Vertical Asymptotes

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

If a factor from the den reduces w/ numerator → it won't be a vert. asy ⇒ just a point discontinuity

Find asy. thru alg:

$$\lim_{x \to 2^-} \frac{3x^2}{(x-2)(x-3)} = \infty$$

$\therefore x = 2$ is a vert asy

$\frac{+}{-\cdot -}$

$$\lim_{x \to 3^+} \frac{3x^2}{(x-2)(x-3)} = \infty \quad \therefore x = 3 \text{ is a vert asy}$$

$$\frac{+}{+ \cdot +}$$

Horizontal Asymptotes tell what happens as $x \to \infty$ or $x \to -\infty$ (not about the origin)

occur when degree of numerator is less than OR $=$ to the denominator,

$$\lim_{x \to \infty} \frac{3x^2}{x^2 - 5x + 6}$$

divide by x to the highest power found in the denominator

$$\lim_{x \to \infty} \frac{\frac{3x^2}{x^2}}{\frac{x^2}{x^2} - \frac{5x}{x^2} + \frac{6}{x^2}}$$

$$\lim_{x \to \infty} \frac{3}{1 - \frac{5}{x} + \frac{6}{x^2}}$$

$$\frac{3}{1 - 0 + 0} = 3$$

$\therefore y = 3$ is a hor. asy

Intercepts

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

y int:

$$f(0) = \frac{0}{0-0+6} = \frac{0}{6} = 0$$

(0,0)

