Pythagoras High School Football Team High School Fundraiser

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The Problem

It is often very difficult when trying to make decisions when it involved money. One sports team from the Pythagoras High School faces a dilemma where none of the team members can agree on a solution.

A football team at the Pythagoras High School is trying to raise money by selling a tickets. The team is trying to decide the best price for a ticket. The students decided to ask the parents of the student body what price they would be willing to pay for ticket to the football games. The survey was sent to all of the 914 families of students in the school. The question was “What is the most that you would be willing to pay for a football season ticket for the school year?”

The football team collected the answers and wanted to find a solution where the price of a ticket would reap the most profit.

Given Information

The results from the form are shown below. From this information, determine the best price for a full season ticket.

Max price ($) 55 80 95 100 120 135 155 180

Expected ticket sales 140 85 45 90 115 80 65 155

In[ ]:=
```
prices = List["Prices", 55, 80, 95, 100, 120, 135, 155, 180];
responses = List["Parent Responses", 140, 85, 45, 90, 115, 80, 65, 155];
table = Grid[Transpose[{prices, responses}], Frame → All]
```

Out[ ]=

Prices	Parent Responses
55	140
80	85
95	45
100	90
120	115
135	80
155	65
180	155

Strategy

First, the information from the survey was created using the lines of input below. The data from the lists were reversed to allow accessing the information easier.

In[ ]:=
```
prices = List[55, 80, 95, 100, 120, 135, 155, 180];
prices = Reverse[prices];
tickets = List[140, 85, 45, 90, 115, 80, 65, 155];
tickets = Reverse[tickets];
```

An assumption was made that any person who was willing to pay a higher price than is set by the ticket price would purchase a ticket. This would mean that parents who would pay a maximum of $100 for a ticket would purchase a $55 ticket if it was available. Therefore, the total number of ticket sales for each price tag would be the number of people who answered that they would purchase the ticket at the current price and the number of people who would be willing to purchase tickets greater than the set price. Thus, the total number of tickets sold for each price is stored in the totaltickets list below.

In[ ]:=
```
totaltickets = Table[Sum[tickets[[i]], {i, i}], {i, 0, 8}];
totaltickets = Drop[totaltickets, 1];
```

The strategy for finding the maximum profit is to find the total revenue from each possible ticket sale prices given the information from the parents . To find the total revenue, the prices was multiplied by the quantity of ticket sales for each price value .

In[ ]:=
```
revenue = prices * totaltickets ;
prices = Prepend[prices, "Price of Ticket"];
totaltickets = Prepend[totaltickets, "Total Tickets Sold"];
revenue = Prepend[revenue, "Total Revenue"];
```

A table representing the total revenue and total ticket sold per price level is shown in the table below. Furthermore, a graph of price versus total revenue is shown below with points representing the data

points and a line showing the general trend of prices.

In[ ]:=
```
table = Grid[Transpose[{prices, totaltickets, revenue}], Frame → All]
```

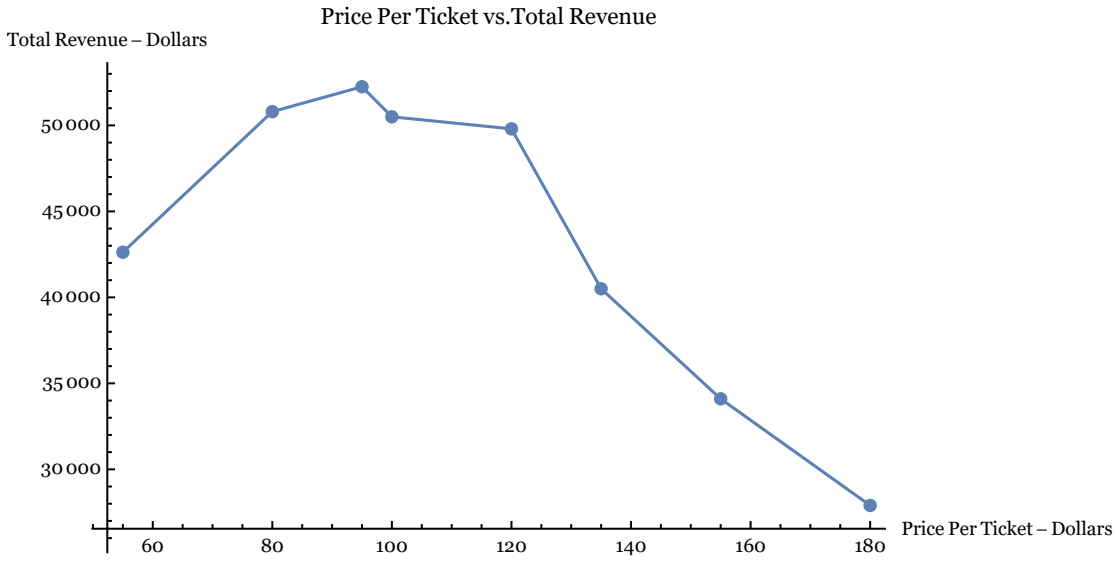
Out[ ]=

Price of Ticket	Total Tickets Sold	Total Revenue
180	155	27 900
155	220	34 100
135	300	40 500
120	415	49 800
100	505	50 500
95	550	52 250
80	635	50 800
55	775	42 625

In[ ]:=
```
a = ListPlot[Table[{prices[[i]], revenue[[i]]}, {i, 1, 9}],
    AxesLabel → {HoldForm[Price Per Ticket – Dollars], HoldForm[Total Revenue – Dollars]},
    PlotLabel → HoldForm[Price Per Ticket vs.Total Revenue],
    LabelStyle → {FontFamily → "Georgia", 10, GrayLevel[0]},
    ImageSize → Large, PlotStyle → {PointSize[Large]}];
b = ListLinePlot[Table[{prices[[i]], revenue[[i]]}, {i, 1, 9}],
    AxesLabel → {HoldForm[Price Per Ticket – Dollars], HoldForm[Total Revenue – Dollars]},
    PlotLabel → HoldForm[Price Per Ticket vs.Total Revenue],
    LabelStyle → {FontFamily → "Georgia", 10, GrayLevel[0]}, ImageSize → Large];
```

In[ ]:=
```
Show[{a, b}]
```

Out[ ]=



Conclusion

Based on the data of the total profit for each ticket price, it can be determined that the maximum profit that can be obtained is $52,250.00 dollars. This profit could be achieved by the optimal price of **$95.00**

per ticket. As seen in the line plot above, this case would be the peak of the price graph and be the maximum profit that could be achieved.

Future work with this problem would be to attempt to compare a quadratic regression solution with the current solution.