For Weekly Assignments:

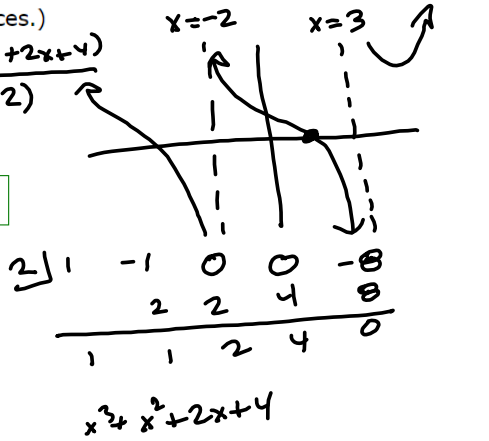
I will place them in the Assignments on D2L.

They will weigh as much as the original writing projects, so you can wipe out a bad WP#1 or WP#0 score, pretty easily, just by doing good weekly work. That's a better way to operate.

Probably make them due on Friday? It's nice to have a little flex time to wipe them out.

Produce graphs of f that reveal all the important aspects of the curve. Then use calculus to find the following. (Enter you answers using interval notation. Round your answers to two decimal places.)

$$f(x) = \frac{x^4 - x^3 - 8}{x^2 - x - 6} = \frac{x^4 - x^3 - 8}{(x-3)(x+2)} = \frac{(x-2)(x^3+x^2+2x+4)}{(x-3)(x+2)}$$



Find the interval(s) of increase.

$(-2.74, -2), (-2, -0.81), (0.41, 1.08), (4.06, \infty)$

Find the interval(s) of decrease.

$(-\infty, -2.74), (-0.81, 0.41), (1.08, 3), (3, 4.06)$

Find the inflection points of the function.

$(x, y) = ($ $-0.39, 1.45$ $)$ (smaller x-value)

$(x, y) = ($ $0.79, 1.31$ $)$ (larger x-value)

Find the interval(s) where the function is concave up.

$(-\infty, -2), (-0.39, 0.79), (3, \infty)$

Find intervals where the function is concave down.

$$f(x) = \frac{x^4 - x^3 - 8}{x^2 - x - 6}$$

$$f'(x) = \frac{(4x^3 - 3x^2)(x^2 - x - 6) - (x^4 - x^3 - 8)(2x - 1)}{(x^2 - x - 6)^2}$$

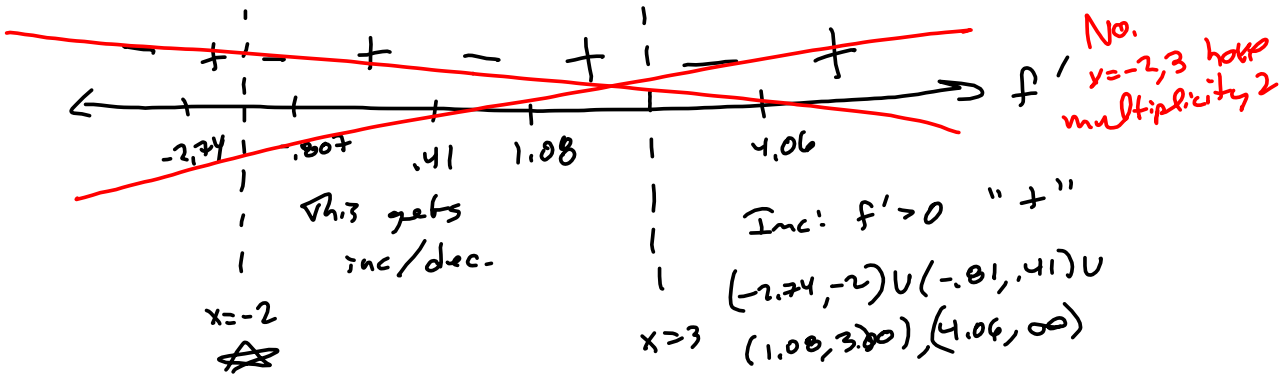
$$= \frac{4x^5 - 4x^4 - 24x^3 - 3x^4 + 3x^3 + 18x^2 - (2x^5 - x^4 - 2x^4 + x^3 - 16x + 8)}{(\quad)^2}$$

solve

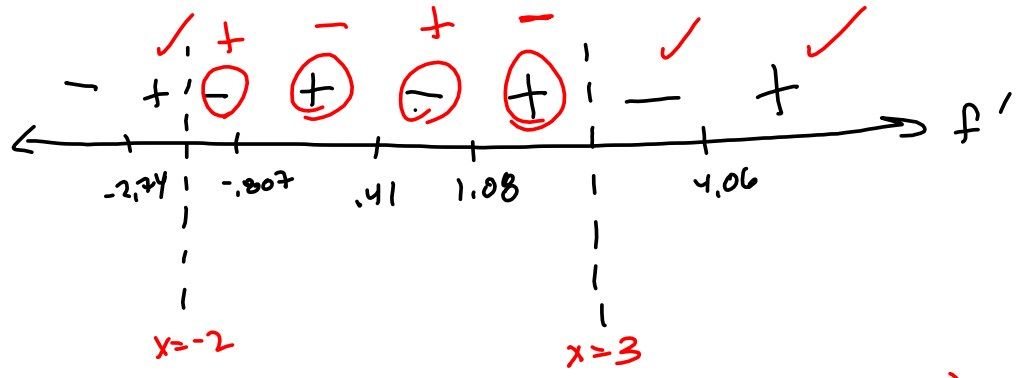
$$= \frac{2x^5 - 4x^4 - 22x^3 + 18x^2 + 16x - 8}{(x^2 - x - 6)^2}$$

$$f'(x) = \frac{(x-r_1)(x-r_2)(x-r_3)(x-r_4)(x-r_5)}{(x-3)(x+2}$$

0.4110790456, 1.082024449, 4.058901063, -0.8071908715, -2.744813686 are the zeros of $f'(x)$, according to technology



