

5.1 Graphs of Reciprocal Functions

$$f(x) = 700$$
$$1/f(x) =$$

$$f(x) = 0.2$$
$$1/f(x) =$$

$$f(x) = 1$$
$$1/f(x) =$$

$$f(x) = -1$$
$$1/f(x) =$$

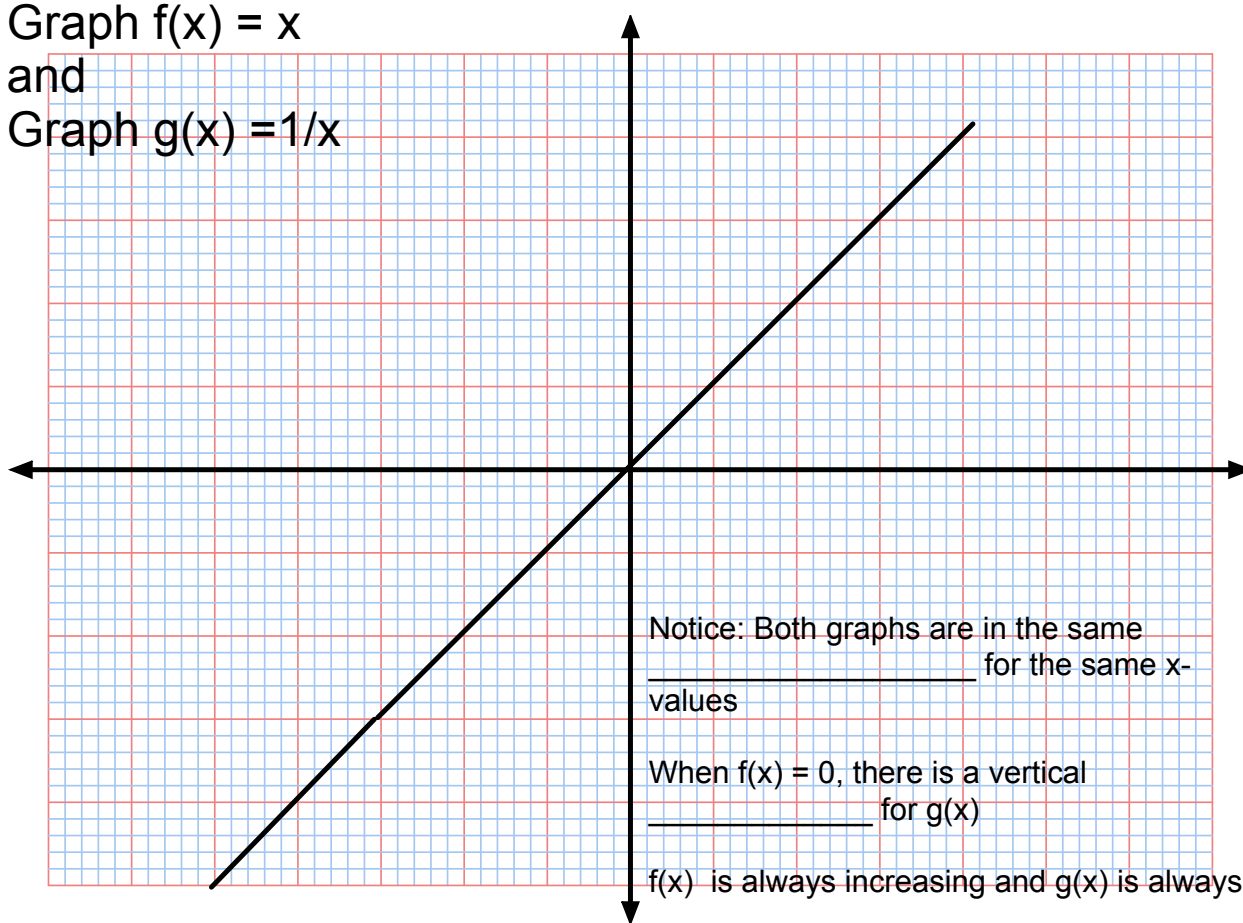
$$f(x) = 0$$
$$1/f(x) =$$

$$f(x) = -54$$
$$1/f(x) =$$

$$f(x) = -0.05$$
$$1/f(x) =$$

List as many interesting things as possible than happen when you take the reciprocal of function.

