

Curve Sketching

Things you should already know

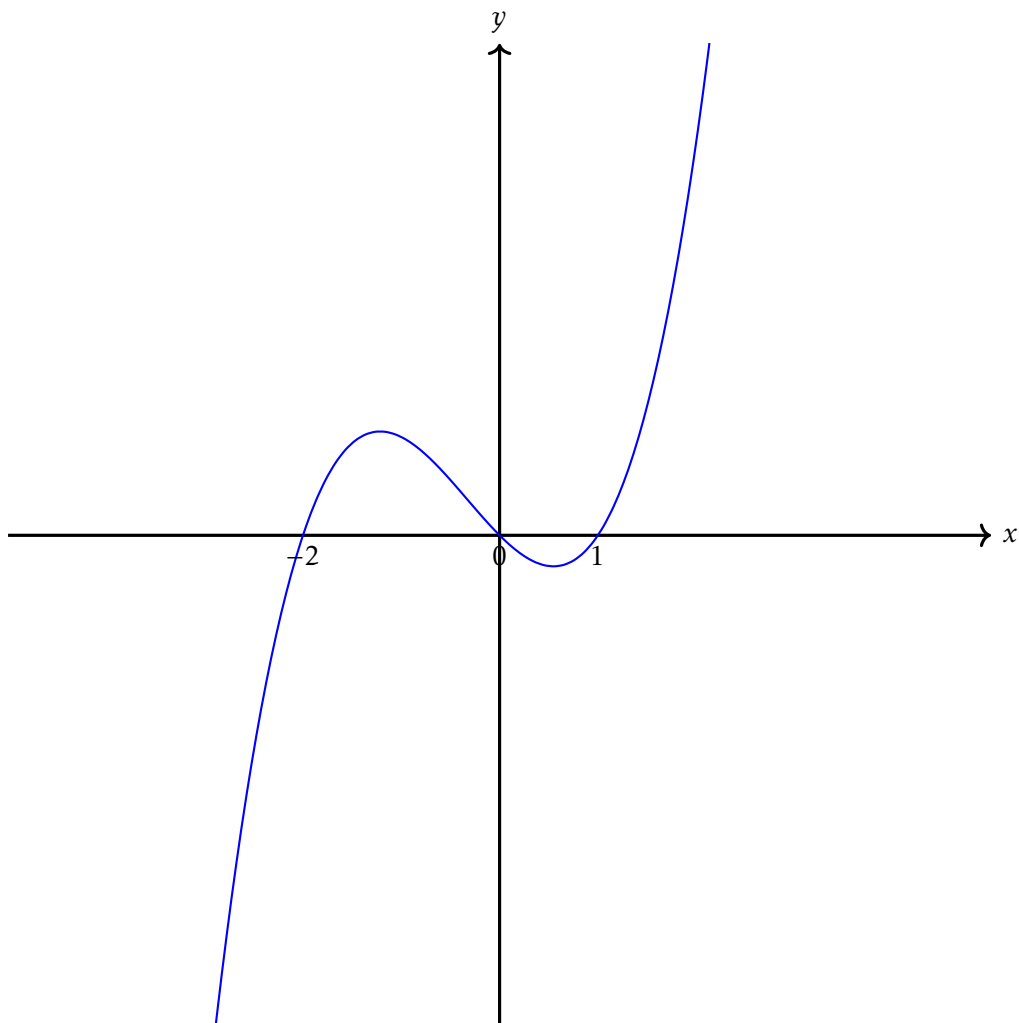
You should already be able to sketch:

