Rational Functions Project

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Funciones algebraicas y trascendentes

Project for Rational Functions:

Goal: Analyze a Rational Functions and its graph.

Objectives:

• Recognize a rational function.

• Explain why the denominator of a rational function cannot be zero thus recognizing these values as the places where vertical asymptotes occur and what they graphically look like.

• Student will explain why the values where vertical asymptotes appear are excluded from domain of the function and thus the graph does not touch or cross them.

• Student will demonstrate what the graph of the function does as it approaches the vertical asymptote from the left and right.

• Student will be able to graphically recognize what a horizontal asymptote is.

Learning Objective: You will explain why the denominator of a rational function cannot be zero thus recognizing these values as the places where vertical asymptotes occur and graphically what vertical asymptotes look like and mean.

Learning Activity: You will use a word problem showing a real world application of rational functions (given), with a grading rubric to explain the possible effects of dividing by zero. The following is an actual mathematical model used for Cost-Benefit analysis. The model is a rational function. Read the situation and analyze what the solution should be using the algebraic techniques we have studied.

Rational Functions Project

Project for Rational Functions:

Application of Rational Functions: If you want to know why it is important to understand Rational Functions, consider the following.

This application is a Cost-Benefit Model. A utility company burns coal to generate electricity. The cost C (in dollars) of removing p amount (percent) of the smokestack pollutants is given by:

Is it possible for the company to remove 100 percent of the pollutants? Discuss why or why not, and support your response by using algebraic analysis on the given model. Remember to write in complete sentences.

What happens if the company does try to remove 100 percent of the pollutants? Will the company be successful at doing so, or will the attempt end in failure, that is, will it be too much expense for the company? Explain your thoughts and remember to write in complete sentences.

Make a graph to show what the consequences of the last question would be. Pick your scale carefully so that all the information you want to discuss is visible on the graph. Remember to label the axes and show units and tick marks. Show the vertical asymptotes as dashed lines and label them. Then discuss their impact on the company's expense (Explain). There are numerous interactive graphing resources on the Internet that can be used. Google it!)

This project is slightly adapted from one written by a Professor Rust. I do not know who he or she is so I cannot give more complete credit than that.

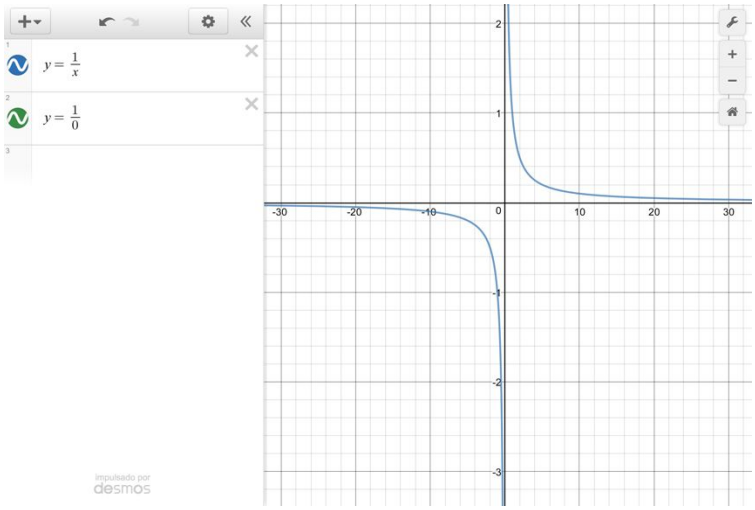
SOURCE: http://graybeard.wikispaces.com/file/view/Rational_Functions_Project.pdf

	Criteria				Points
	4	3	2	1	
Explanation	A complete response with a detailed explanation showing individual insight.	Response is a clear explanation, but no personal in depth details.	Explanation is unclear.	Misses key points.	___
Use Of Visuals	Clear diagram or sketch with details and labeling.	Diagram or sketch with no details or labeling.	Inappropriate or unclear diagram.	No diagram or sketch.	___
Mechanics	No math errors. Complete sentences and properly constructed paragraphs	No **major** math errors, serious flaws in reasoning, or major grammar and sentence structure problems	May be some serious math errors, flaws in reasoning, or grammar and sentence structure mistakes	Major math errors, serious flaws in reasoning, major grammar and sentence structure mistakes	___
Demonstrated Knowledge	Shows complete understanding of the questions, mathematical ideas, and processes, gives individual insight to problem.	Shows understanding of the problem, ideas, and processes, but no individual insight added only definitions given.	Response shows some understanding of the problem.	Response shows a complete lack of understanding for the problem.	___
Requirements	Goes beyond the requirements of the problem, explains concepts in detail enhancing answers with own insights and reasoning.	Meets the requirements of the problem, may explain concepts by stating definitions, instead of contributing own insights.	Hardly meets the requirements of the problem.	Does not meet the requirements of the problem.	___
				Total---->	___

