

Introduction to Rational Functions – Planning a Summer Camp

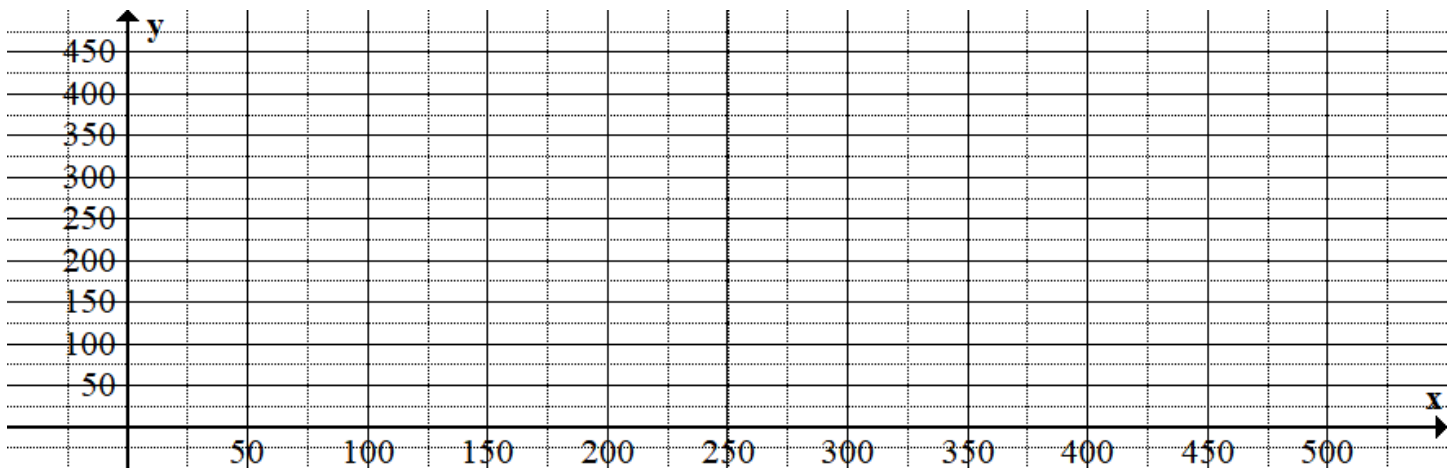
The finance committee of a nonprofit summer camp for children is setting the cost for a 5-day camp. The fixed cost for the camp is \$2400 per day, and includes things such as rent, salaries, insurance, and equipment. An outside food services company will provide meals at a cost of \$3 per camper, per meal. Campers will eat 3 meals a day.

As a nonprofit camp, the camp must cover its costs, but not make any profit. The committee must come up with a proposal for setting the fee for each camper, based on the number of campers who are expected to attend each week.

1. Initially, the committee decides to calculate camper fees based on the fixed cost of the camp alone, without meals for the campers.
 - a. What is the total fixed cost for the five days?
 - b. Complete the table below to determine the fee per camper that will guarantee the camp does not lose money.

Number of Campers	Fee per Camper
25	
50	
75	
100	
200	
500	
1000	
x	

- c. Make a graph showing the relationship between the fee per camper and the number of campers in attendance. Label the axes.



2. Describe the features of the graph in Item 1c.

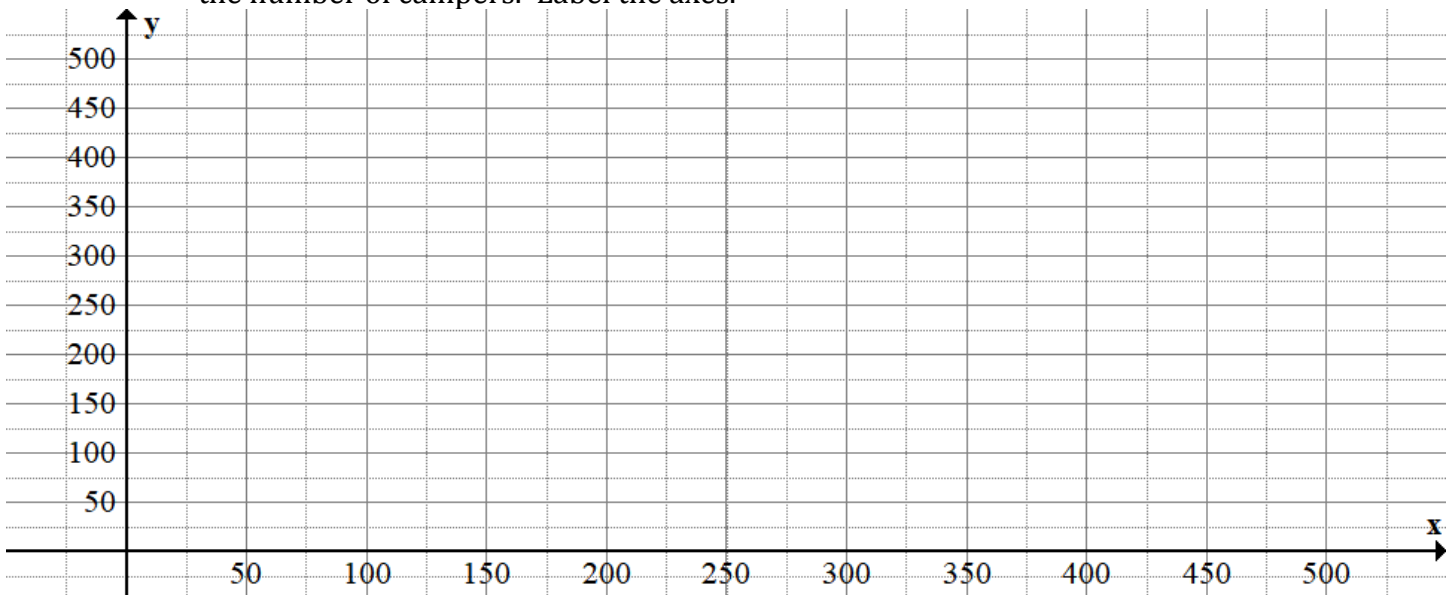
3. Based on your work so far, is there a minimum camper fee, not counting the cost of meals? Is there a lower bound? If so, what is it? Explain.

