Name: _____ _____ **/ 25**

There are 25 points possible on this quiz. No aids (book, calculator, etc.) are permitted. **Show all work for full credit.**

1. [12 points] Answer the questions below about the function $f(x) = \dfrac{x^2+2x}{x^2-2x+1}$. Observe that $f'(x) = \dfrac{-4x-2}{(x-1)^3}$ and $f''(x) = \dfrac{8x+16}{(x-1)^4}$.

a. Find all intervals where f is **increasing** and where f is **decreasing**.

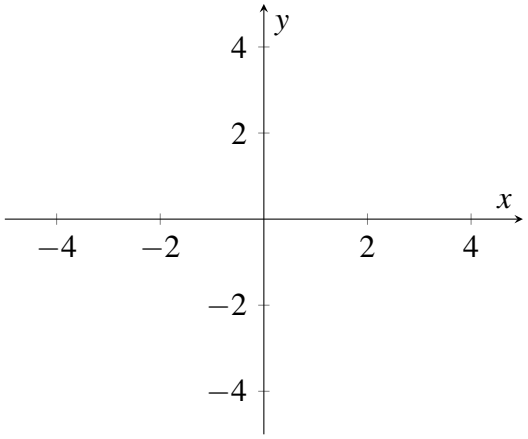
b. Find the x-values of **all local minima and local maxima** of f or state that none exist.

c. Find all intervals where f is **concave up** and where f is **concave down**.

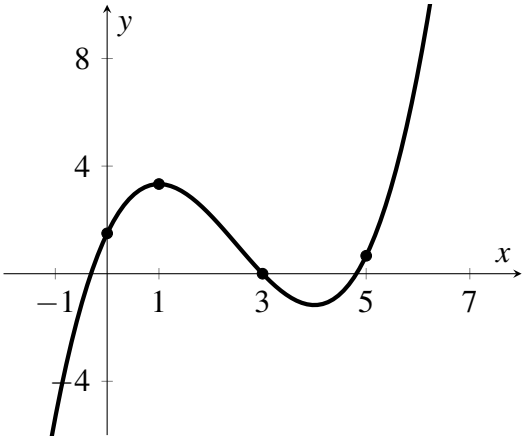
d. Determine whether $f(x)$ has any **horizontal asymptotes**. Show you work.

2. [7 points] Sketch a graph of a function $h(x)$ that satisfies the following criteria:

- $h(-2) = 2$, $h(2) = -2$, and $h(4) = 0$
- $h'(x) < 0$ when $x < 2$
- $h'(x) > 0$ when $x > 2$
- $h''(x) < 0$ when $x < 0$
- $h''(x) > 0$ when $x > 0$



3. [6 points] Use the graph of the function $g(x)$ (below) to determine whether each value below is **positive**, **negative**, **zero**, or **undefined**. You do not need to justify your answers.



a. $g''(0)$

b. $g'(1)$

c. $g''(1)$

d. $g'(3)$

e. $g'(5)$

f. $g''(5)$