

Today's Learning Goal(s):

By the end of the class, I will be able to:

- determine if and where any holes or asymptotes occur for a rational function.
- graph a rational function.

2.5 Exploring Graphs of Rational Functions (Holes)

Date: _____

(Every lesson)

HOLES!!!

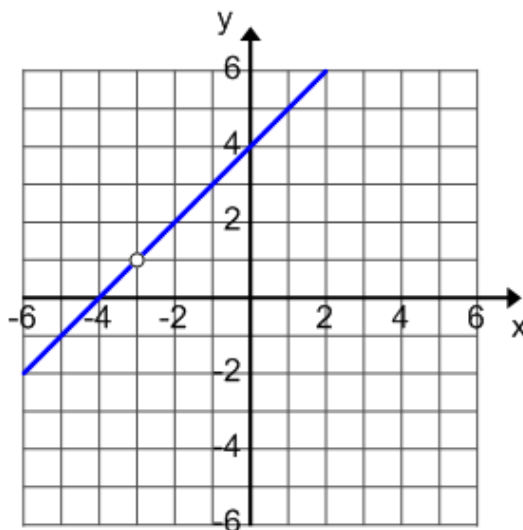
$$\text{Graph } g(x) = \frac{x^2 + 7x + 12}{x + 3}$$

Just like our first unit! Factor first.

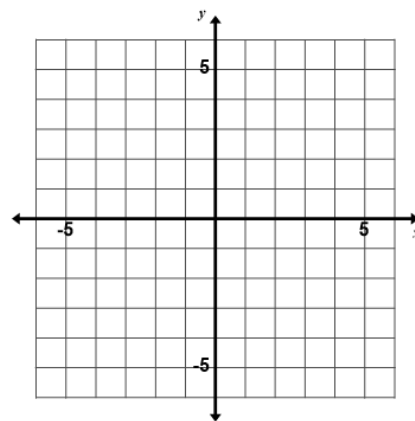
$$g(x) = \frac{(x+3)(x+4)}{(x+3)}$$

We have the restriction that $x \neq -3$, but since we cancel $(x+3)$ we create a hole in the graph.

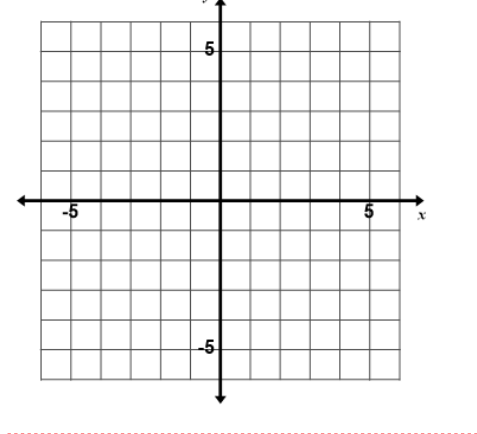
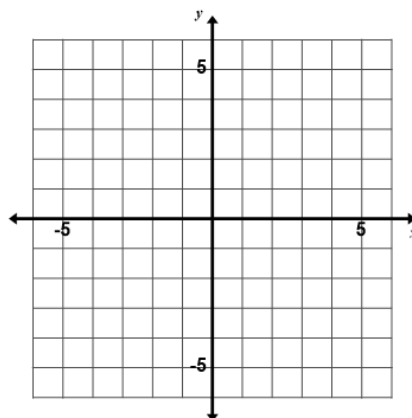
So, $g(x) = (x + 4)$ is a linear function with a hole at $x = -3$



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



Ex.2 Graph $g(x) = \frac{1}{x - 2}$

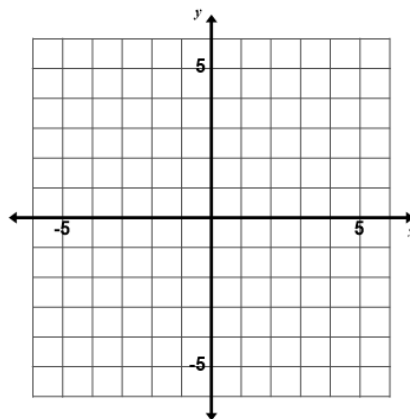


Summary:

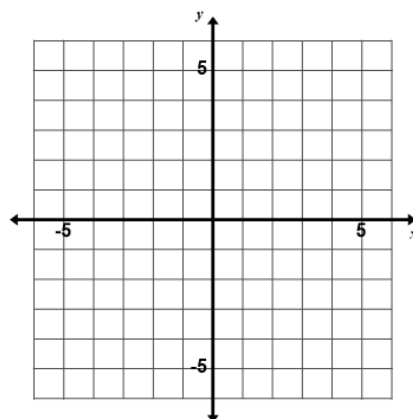
If the restriction divides out, then there is a **hole** at that point.

