# Vertical Asymptotes

p. 128 - 137 (2.5)

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1. If $f(x) \to \pm\infty$ as $x \to c^{\pm}$, then $x = c$ is a V.A.

2. If a function has a vertical asymptote, then it is not continuous.

3. V.A. occurs where denominator = 0, there is not a common factor, and the numerator $\neq 0$.

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For 1-3, find the vertical asymptotes.

1. $g(x) = \dfrac{(2x^2 - x)}{x + 5}$ $x = -5$

2. $h(t) = \dfrac{t^2 - 4}{t^2 + 5t + 6}$ $(t+2)(t-2)$ $(t+2)(t+3)$ $t = -3$

3. $f(x) = \dfrac{3x - 7}{x^2 - 9}$ $x = \pm 3$

**4(FR) Let $f$ be the function by $f(x) = \dfrac{x}{\sqrt{x^2 - 4}}$

$x^2 - 4 > 0$

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

(a) Find the domain of $f$. $x < -2$ and $x > 2$

(b) Write the equation for each vertical and horizontal asymptote to the graph of $f$. $x = \pm 2$, $y = 1$

**5(FR) Let $f$ be the function given by $f(x) = \dfrac{9x^2 - 36}{x^2 - 9}$ $\dfrac{9(x+2)(x-2)}{(x+3)(x-3)}$

(a) Describe the symmetry of the graph of $f$.

(b) Write an equation for each vertical and each horizontal asymptote of $f$. $x = \pm 3$, $y = 9$