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Rational Functions Project

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.

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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:

$$C(p) = \frac{80,000\,p}{(100-p)}$$

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.

R= No, no es posibe porque en la grafica podemos observar que cuando la "x" (en este caso "p") la "y" (en este caso "c") se va hacia infinito sin poder tocaar el 100(porciento).

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.

$$C(p) = \frac{80,000\,p}{(100 - p)}$$

Si la compañia quisirea quitar el 50% de la sustancia contaminante tendriamos que sustituir la "p"(porcentaje) por el 50. Y asi con el 75 o el 90.

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$$C(p) = \frac{80,000\,(50)}{(100 - (50))} \qquad C(p) = \frac{80,000\,(75)}{(100 - (75))} \qquad C(p) = \frac{80,000\,(90)}{(100 - (90))}$$

$$C(p) = \frac{4,000,000}{50} \qquad C(p) = \frac{6,000,000}{25} \qquad C(p) = \frac{7,200,000}{10}$$
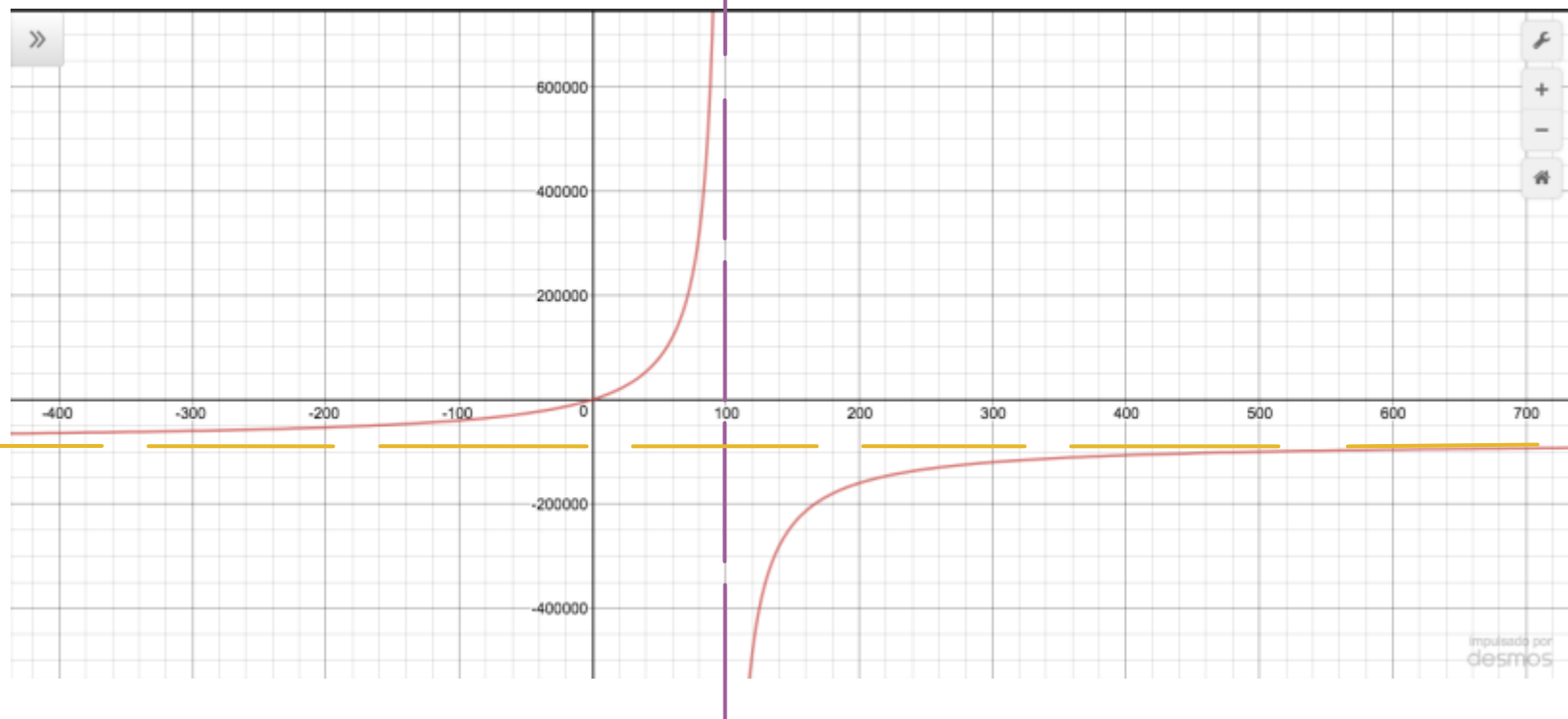
$$C(p) = 80,000 \qquad C(p) = 240,000 \qquad C(p) = 720,000$$

Esto puede o no ser muy costoso para la compañia, todo dependeria de los ingresos que esta recibiria a cambio de este "gasto" o inversion en su defecto, si la compañia no recupera lo invertido o esta fuera de sus limites, esto seria un gasto y sin duda seria demasiado costoso para ella.

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!)

AV: X=100   AH: Y=-80,000   H: No hay

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	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: