

7.5 Homegrown Music Fest



Tickets for *Maurice and the O's* first concert at the NC State Fair in Dorton Arena sold for \$55 each, and 13,400 fans came to the show. The concert promoter wants to maximize the profits from the show, so he is asking his math expert friends (you!) to take a closer look.

- What was the income from ticket sales for the first show? \$ 737,000
- The concert promoter estimates that the show will sell 200 more tickets for every dollar the price is reduced. For example, if the price is reduced from \$55 to \$54, sales will increase from 13,400 tickets to 13,600 tickets; and if the price is dropped from \$55 to \$53, sales will increase from 13,400 tickets to 13,800 tickets. Based on this assumption, you set up a table and calculate the income for the following ticket prices:

Ticket Price (\$)	54	53	52	51	50
Number of tickets sold	13600	13800	14000	14200	14400
Income (\$)	734400	731400	728000	724200	720000

- If reducing the price will attract more ticket-buyers, then it is reasonable that increasing the price will attract fewer ticket-buyers. If the relationship stays the same – a change of \$1 is related to a change of 200 ticket-buyers – how many tickets could the concert promoter expect to sell at \$56? Calculate the income for the following ticket prices:

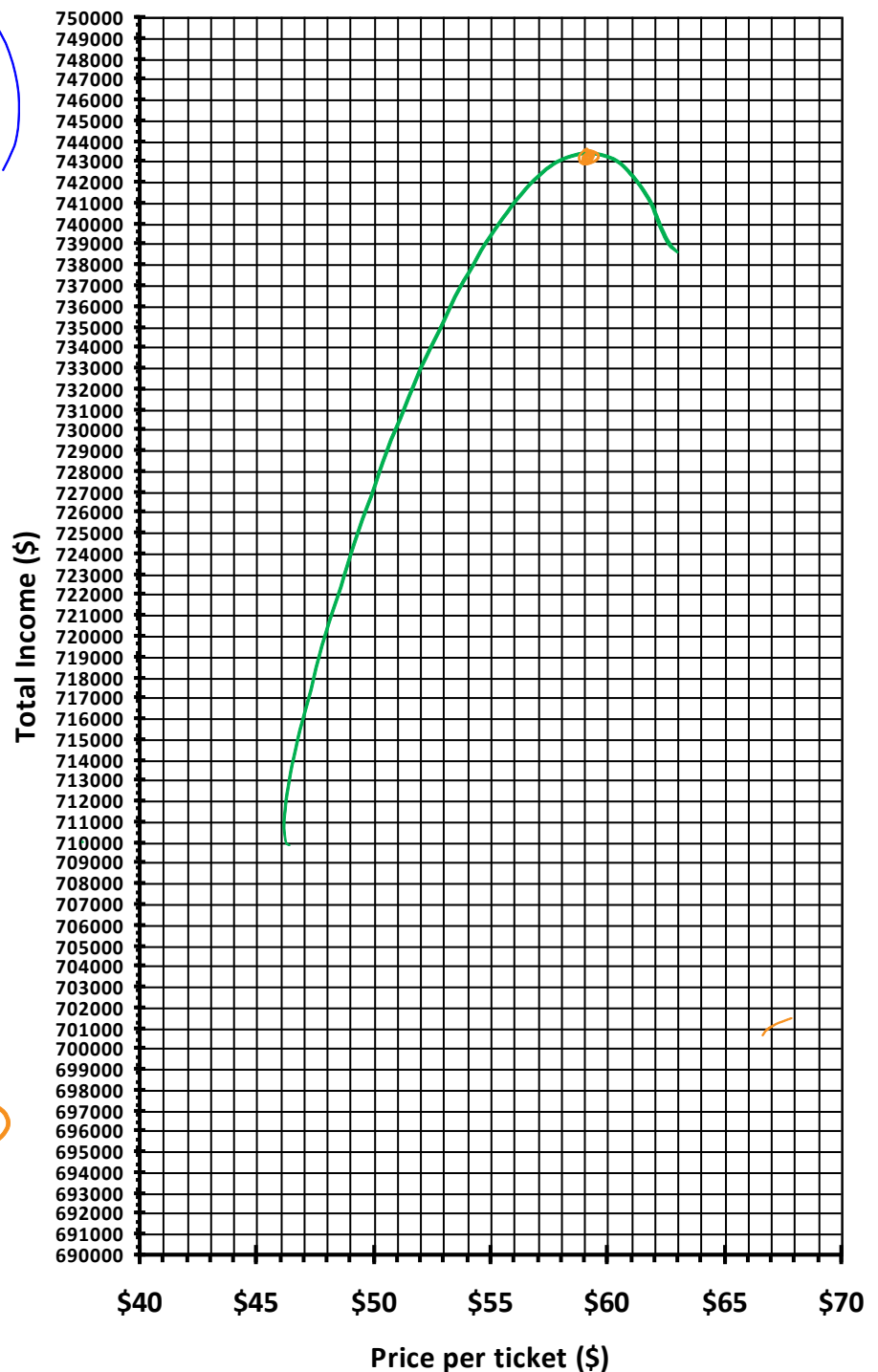
Ticket Price (\$)	55	56	57	58	59
Number of tickets sold	13400	13200	13000	12800	12600
Income (\$)	737000	739200	740000	742400	743400

- Describe the relationship between the price of a ticket and the income from ticket sales.

5. You decide to move from looking at tables of data to looking at graphs. Complete the table below by transferring the values that you have already calculated and looking for a pattern to figure out the values that you did not calculate yet. Then graph the data.

Ticket Price (\$)	Total Income (\$)
45	
46	
47	
48	
49	
50	720000
51	724200
52	728000
53	731400
54	734000
55	737000
56	739200
57	741000
58	742400
59	743400
60	744000
61	744200
62	744000
63	743400
64	742400

Ticket Price vs. Income



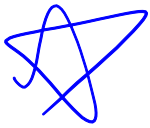
6. What is the highest income you found based on the data in the table? What ticket price does this correspond to?

at \$61 \$ 744200

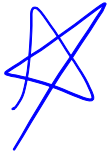
Based on what you see in the graph, do you think this is the highest possible income? Explain.

Yes going down on both sides

If not, would you try prices that are higher than \$64, lower than \$45, or in-between values like \$50.25 to find the highest possible income?



Describe any patterns you see that influence your choice.



Describe how you might find the highest income possible under the given conditions.

7. Do you think there is a price that is so high that no one will buy a ticket? _____
Describe how you might find such a price.

8. If we let x represent the number of \$1 price changes from \$55 per ticket, write an expression for the **price of a ticket** after x \$1 changes $55 + 1x$

Write an expression for the **number of tickets** sold after x \$1 changes $13400 - 200x$

We discussed at the beginning of the investigation that the Income can be described as being:

(the price for a ticket) · (the # of tickets sold)

Use the expressions you created above to write a function in terms of x that describes the *income*

from the concert. $y =$ $(55 + 1x)(13400 - 200x)$

How can you use this function to help you advise the concert promoter? What would you tell the promoter about maximizing profits?