

Infinite Limits

The line $x = a$ is called a **vertical asymptote** if at least ONE of the following is true:

$$\lim_{x \rightarrow a} f(x) = \pm\infty \text{ or } \lim_{x \rightarrow a^-} f(x) = \pm\infty \text{ or } \lim_{x \rightarrow a^+} f(x) = \pm\infty.$$

Example: For the function $g(x)$ shown below, use the graph to state the following:

- ① $\lim_{x \rightarrow 4} g(x) = \infty$
- ② $\lim_{x \rightarrow 2} g(x) = -\infty$
- ③ $\lim_{x \rightarrow -2^-} g(x) = -\infty$
- ④ $\lim_{x \rightarrow -2^+} g(x) = \infty$
- ⑤ the equations of any vertical asymptotes
 $x = \pm 2, 4$
 $x = -2, x = 2, x = 4$