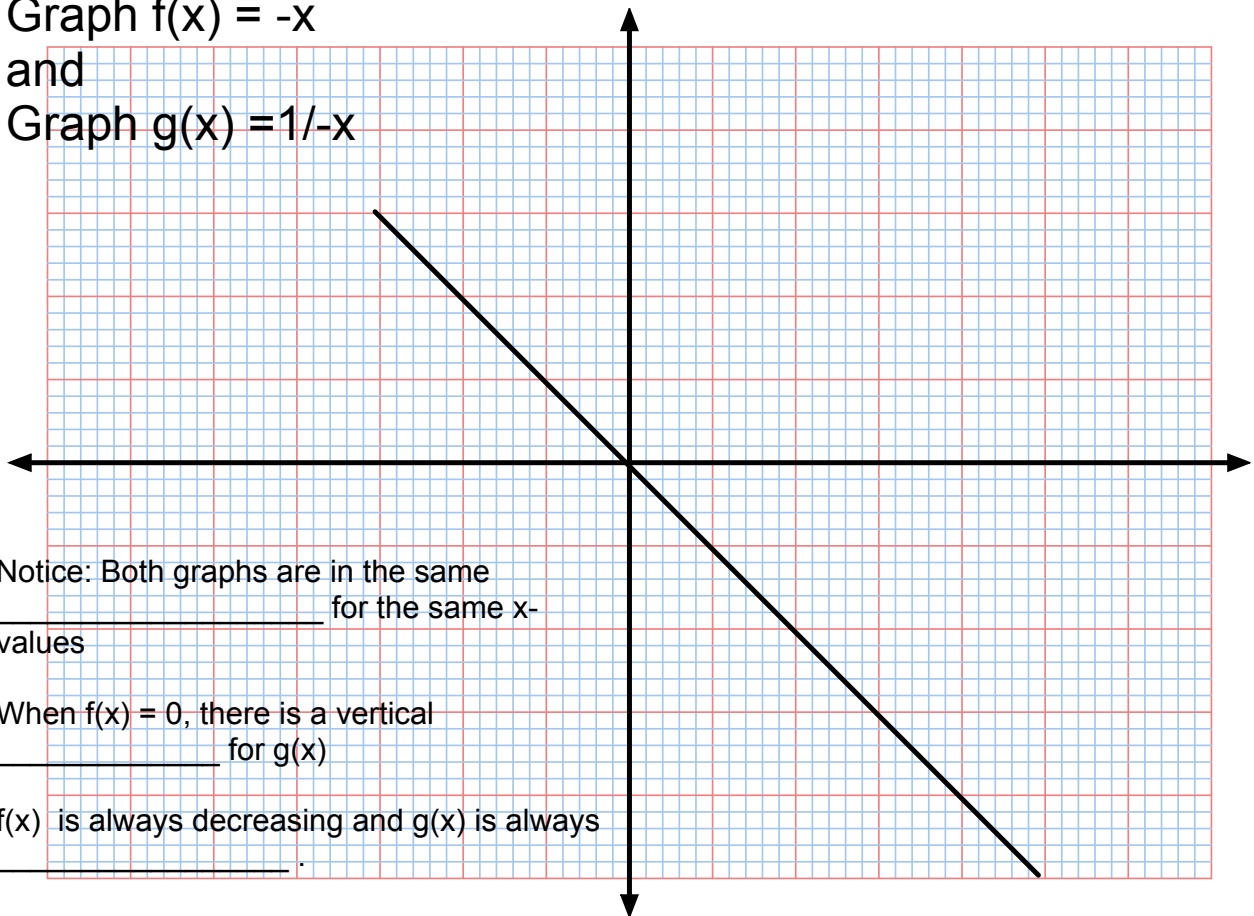
Graph $f(x) = x$
and
Graph $g(x) = 1/x$



Graph $f(x) = -x$

and

Graph $g(x) = 1/-x$



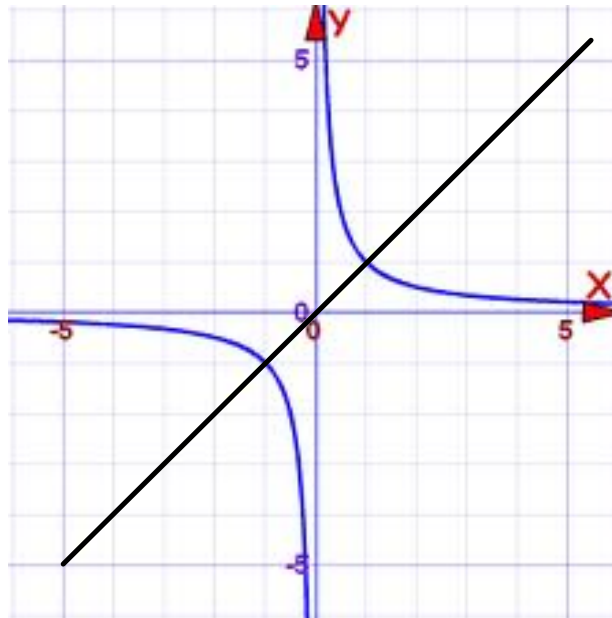
Notice: Both graphs are in the same _____ for the same x-values

When $f(x) = 0$, there is a vertical _____ for $g(x)$

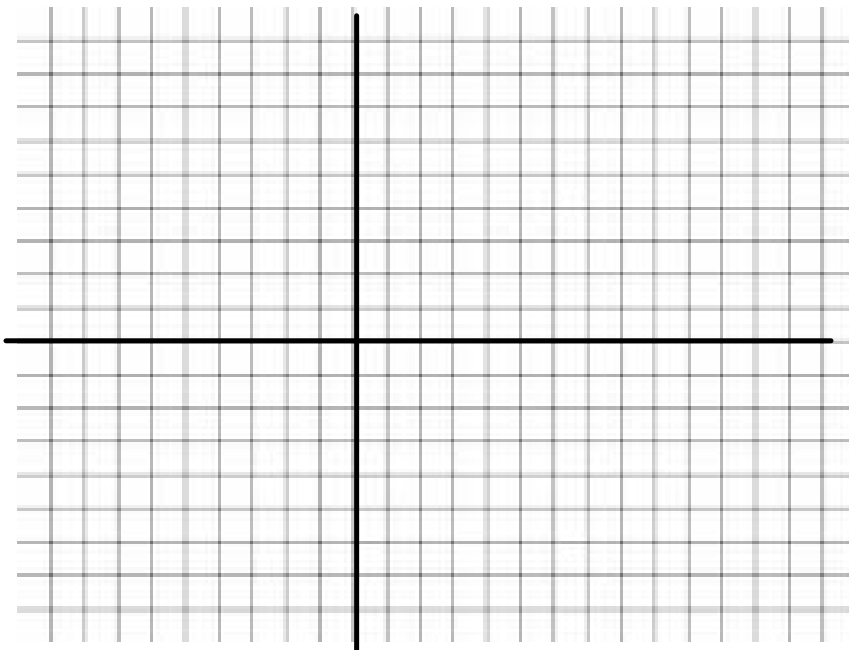
$f(x)$ is always decreasing and $g(x)$ is always _____

What are the y-coordinates of the points where $f(x)$ and $g(x)$ intersect?

If the range of $f(x)$ includes 1 and/or -1, the reciprocal function, $g(x)$ will intersect the original function, $f(x)$, at a point (or points) where the y-coordinate is 1 or -1.