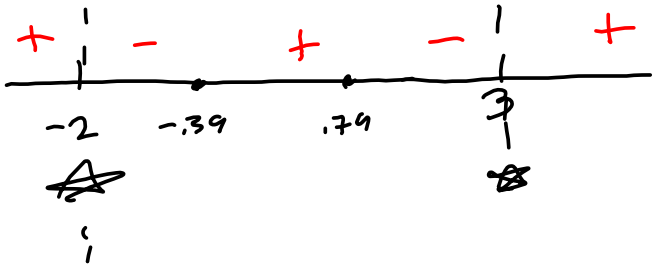
Wait! x = -2 and x = - 3 are roots of multiplicity 2 of the denominator of f', so the sign of f' doesn't change as we cross those boundaries.



Inc: $(-2.74,-2) \cup (-2,-.81) \cup (.41,1.08) \cup (4.06,\infty)$

$$\boxed{(-2.74,-2),(-2,-0.81),(0.41,1.08),(4.06,\infty)}$$

$f''(x) = \dfrac{2x^6 - 6x^5 - 30x^4 + 82x^3 + 348x^2 - 168x - 112}{(x^2 - x - 6)^3}$



0.7903183252

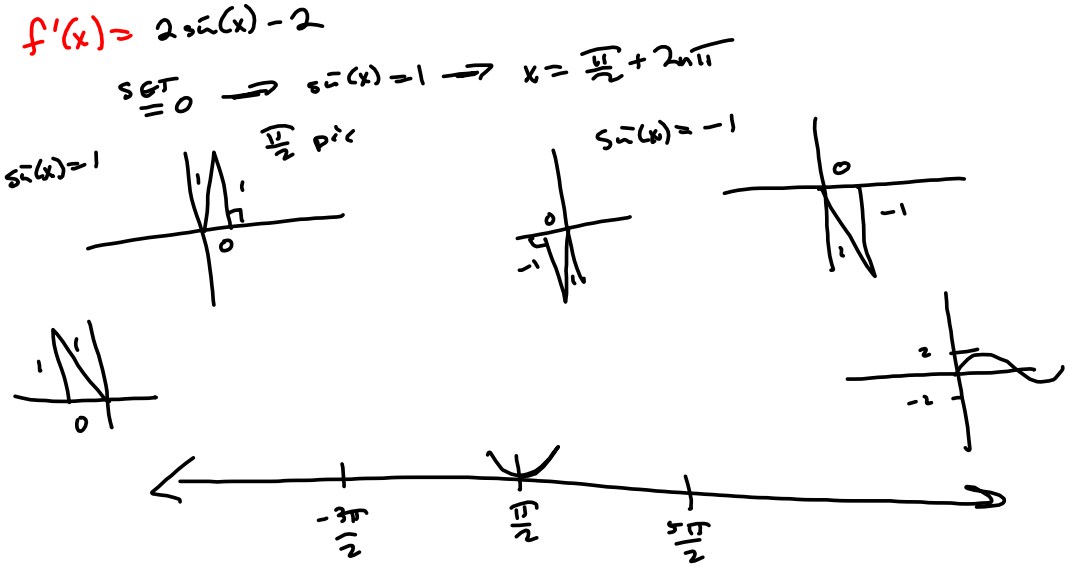
-0.3875863048

C.U.D: ∪ ∩ $(-\infty, -2) \cup (-.39, .79) \cup (3, \infty)$

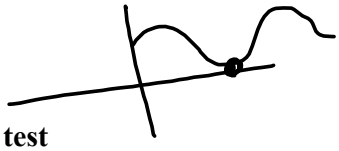
This 3.6 #2 was very difficult to solve by hand (un-possible). Concepts aren't that tough, but the execution of the derivatives without a tech assist would probably be a tiny bit off and therefore ALL WRONG according to WebAssign.

Polynomials and rational functions:

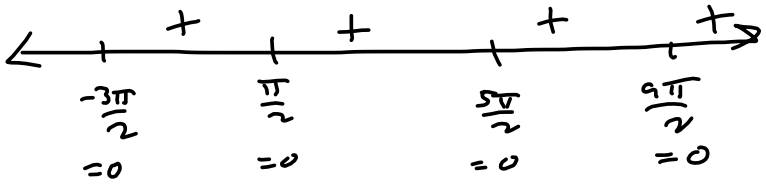
Sign patterns for f' and f'' are pretty easy, because it changes sign when multiplicity is odd and doesn't change sign when multiplicity is even. It's not so easy with trig functions...



The sign doesn't change at all, because it's just kissing the x-axis. No substitute for doing intervals and test values.



If that's f' for some f(x), then



Inc: ..., $(\frac{\pi}{2}, \frac{5\pi}{2}) \cup (\frac{5\pi}{2}, \frac{9\pi}{2})$, ...

Dec: Nevah!