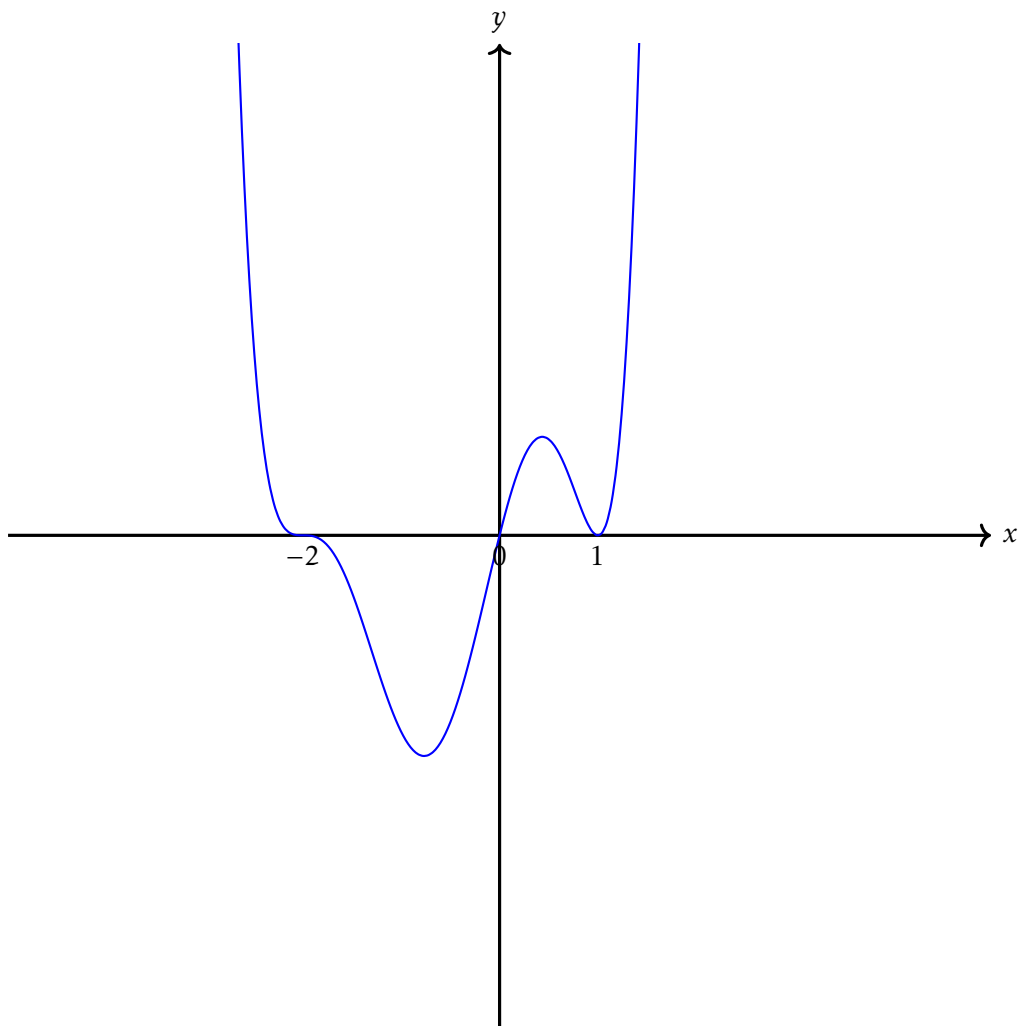
1. $y = mx + c$
2. $y = ax^2 + bx + c$
3. $y = x^m$
4. $y = \sqrt{x}$
5. $y = \sin x, y = \cos x, y = \tan x$

