



5)



6) A rectangle is bound by the x and y axis and the graph $y = \dfrac{6-x}{2}$ (see figure). What length and width should the rectangle have so that it's area is a maximum?