Graph $f(x) = 4-x$ in order to graph $1/f(x)$



Step 1: Graph $f(x)$

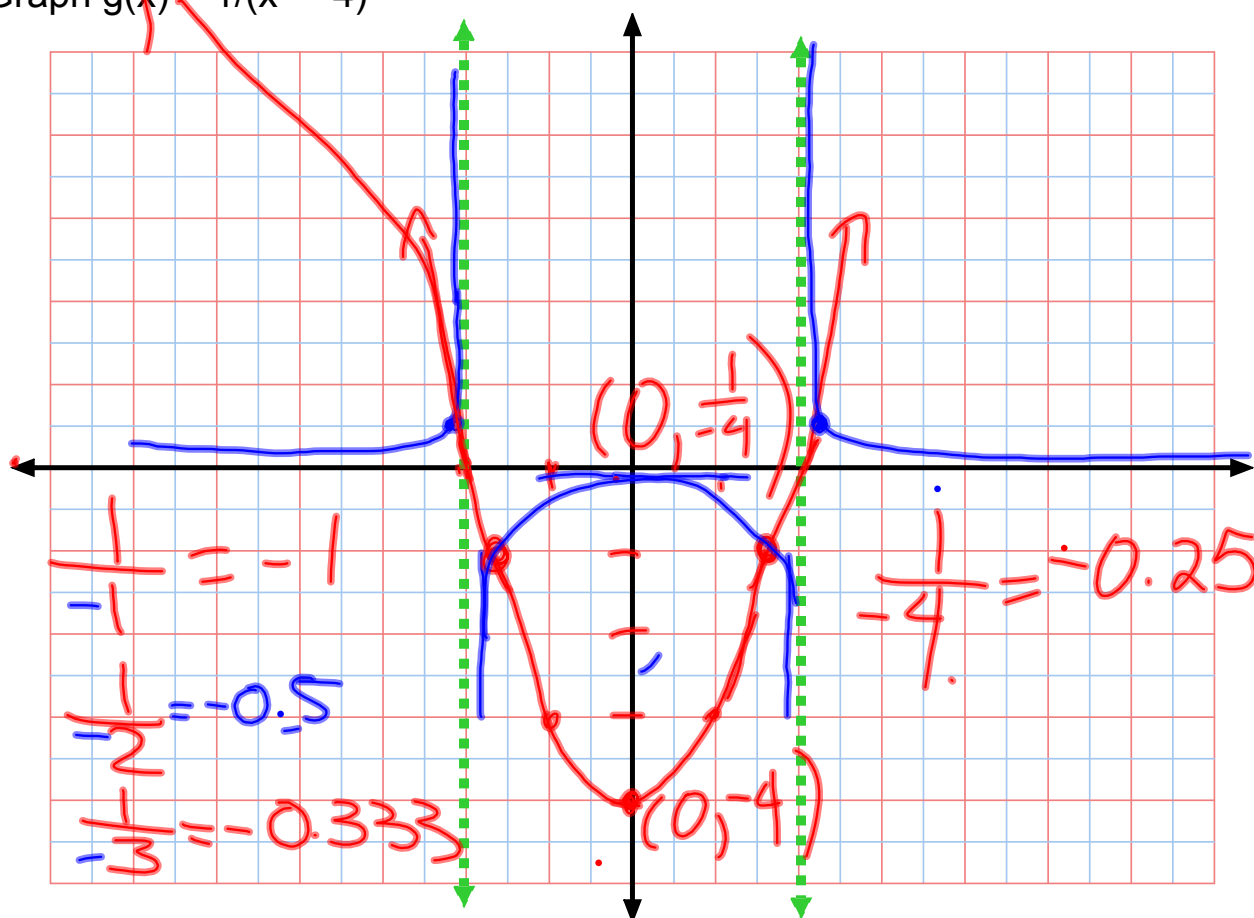
Step 2: Determine the zeros of $f(x)$ and draw an asymptote for $1/f(x)$

Step 3: Determine positive and negative intervals for $1/f(x)$

Step 4: Determine end behaviours

Step 5: Determine where $f(x) = 1$ or -1 since that is where the graphs intersect

Step 5: Check that $1/f(x)$ increases when $f(x)$ decreases and vice versa

Graph $g(x) = 1/(x^2 - 4)$ 

	$f(x) = x^2 - 4$	$g(x) = 1/(x^2 - 4)$
Zeros or Vertical Asymptotes		
Values when the graph is positive		
Values when the function is negative		
Intervals when the function is increasing		
Intervals when the function is decreasing		
points where the y-value is 1		
points where the y-value -1		

All y-values on the reciprocal function are the reciprocals of the y-coordinates of the original function.

ie. if y is on the original function, then $1/y$ is on the _____ function.