4. The function developed in Item 1 did not account for meals. Campers eat 3 meals a day at a cost of \$3 per camper per meal. The committee must determine a function that includes the cost of meals when setting the fee per camper.
 - a. What will be the total cost for meals per camper each week?

 - b. Complete the table below to determine the fee per camper that will guarantee the camp does not lose money.

Number of Campers	Fixed Cost plus the Cost of Meals	Fee per Camper
25		
50		
75		
100		
200		
500		
1000		
x		

- c. Make a graph showing the relationship between the fee per camper, including meals and the number of campers. Label the axes.



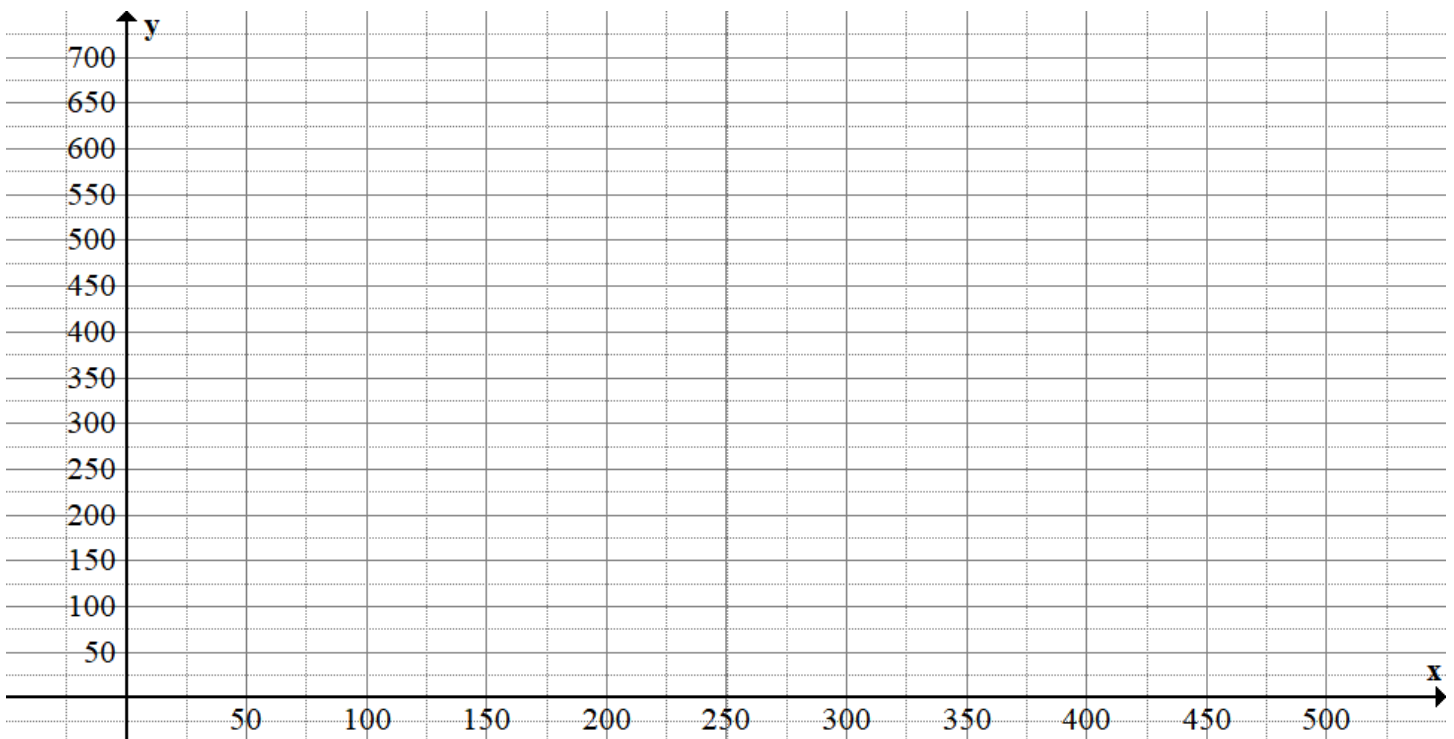
5. How did the lower bound for the camper fee change when you added the cost of meals?

6. Describe how the graph changed from the original graph.

7. The committee decides to award 30 scholarships to students who otherwise could not afford the camp. These scholarships include full use of the facilities and all meals at no charge.
 - a. To help account for the scholarships, complete the table below.

Number of Campers	Fixed Cost plus Cost of Meals	Number of Paying Campers	Fee per Camper
50			
75			
100			
200			
500			
1000			
x			

- b. Make a graph showing the relationship between the fee per paying camper and the number of campers. Label the axes.



8. How does the lower bound for the camper fee compare to the previous lower bound? Did it change? Explain.
9. How does your graph in Item 7b compare to the one in Item 4c?
10. If the number of campers is 25, what is the fee per paying camper? What does your answer tell you about the limitations of this model and how does that impact the domain of the function?
11. Last year the weekly camper fee was \$80. If the camp charges the same amount and grants 30 scholarships, what is the minimum number of paying campers that must attend so the camp does not lose money?
12. Express the number of campers as a function of the fee for each paying camper.
13. What is the relationship between the function in Item 7 and the function in Item 12?