

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
- f' 3. Relative extrema (mult.)
4. Increasing/Decreasing
- f'' 5. Concavity
6. Inflection points

#1: Sketch $g(x)$

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

PreCalculus

1. x-int: $0 = x^3(4 - 3x)$

$x = 0$ ^{4/3}
cross cross

y-int: 0

2. $g(-x) = -4x^3 - 3x^4$
neither

3. D: All reals

4. $\downarrow \downarrow$

Calculus

1. cont. 2. diff.

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

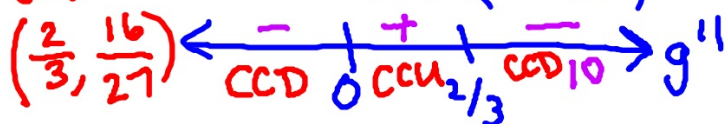
4. $0 = 12x^2(1 - x)$



Rel. max: $(1, 1)$

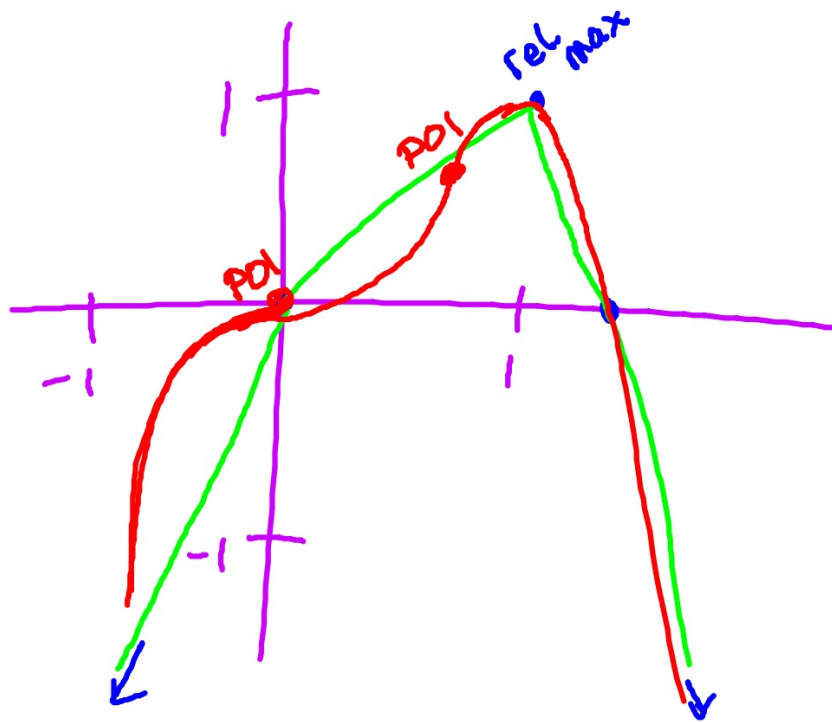
5. $g''(x) = 24x - 36x^2$

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



POI
 $(0, 0)$

$(\frac{2}{3}, \frac{16}{27})$



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

PreCalculus

1. $(\pm 3, 0)$ $(0, 4\frac{1}{2})$
cross

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

3. Domain: $x \neq \pm 2$

4. VA: $x = \pm 2$
 $y = 2$

Sketch $f(x)$

Calculus

1. Disc. $x = \pm 2$
2. not diff. at $x = \pm 2$

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

