

Graphing Rational Functions

Guide Notes

Function:

The function is a relation such that no two ordered pairs have the same first element. A function may be denoted as $y = f(x)$ which is read "f of x". A function may be written as $f: x \rightarrow y$, where $x \in \text{domain}$ while $y \in \text{range}$.

Sample Problem 1: Find the Range of the following rational function.

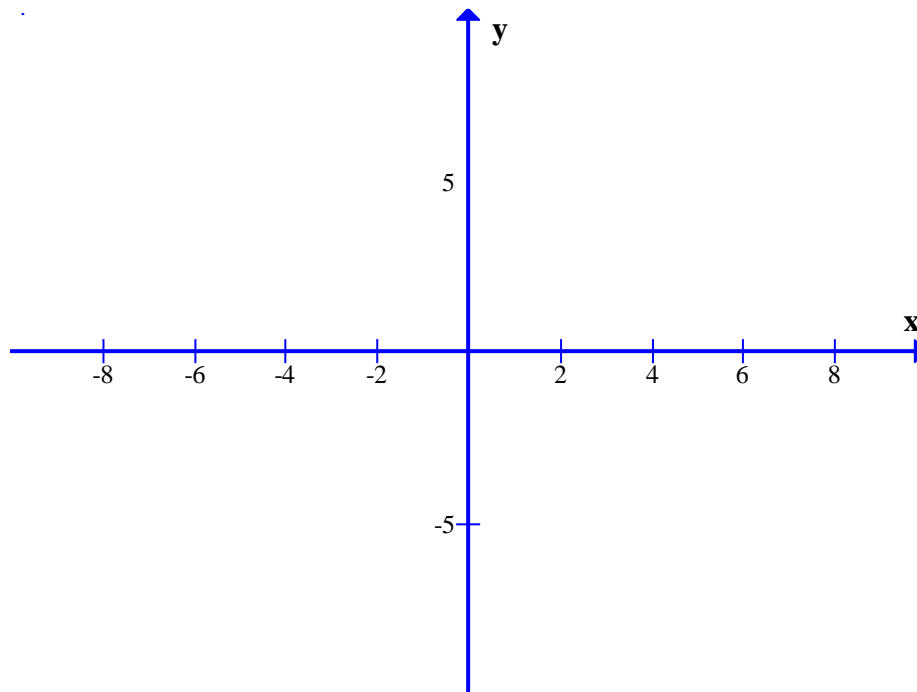
1. If $f(b) = \frac{b-b^2}{1+b^2}$, find a. $f\left(-\frac{1}{2}\right)$; b. $f(-2)$; c. $f(-1)$.

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Sample Problem 2: Draw the graph of the following rational function.

2. Below is the table containing the domain of $f(x) = \frac{x}{2}$, find $f(x)$ given the value of x below and graph its function.

