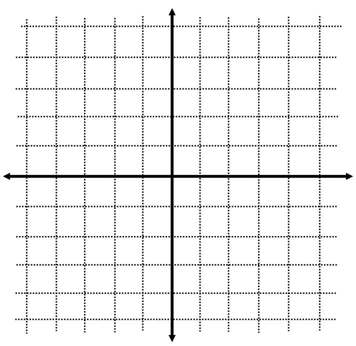
7.4 Reciprocal Functions

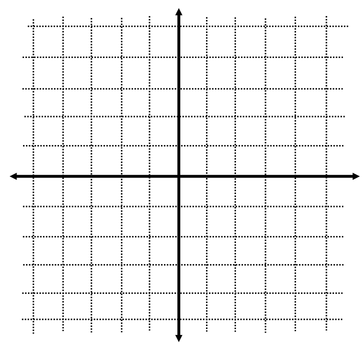
* If $y = f(x)$ is a function, then its ________ function is defined by $y = \frac{1}{f(x)}$.
In this case, the reciprocal function has a restriction on its domain everywhere that $f(x)$ = ________

* $y = \frac{1}{x}$ is the mother function of all inverse functions.

ex. Graph $y = x$ and its inverse as well as $y = 2x - 2$ and its inverse.



x	1/x	2x-2	1/(2x - 2)
-3			
-2			
-1			
0			
1			
2			
3			
4			



What happens at x = 0?

What happens at x = 1?

We call these ________

Do either graphs cross the x-axis?

We call these ________

Def^n: a ________ is a line that a function ________ without ever crossing it. A ________ is similar but can occasionally be crossed.

* For any inverse function, the ________ will result in vertical asymptotes (or holes... but we shouldn't see that until PC12).

* To graph an inverse function:

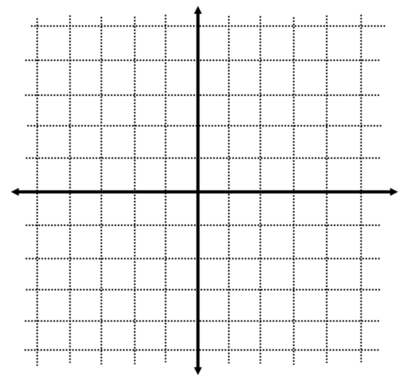
1) graph the base function y = f(x) and determine its zeroes

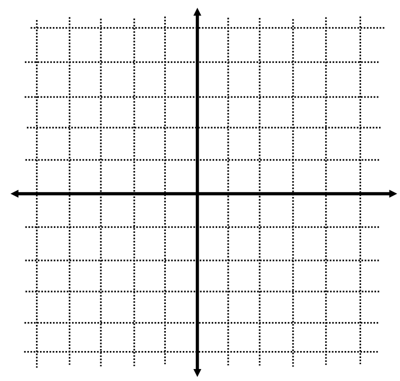
2) Use a dotted line to show the vertical asymptotes. These will occur wherever f(x) crosses the x-axis.

3) Determine the invariant points. These occur where f(x) crosses the lines y = 1 and y = -1

4) Do not make a table of values! Remember:
   - When f(x) gets large, the inverse function approaches zero
   - When f(x) gets small the inverse function approaches infinity
   - When f(x) is positive, the inverse function is also positive
   - When f(x) is negative the inverse function is also negative
   - Make sure your inverse function never crosses a vertical asymptote

ex. graph $y = \dfrac{1}{2x - 5}$





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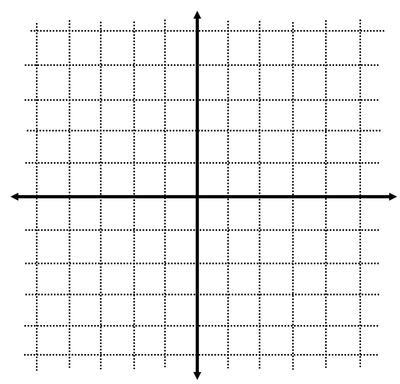
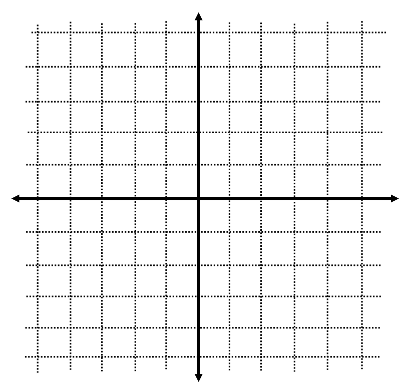
ex. graph $y = \dfrac{1}{x^2 + 2x - 3}$





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