Teacher Comments:

Función Racional: es una función que tiene una cociente de dos polinomios

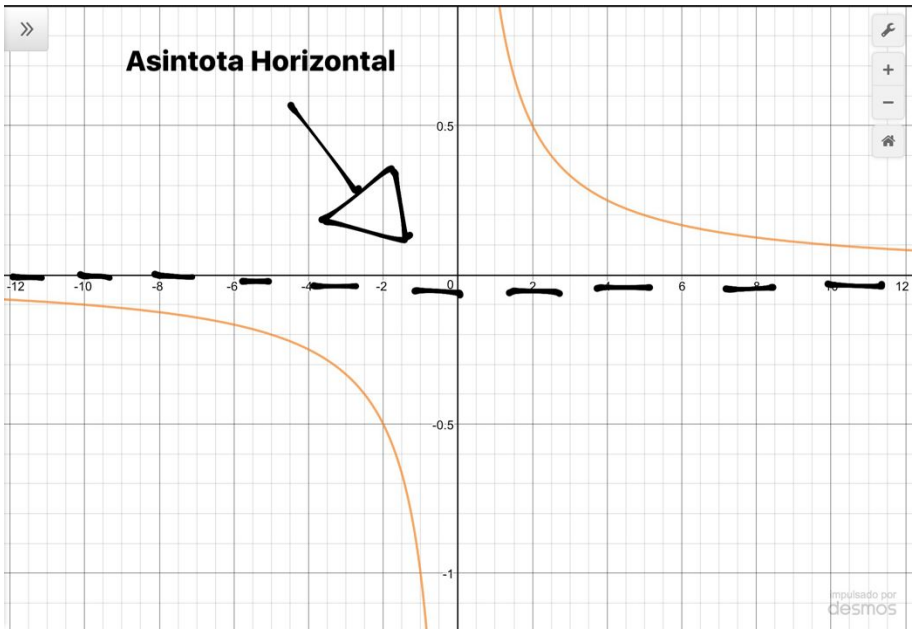
El denominador de una función racional no puede ser cero, ya que el tener como denominador 0, la función estaría indefinida, y no tendría asintota horizontal, y está sería el ejemplo de una función con denominador cero:



No habría función

Los Valores de la asintota vertical no son contados en el dominio por qué nunca llega a tocar con x, y está es por qué siempre se cerca indefinidamente, pero nunca llega tocarla por que no es definidamente en la función.

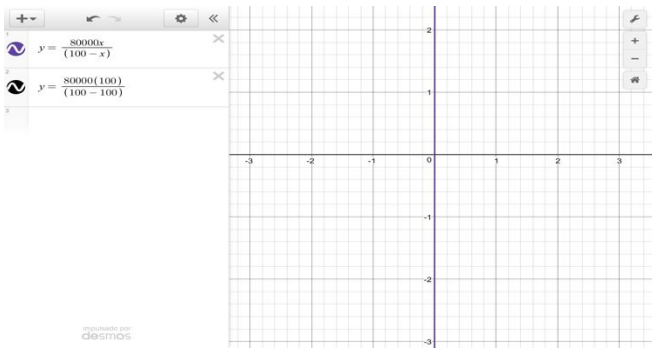
Cuando la gráfica se acerca por la asintota por la derecha, se considera que va infinito, y cuando va a la izquierda, sería menos infinito.



Esta es una asintota horizontal:

La fábrica busca la limpieza de su contaminación, pero el 100 por ciento resultaría imposible, ya que y= 80000(100)/(100-100) daría el denominador cero, y daría indefinido, y eso causaría un gran gasto en la empresa.

Y si la empresa intenta hacerlo, no podría, ya que no sabría cuánto sería el costó de la limpiez y haría una gran pérdida de dinero en la propia fábrica, y eso traería problemas, ya que hay una probalidas de que el dinero se les empieza a acabar.



En esta gráfica se puede ver que si la empresa busca el 100 por ciento no sabría cuál sería el costo, y causaría una gran pérdida de dinero