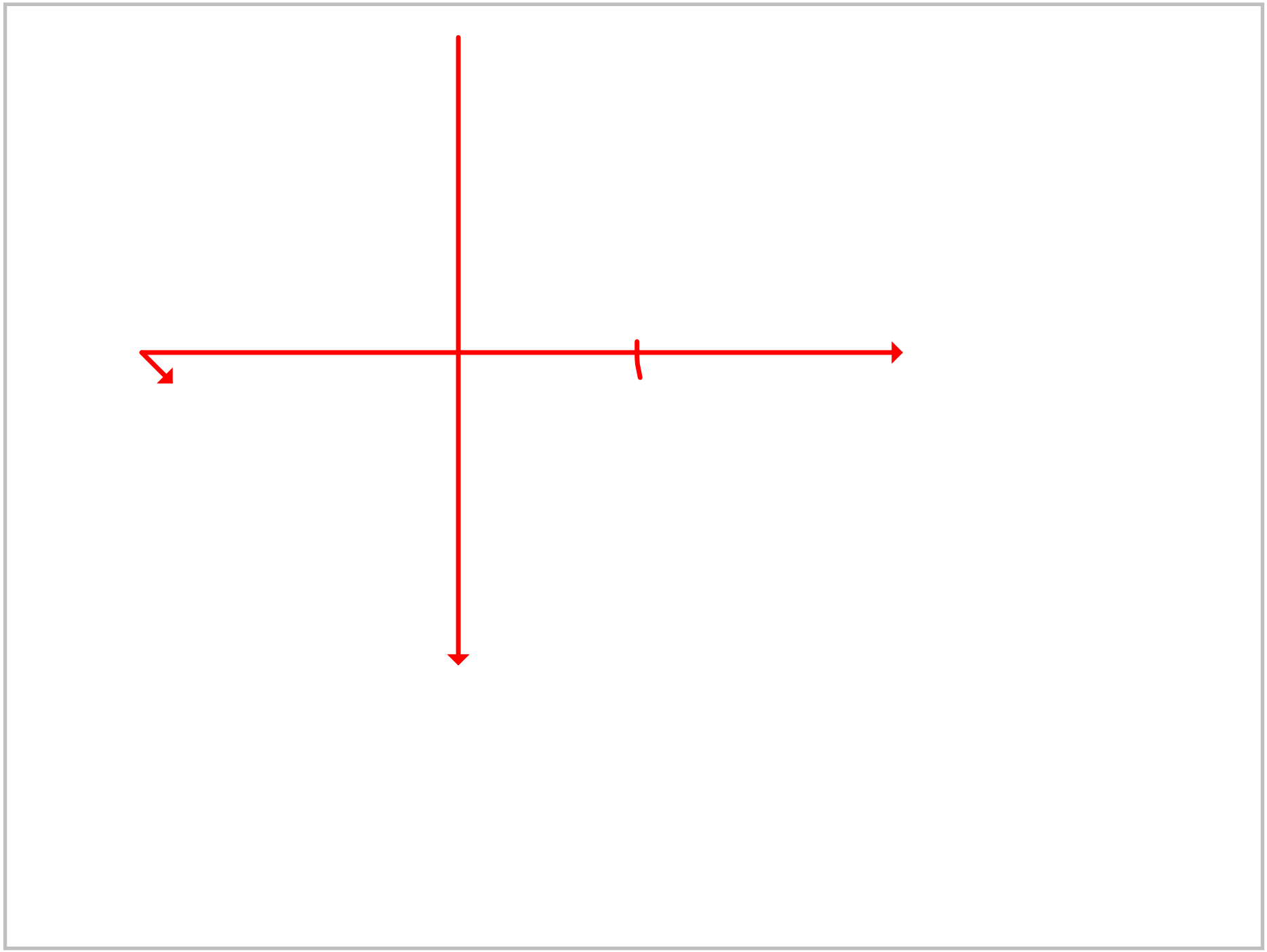
x-int

$$\left[\frac{3x^2}{x^2-5x+6} = 0\right](x^2-5x+6)$$

$$3x^2 = 0$$

$$x^2 = 0$$

$$x = 0$$



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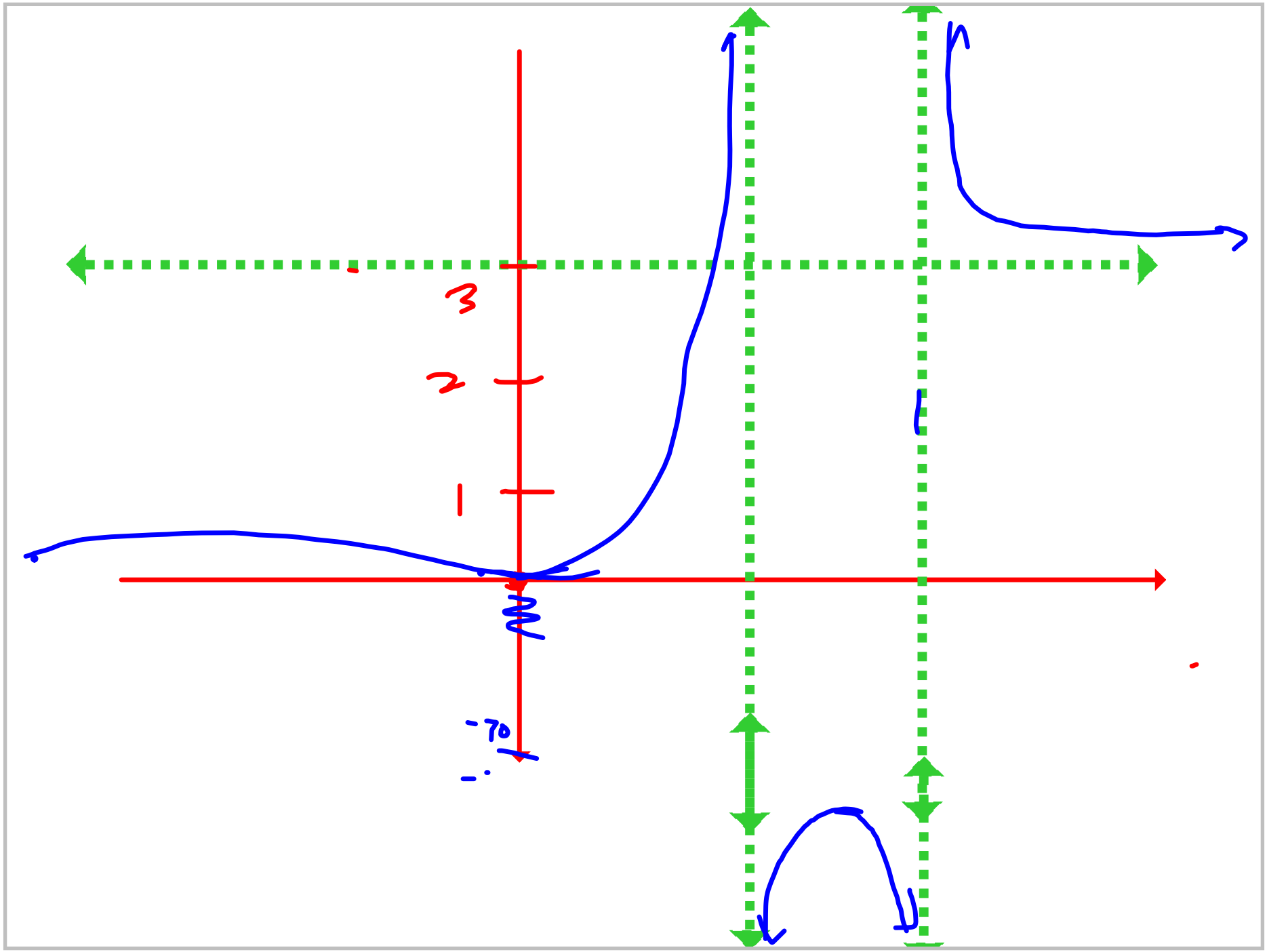

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