

I will collect the FRQ questions from last night along with the HW for the next quiz

3.6

A Summary of Curve Sketching

- Analyze and sketch the graph of a function.

Pre Calculus topics to consider:

1. x and y intercepts(multiplicity)
2. Symmetry
3. Domain
4. Asymptotes/end behavior

Calculus topics to consider:

1. Continuity
2. Differentiability
3. Relative extrema
4. Increasing/Decreasing
5. Concavity
6. Inflection points

#1: Sketch $g(x)$

$$g(x) = 4x^3 - 3x^4$$

$$D: (-\infty, \infty)$$

x-int:

$$0 = x^3(4-3x)$$

$$x = 0, \frac{4}{3}$$

y-int: $(0, 0)$

symmetry: none

end behavior

↓ ↓

$$g'(x) = 12x^2 - 12x^3$$

$$0 = 12x^2(1-x)$$

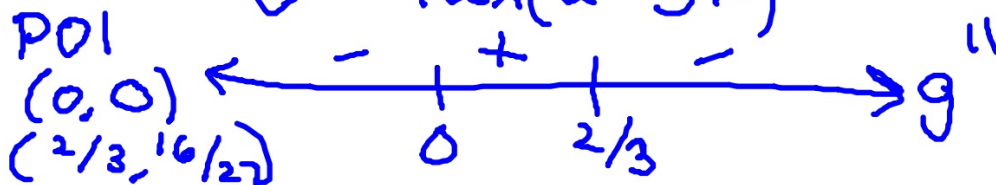
$$x = 0, 1$$

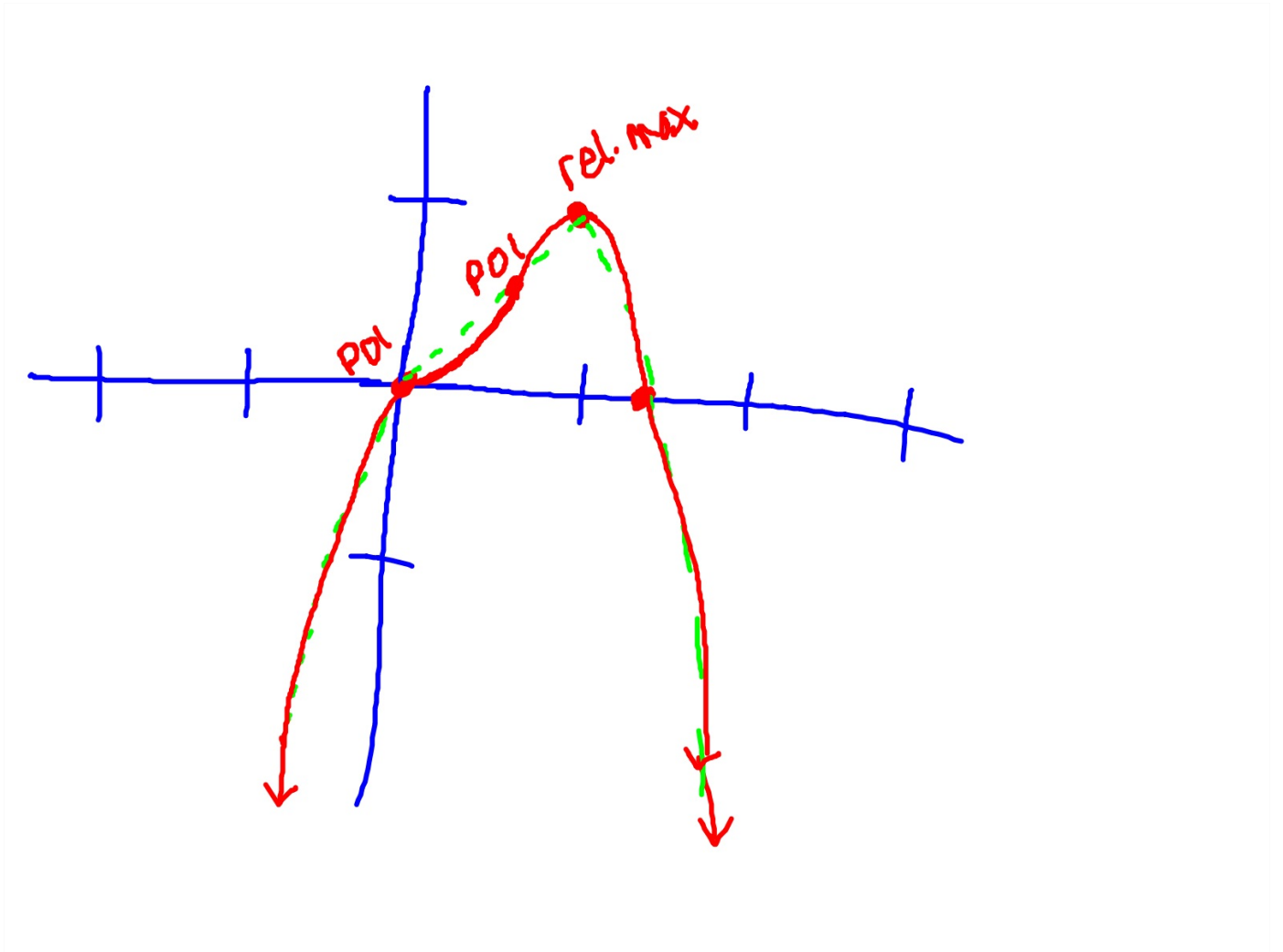


rel. max $(1, 1)$

$$g''(x) = 24x - 36x^2$$

$$0 = 12x(2-3x)$$





$$\textcircled{2} f(x) = \frac{2(x^2-9)}{x^2-4}$$

$$D: \{x \mid x \neq \pm 2\}$$

$$x\text{-int}: (\pm 3, 0)$$

$$y\text{-int}: (0, 9/2)$$

Symmetry

$$f(-x) = \frac{2(x^2-9)}{x^2-4}$$

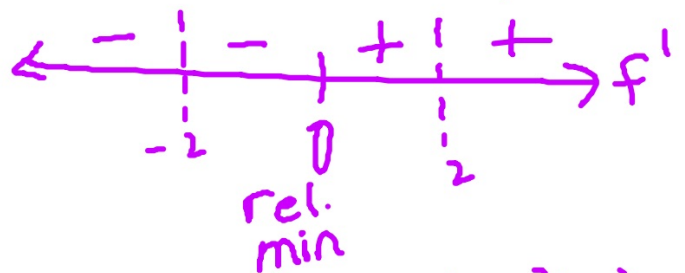
even; y-axis

End behavior

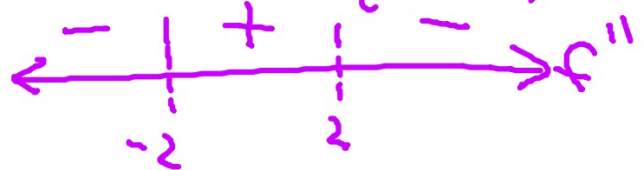
$$HA @ y=2$$

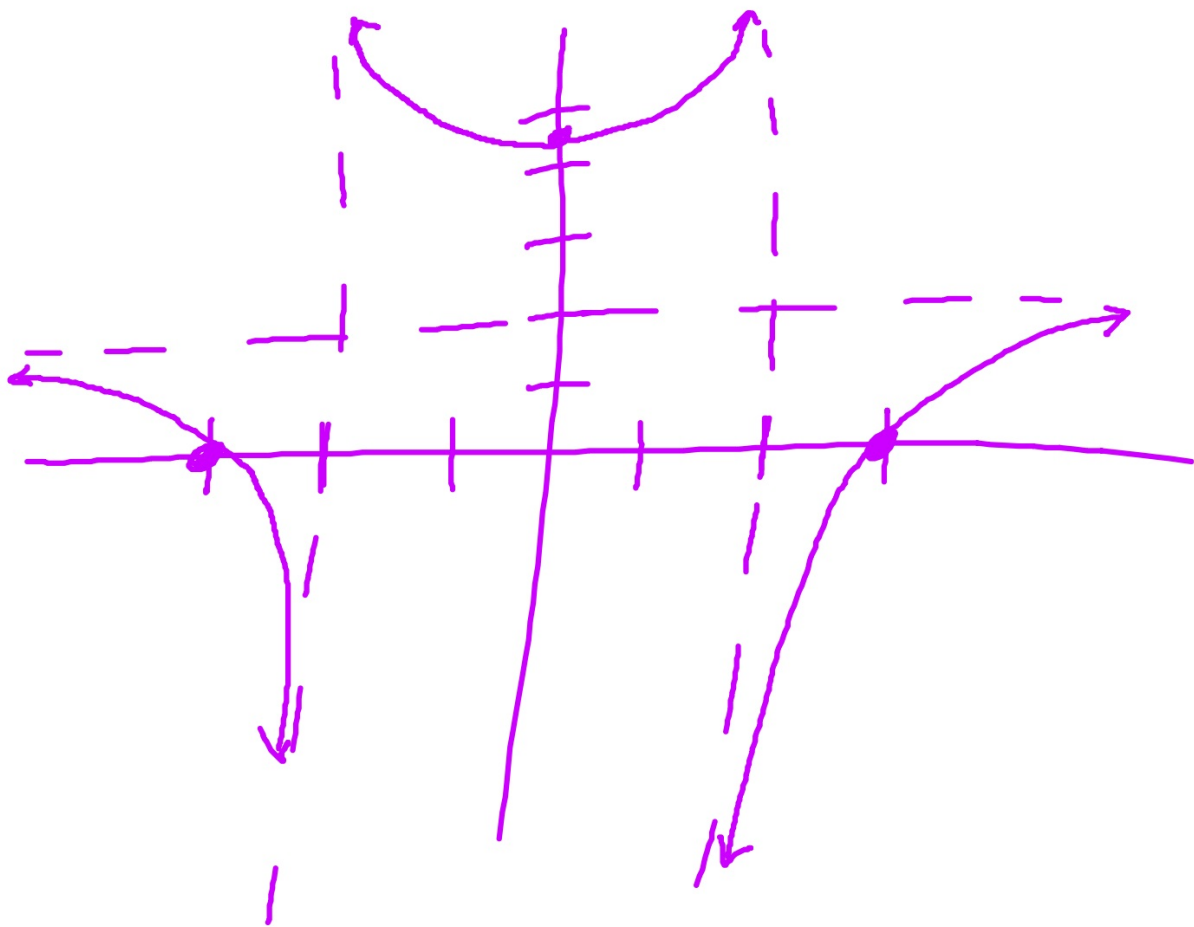
Sketch f(x)