X	-2	-1	0	1	2	3
Y						

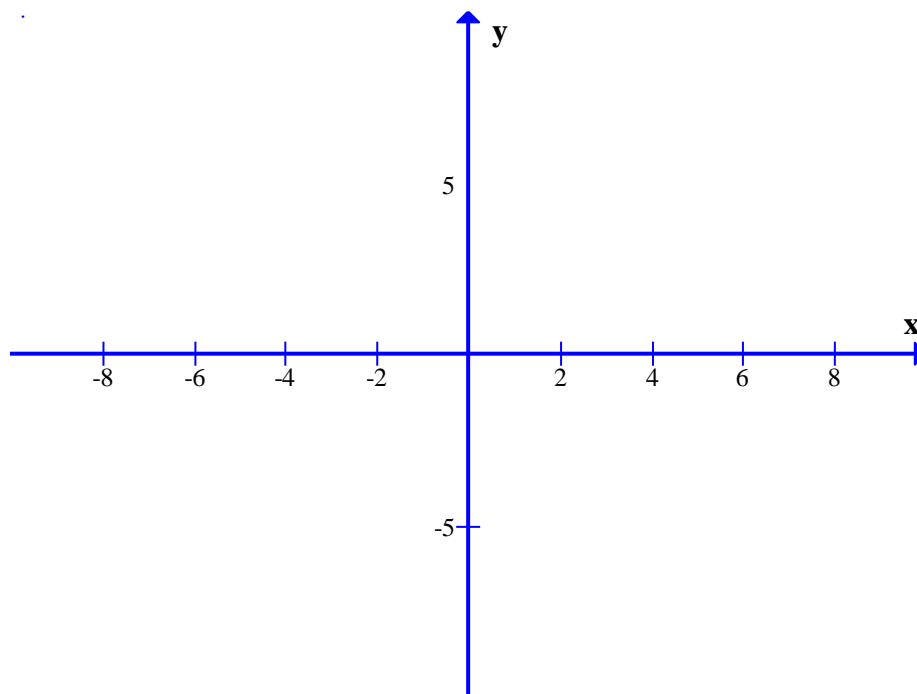


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3. Below is the table containing the domain of $f(x) = \frac{3x}{2}$, find $f(x)$ given the value of x below and graph its function.

X	-2	-1	0	1	2	3
Y						



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Graph of Rational Function

The line $x = a$ is a vertical asymptote if the graph increases or decreases without bound on one or both side of the line as x closer to $x = a$.

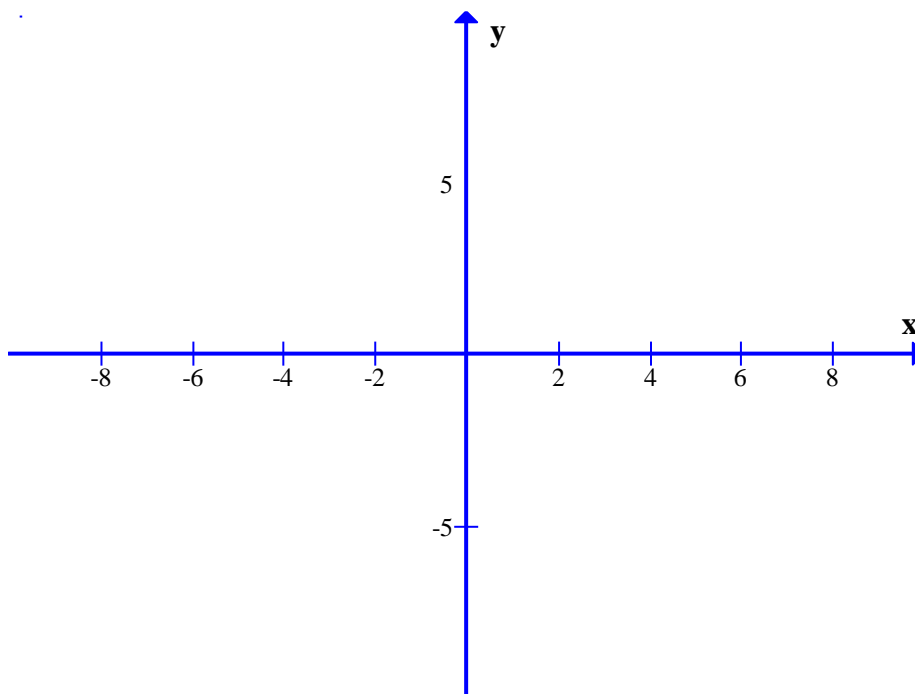
The line $y = b$ is a horizontal asymptote if the graph approaches $y = b$ as x increases or decreases without bound. Note that it doesn't have to approach $y = b$ as both increases and decreases. it only need to approach it on one side in order for it to be a horizontal asymptote.

1. The graph will have a vertical asymptote at $x = a$ if the denominator is zero at $x = a$ and the numerator isn't zero at $x = a$.
2. If $n < m$ then x axis is the horizontal asymptote.
3. If $n = m$ then the line $y = a/b$ is the horizontal asymptote.
4. If $n > m$ there will be no horizontal asymptote.

$$f(x) = \frac{ax^n + \dots}{bx^m + \dots}$$

Sample Problem 3: Draw the graph of the following rational function.

4. Sketch the graph of a function $f(x) = \frac{3x+1}{2x-1}$



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Sample Problem 4: Identify the function and the range of the following graph.

5. Find the domain and range of the graph below.

$$\underline{f(x) = (x)(x)/2}$$