Polynomial Functions

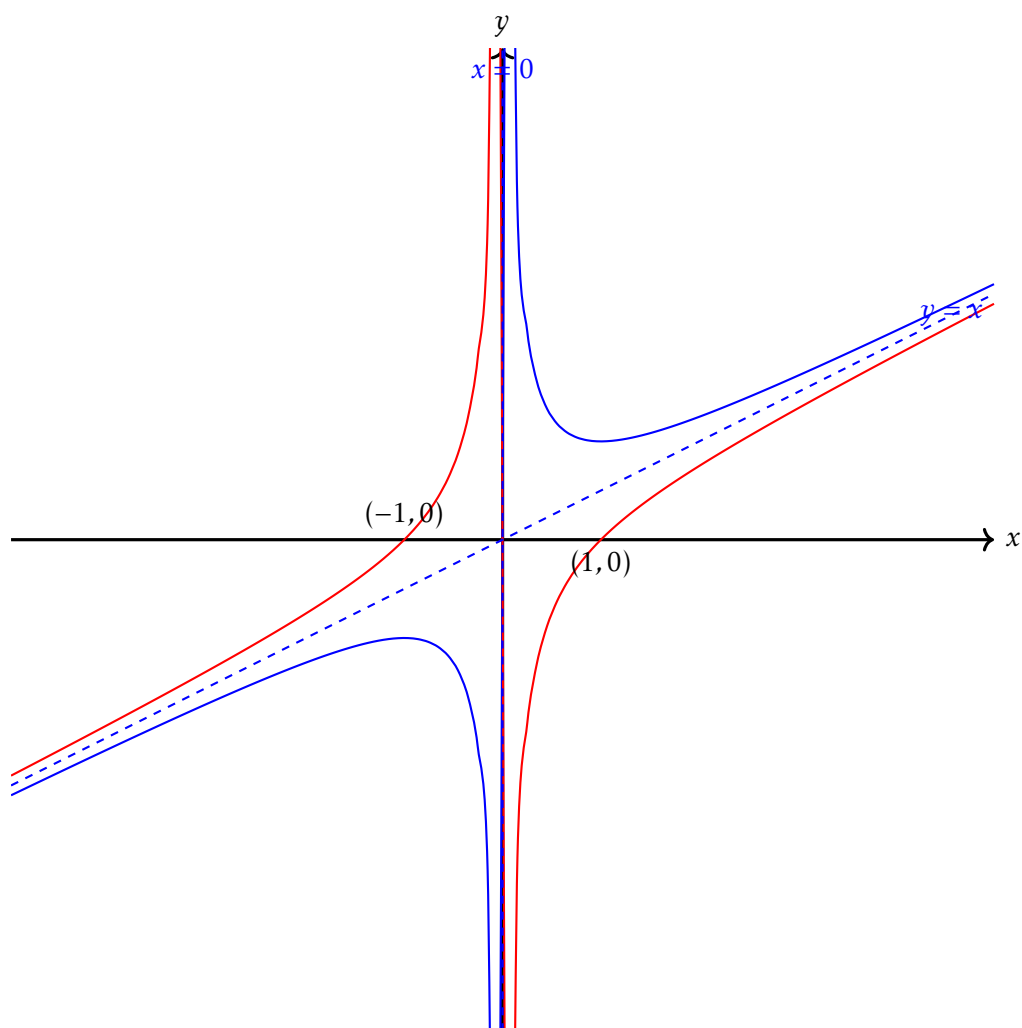
Example

Sketch $y = x(x-1)(x+2)$



ExampleSketch $y = x(x-1)^2(x+2)^3$ 

Rational Functions

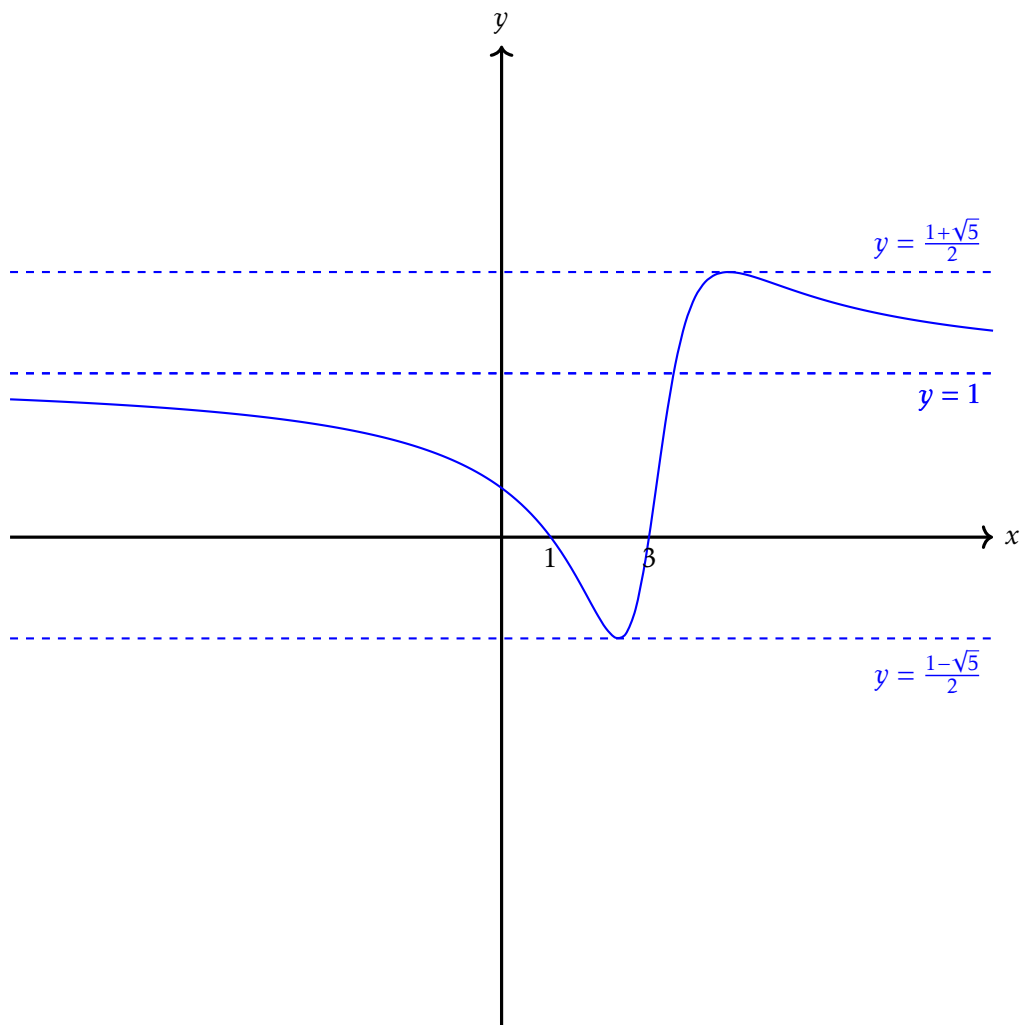
ExampleSketch $y = x + \frac{1}{x}$ and $y = x - \frac{1}{x}$ 