$$f'(x) = \frac{20x}{(x^2-4)^2}$$



$$f''(x) = \frac{-20(3x^2+4)}{(x^2-4)^3}$$





5. Sketch a curve that satisfies the following conditions:

$$\frac{dy}{dx} > 0 \text{ on } (-\infty, 0) \text{ and } (2, +\infty)$$

$$\frac{dy}{dx} < 0 \text{ on } (0, 2)$$

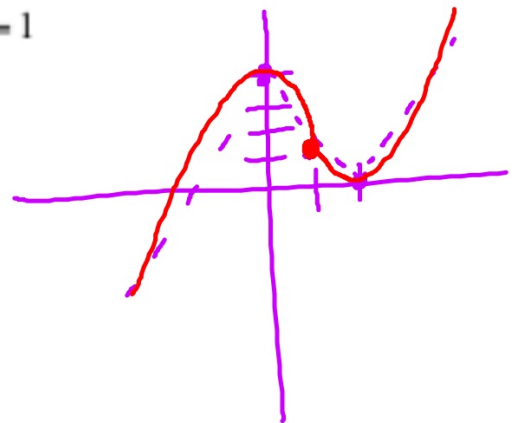
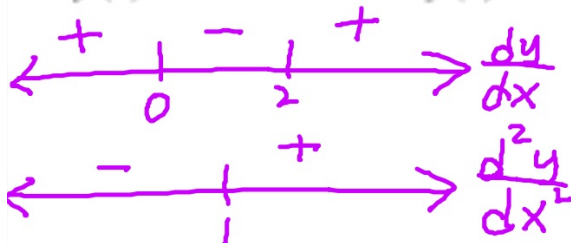
$$\frac{d^2y}{dx^2} > 0 \text{ on } (1, +\infty)$$

$$\frac{d^2y}{dx^2} < 0 \text{ on } (-\infty, 1)$$

$$f(0) = 4$$

$$f(2) = 0$$

$$f(1) = 1$$



$$f(0) = f(2) = 0$$

- $f'(x) > 0$ if $x < 1$
- $f'(1) = 0$
- $f'(x) < 0$ if $x > 1$
- $f''(x) < 0$

