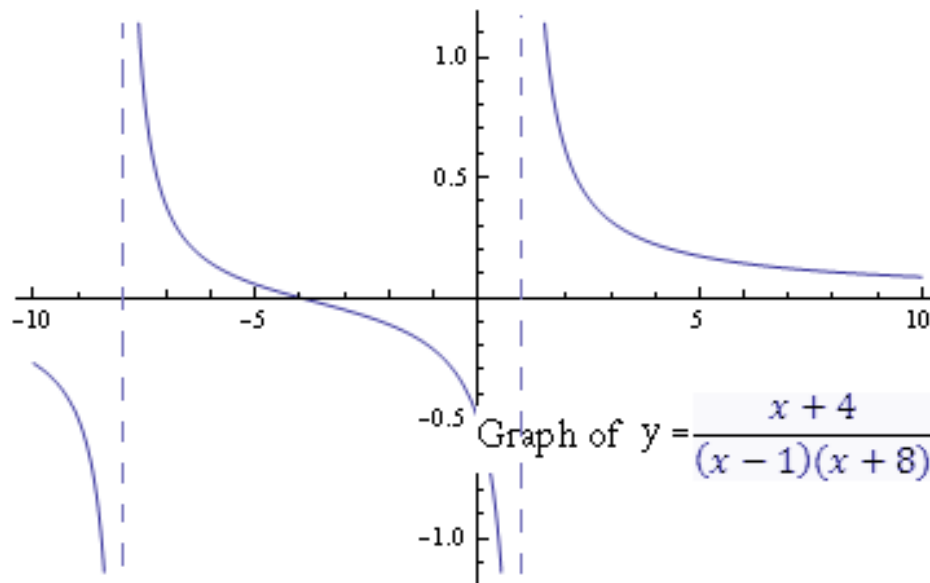


**Discontinuities:**

This graph has asymptotes, which are **nonremovable discontinuities**. Asymptotes occur when a function approaches infinity or negative infinity at a specific value of  $x$ . Notice this from the equation:

Point discontinuities are called **removable discontinuities**.

- Occurs when function has a denominator that can be equal to zero, but part of the denominator can be cancelled out with a like term in the numerator.

**Example #1: Find any removable discontinuities.**

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

**Example #2: Find any removable discontinuities.**

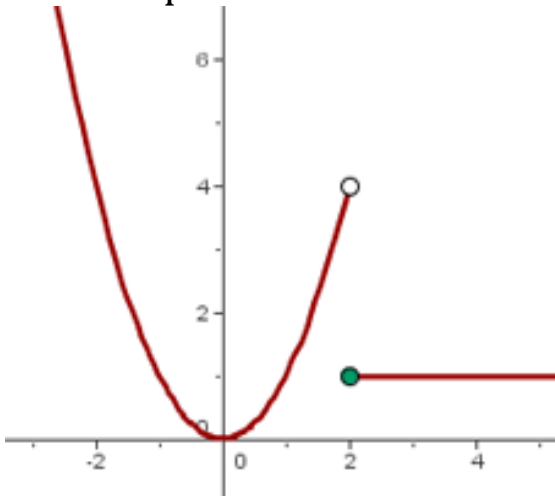
$$f(x) = \frac{x^3 - 8}{(x - 2)}$$

Lesson #18

You try: Find any places of discontinuity and classify.

$$f(x) = \frac{x^3 + 8}{(x^2 - 4)}$$

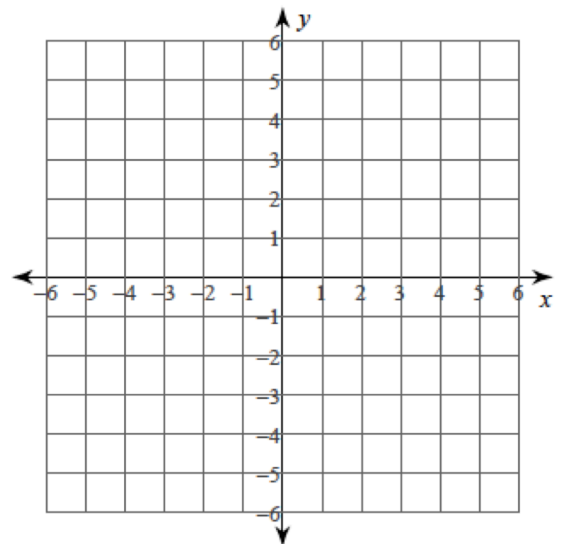
**Jump discontinuities** occur when there is a gap in a graph, usually within a piece-wise function.



Example #4:

Graph the function to find any discontinuity.

$$f(x) = \begin{cases} x^2, & x \leq 1 \\ 6 - x, & x > 1 \end{cases}$$



Lesson #18

Example #5: **Find any discontinuities.**

$$f(x) = \begin{cases} \frac{x}{x+3}, & x < -1 \\ -\frac{1}{2}, & x \geq -1 \end{cases}$$

Example #6:

**Find any discontinuities.**

$$f(x) = \frac{1}{\sin x}$$

You try:

**Find any discontinuities.**

$$g(x) = \tan x$$