A reciprocal function will always have $y=0$ as a _____ asymptote if the original function is linear or quadratic.

The graph of a reciprocal function has a vertical asymptote at each _____ of the original function

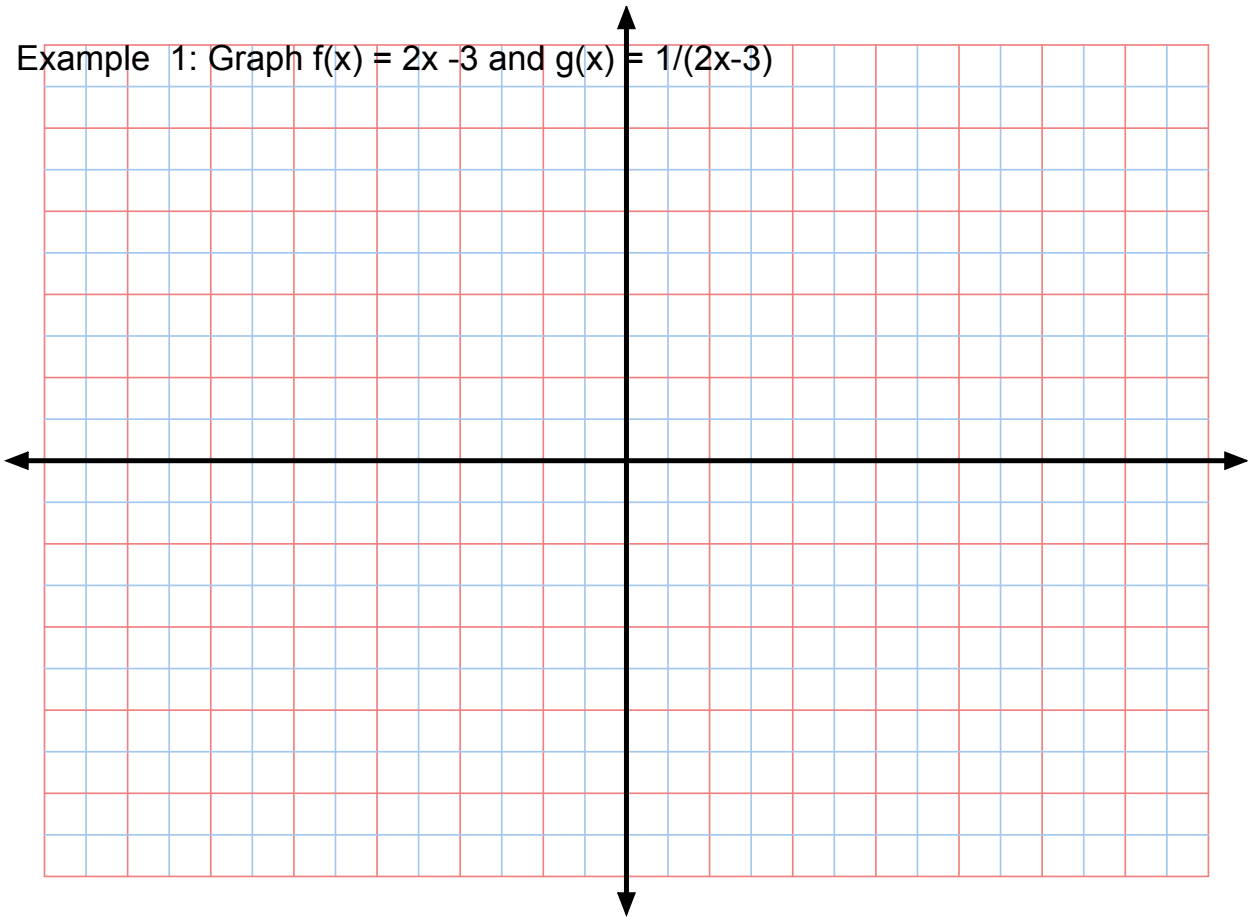
A reciprocal function has the same positive/negative intervals as the _____ function.

