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

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

$\lim_{x \to 2^+} f(x) = \infty$

2. $f(x) = \csc \frac{\pi x}{4}$

$\lim_{x \to 4^-} f(x) = \infty$

$\lim_{x \to 4^+} f(x) = -\infty$

3. $f(x) = \frac{2x-1}{x^2-4}$ (DOTS)

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

$(x+2)(x-2) = 0$

$x+2 = 0 \quad x-2 = 0$

VA $x = -2 \quad x = 2$

VERTICAL ASYMPTOTES: RATIONAL FUNCTIONS

(1) FACTOR TOP, FACTOR BOTTOM

(2) CANCEL IF POSSIBLE

(3) SET DENOM. EQUAL TO ZERO AND SOLVE

4. $f(x) = \frac{x^2-9}{x^3-3x^2+3x-9}$ (DOTS) (GROUPING)

(1) $= \frac{(x+3)(x-3)}{(x^2+3)(x-3)}$

(2) $= \frac{x+3}{x^2+3}$

(3) $x^2+3 = 0$

$x^2 = -3$

$x = \pm\sqrt{-3}$

"$i$"

NO VERTICAL ASYMPTOTES