If the restriction remains, then there is a vertical asymptote at that point.

Ex.3 Graph $h(x) = \frac{x-2}{x^2-4}$

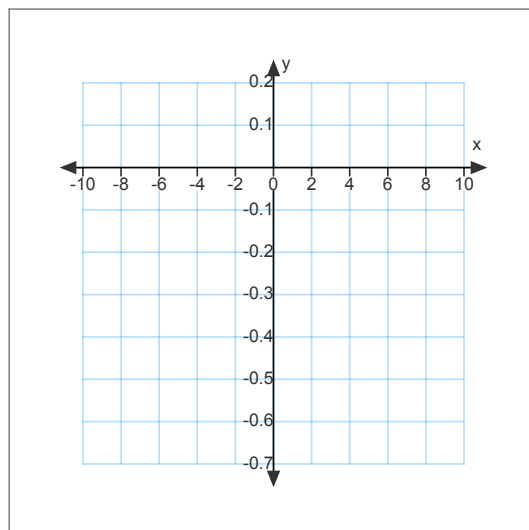
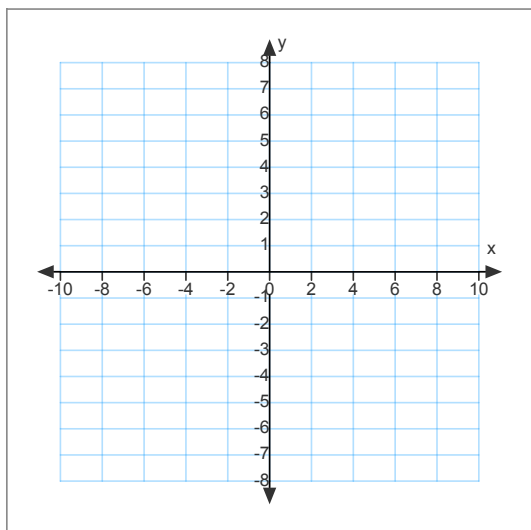


Ex.4 Graph $m(x) = \frac{x-2}{x^2+4}$



$$y = \frac{x-2}{x^2+4}$$

$$y = \frac{x-2}{x^2+4}$$

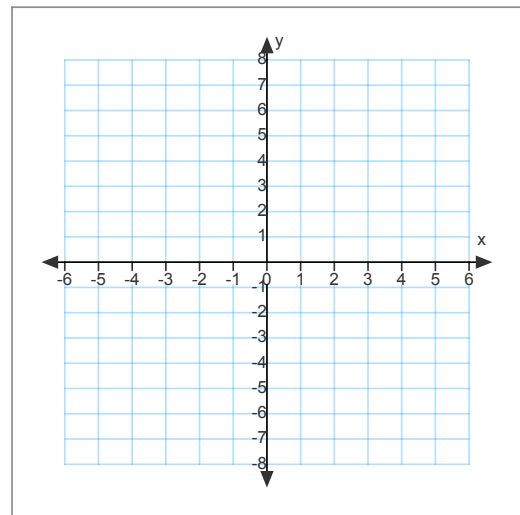
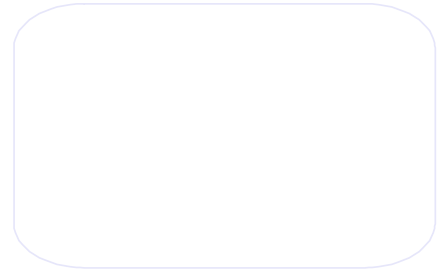


If time,

(otherwise, continue to additional homework on next slide)

Ex.5 Determine any vertical asymptotes or holes for:

$$f(x) = \frac{x^3 - 4x}{x^3 - x^2 - 6x}$$



$$y = \frac{x^3 - 4x}{x^3 - x^2 - 6x}$$

$$y = \frac{x-2}{x-3}$$

Today's Homework Practice includes:

pp. 70-73 #6bc, 7c, (8,9)ac, 10, 12,

16, 18 [20, 22]

+3 Questions

Additional Homework Questions Assigned

MCR 3UI

Graphs of Rational Functions

Determine any Vertical Asymptotes or Holes for the following functions.

Graph each function.

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

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

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