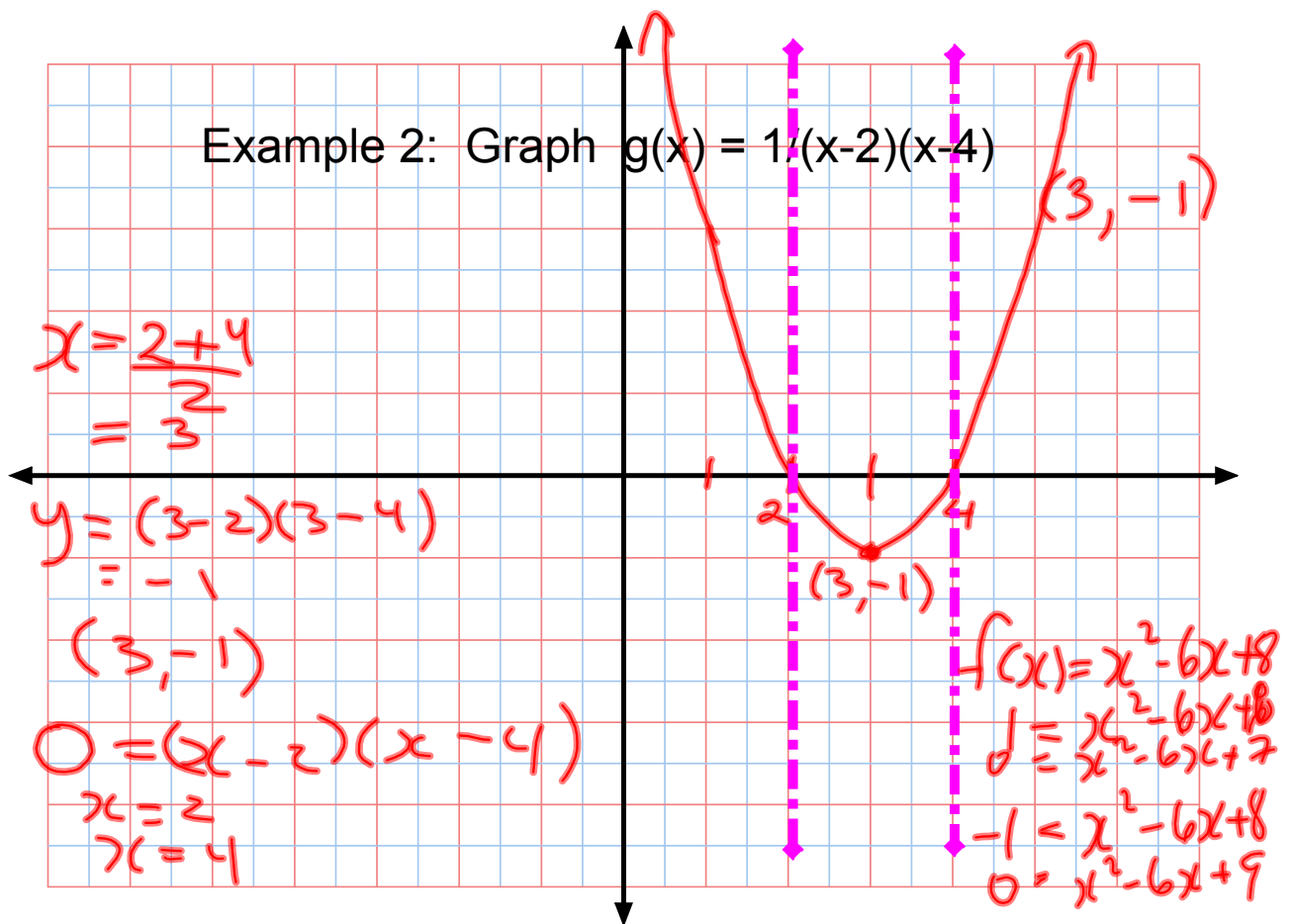
Intervals of increase on the original function are the intervals of _____ on the reciprocal function.

Intervals of decrease on the original function are the intervals of _____ on the reciprocal function.

