**Subject area/course**: Mathematics/Algebra I or II   
**Grade level/band**: 9-­‐12

**Task source**: Stanford University School Redesign Network and The Ohio Department of Education

**Open for Business**

# STUDENT INSTRUCTIONS

1. **Task context**:

Malena is a college student who wants to raise $5,000 to tour South America next summer. To raise the money, she decides to open her own business on eBay. The owner of an electronics shop offers to sell Malena some of his products at the wholesale price. She needs to decide which items to sell and how to price those items in order to maximize her profit.

She does some market research and finds the information provided in the table below about some of the items she is considering selling. Her research results include the cost to buy these items from the wholesale supplier, the retail price at which different items were sold at different times, and the number of items sold at these different prices during the month.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Item | Wholesale  Price | Jan. Price | Number Sold | March Price | Number Sold |
| iPod | 150 | 225 | 27 | 200 | 35 |
| X-­‐Box 360 | 250 | 300 | 41 | 275 | 53 |
| Laptop | 700 | 900 | 15 | 950 | 12 |
| Stereo | 125 | 150 | 21 | 131 | 35 |
| Calculator | 65 | 85 | 31 | 75 | 45 |

Malena also does some research on eBay. She learns that for each item sold, eBay will charge her 8.75% of the initial $25 of the selling price, plus 3.50% of the remaining selling price.

# Your Task

Your task is to help Malena decide which items to sell and how to price the items to maximize her profit. Decide which of the items from the table above will be sold, and what their retail prices will be. Be sure to find the prices that maximize Malena’s profit.

She wants to sell some combination of items, and she wants to reach her goal of $5000 profit, and as efficiently as she can.

# Final product:

Write a letter to Malena in which you explain your recommendation of the prices you think she should use to gain the most profit. Prepare graphs, equations, and a detailed explanation of the calculations you performed to find each price. Be clear about how you found the price that maximizes profit for each item, and identify how many of each item Malena needs to sell in order to reach her profit goal of $5000.

Your letter must include the following:

* 1. Description of the task in your own words
  2. How you figured out the demand, revenue, cost, and profit (show your math and describe your work in words)
  3. Your overall recommendation with justification (show your math and describe your work in words)
  4. Conclusion that clarifies that you completed the task to help Malena and your reflections about what you learned

What assumptions can you make?

* You may assume that all shipping costs will be paid by Malena’s customers.
* For each type of item, Malena’s profit will be the difference between the total revenue (amount received from retail sales of that item) and total cost (amount paid to the wholesale supplier and to eBay).
* You may also assume that the demand for an item is equal to the number of that item sold.
* The demand for an item is related to the price of the item, and you may assume this relationship is linear.

# ADDITIONAL INFORMATION

1. **Knowledge and skills you will need to demonstrate on this task:**
2. On this task, you will show that you know these things:
   * The mathematics of supply and demand
3. On this task, you will show that you are able to do these things:
   * Use tables and graphs to find a maximum value
   * Model relationships among quantities

# Materials needed:

* The task sheet
* A graphing calculator
* Internet access
* You may use a spreadsheet application like Excel if you wish to make charts and graph etc.)

# Time requirements:

Your teacher will provide the timeline and due dates for completing each portion of the task.

# Scoring:

Your work will be scored using the Math Performance Assessment Rubric (Grades 9–12). Make sure you are familiar with the language that describes the expectations for proficient performance.