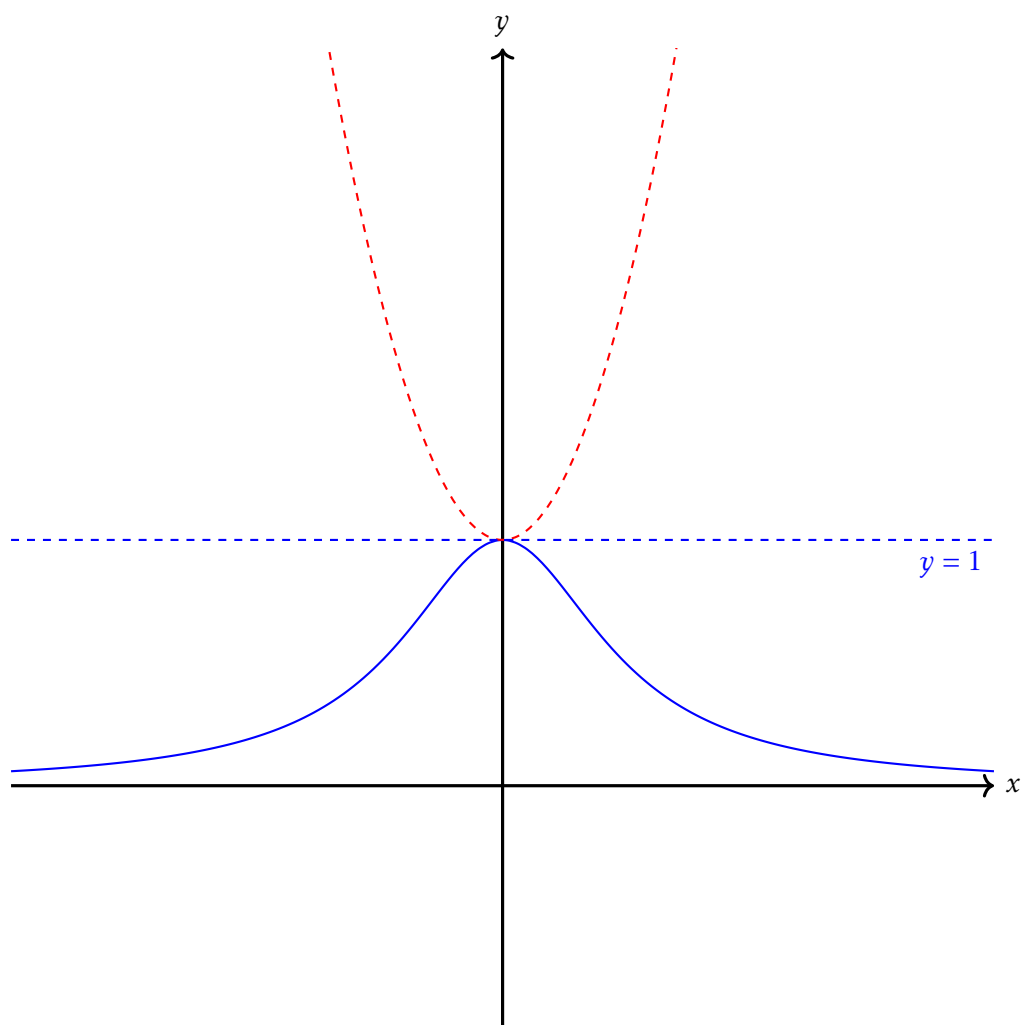
Example

$$\text{Sketch } y = \frac{x^2 - 4x + 3}{x^2 - 6x + 10}$$

Notice that $x^2 - 4x + 3 = (x - 3)(x - 1)$ and the denominator is always positive. $(x - 3)^2 + 1$.

Also recall from back when we were studying inequalities, $y \in \left[\frac{1 - \sqrt{5}}{2}, \frac{1 + \sqrt{5}}{2} \right]$



ExampleSketch $y = \frac{1}{1+x^2}$ 

1. What are the turning points on this curve?
2. What are the points of inflection? How do we know they have them? [Without calculation!]