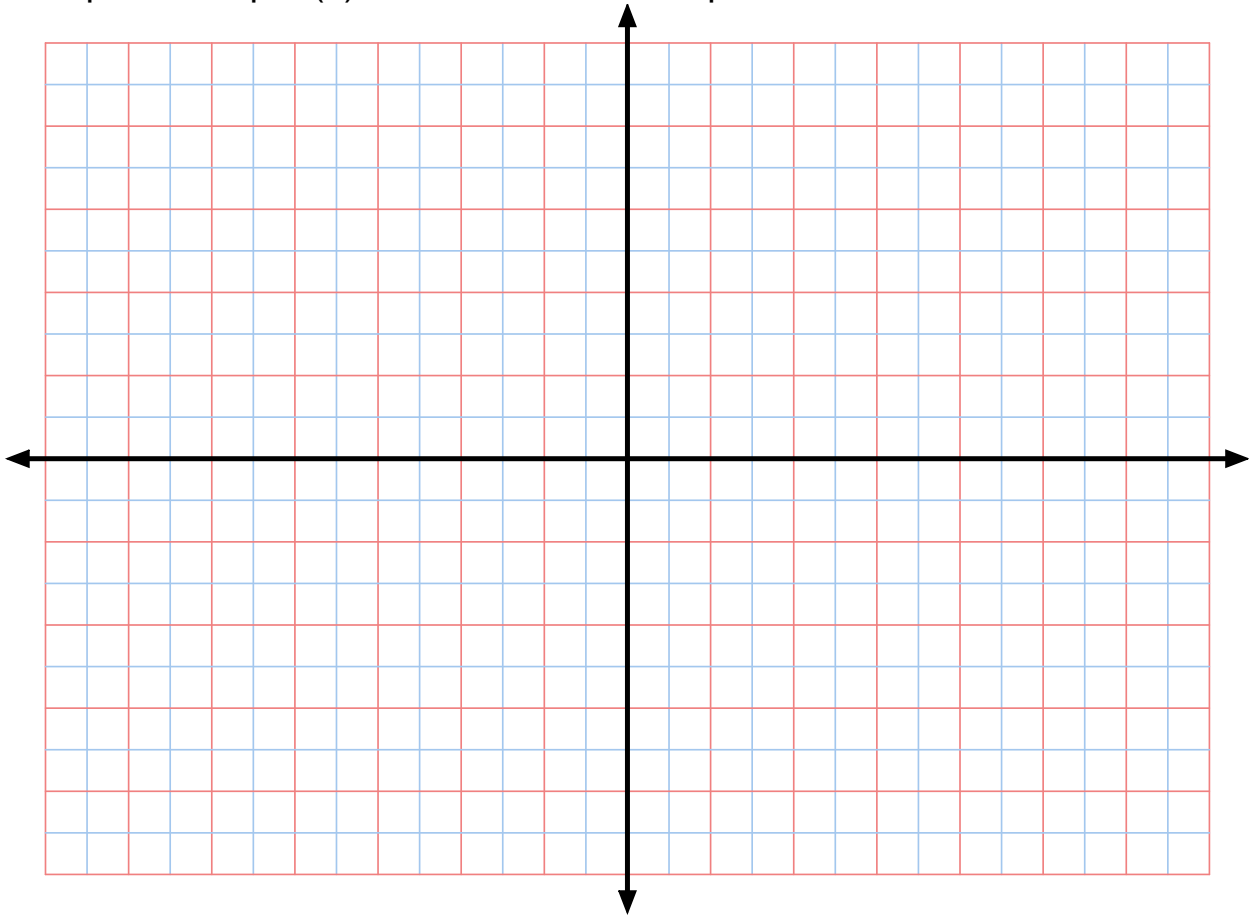
If the original function has a local minimum point, the reciprocal will have a local _____ point at the same x-value (and vice versa).

Example 1: Graph $f(x) = 2x - 3$ and $g(x) = 1/(2x-3)$





Example 3: Graph $f(x) = 4x^2 - 25$ and its reciprocal function.



Homework: page 255-257
#2,5,6a,d,7,8,12