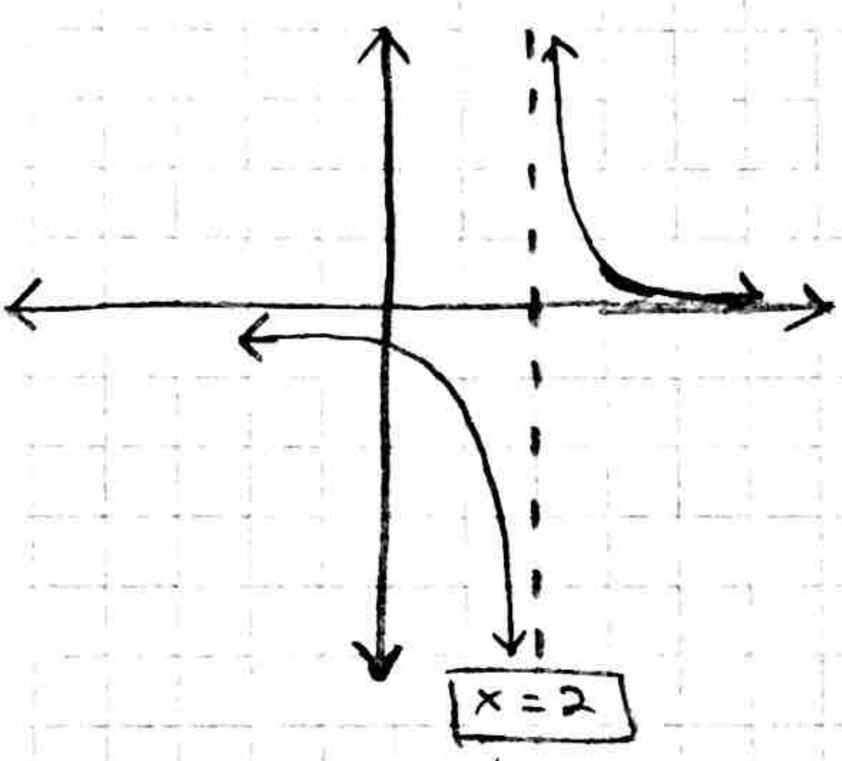
Finding Vertical Asymptotes of Rational Functions

Vertical Asymptotes occur for those values of x that produce '0' in the denominator **But Not** in the Numerator.

If $\frac{0}{0}$ occurs, You Simply Have a 'Hole' in the Graph.



$f(x) = \frac{1}{x-2} = \frac{1}{(2)-2} = \frac{1}{0}$

I have a 1 in the numerator and a 0 in the denominator.
This fits a vertical asymptote

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a) $f(x) = \frac{5}{x^2-9}$

① $x^2 - 9 = 0$

$+9 \quad +9$

$\sqrt{x^2} = \pm\sqrt{9}$

$x = \pm 3$

Set denominator to 0 and solve for x.

Vertical Asymptote
$x = 3$ or $x = -3$

$\frac{5}{(3)^2-9} = \frac{5}{9-9} = \frac{5}{0}$

$\frac{5}{(-3)^2-9} = \frac{5}{9-9} = \frac{5}{0}$