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Lesson 5.4: Curve Sketching with Extrema and Points of Inflection

Curve Sketching Recipe

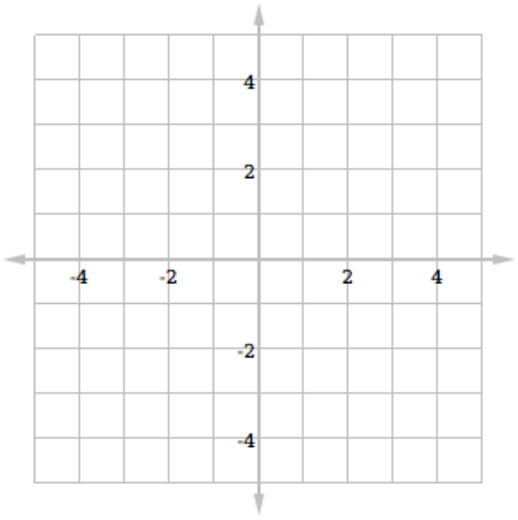
1. Give the domain.
2. Reduce $f(x)$.
3. Find vertical asymptotes and holes.
4. Give x- and y-intercepts.
5. Find the end behavior (horizontal asymptotes or other).
6. Check for symmetry. (Optional)
7. Find increasing/decreasing intervals and relative extrema (show an f' number line).
8. Find concavity and points of inflection (show an f'' number line).
9. Graph!

Examples:

1. A Rational Function

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

Domain:
V.A.:
Holes:
x-intercepts:
y-intercept:
End Behavior:
Symmetry:
Relative Max:
Relative Min:
Points of Inflection:



2. A Radical Function

$$f(x) = \frac{x}{\sqrt{x^2+2}} \qquad f'(x) = \frac{2}{\sqrt{(x^2+2)^3}} \qquad f''(x) = \frac{-6x}{\sqrt{(x^2+2)^5}}$$

Domain:
V.A.:
Holes:
x-intercepts:
y-intercept:
End Behavior:
Symmetry:
Relative Max:
Relative Min:
Points of Inflection: