***QUARTER 1 PROJECT: NBHS DESIGN STAR***

You have been presented with the task of creating a new shirt design for Broughton High School. The design can represent your class, sports team, club, or event (Homecoming, Queen of Hearts, etc.) The school store has requested that you produce a minimum of 25 of each shirt. However, they do not have room to store more than 100 shirts total. The PTSA has provided $1000 for your production costs.

OPTION 1: Create one design and offer a short-sleeved and long-sleeved option.

 OPTION 2: Create two shirts – one with a front-only design, and one with a front and back design.

**Step 1:** Create the t-shirt design. You do not have to physically create the t-shirt, but you will need to provide an image of the design.

**Step 2:** Decide how much it will cost to produce each type of shirt. You may want to use an online search to find what other companies charge to purchase and print to give you some ideas. WRITE A COST INEQUALITY USING THE AMOUNT THE PTSA HAS GIVEN YOU.

**Step 3:** Decide how much you will charge for each shirt. State the reason you chose these prices. WRITE A PROFIT EQUATION. (Remember: Profit = Income – Cost). This is your objective function.

**Step 4:** Decide what additional inequalities and constraints are required. WRITE ADDITIONAL INEQUALITIES USING INFORMATION PROVIDED AND INFORMATION IMPLIED BASED ON THE SITUATION.

**Step 5:** Graph your inequalities. Shade all appropriate regions, and find all points of intersection that create the desired boundaries. Clearly label all axes.

**Step 6:** Use the points of intersection to evaluate your profit equation. Which combination of shirts will p7ovide you with the greatest profit? State this combination using a complete sentence.

**Step 8:** Combine all of the above elements into an electronic presentation. You can create a Powerpoint, Prezi, or video. (Hint: If you are unable to create your graphs electronically, do them by hand and take a picture. Insert the picture into the presentation.) This must include a definition of your variables. All equations should be accompanied by a description of what the values in the equation represent. The presentation should include a paragraph describing how and why you came up with your t-shirt design. All descriptions and explanations should be in complete sentences and grammatically correct.

*Values chosen for cost, time, and profit should be realistic to the current market and your target buyer. Designs must be school-appropriate and should not violate any dress codes restrictions (alcohol, tobacco, nudity, drugs, offensive language, etc.). There will be a 10-point-per day deduction for late projects.*

 Due Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- | --- |
| **Category** | **Points Possible** | **Points Earned** | **Comments** |
| **Defined Variables** | 5 |  |  |
| **Cost Inequality*** Accurate
* Realistic
* Sentence Description
 | 5 |  |  |
| **Production Inequalities*** Accurate
* Realistic
* Sentence Descriptions
 | 10 |  |  |
| **Profit Equation*** Accurate (P = I – C)
* Explanation of sales price
* Realistic
* Sentence Description
 | 10 |  |  |
| **Graph*** Labeled Axes
* Accurate Lines
* Accurate Shading
 | 15 |  |  |
| **Points of Intersection and Evaluation Using Objective Function*** Correct Values
* Accurate Evaluation of Profit Equation
 | 20 |  |  |
| **T-Shirt Design*** Neat
* Creative
* Includes Both Types of Shirts
* Rationale for Design
* Appropriate
 | 15 |  |  |
| **Presentation*** Creative
* Includes all necessary components
* Neat
* Electronic Format
 | 20 |  |  |
|  | 100 |  |  |

**Powerpoint Suggestions**

Slide 1: Introduction - name, class period, topic for your shirt

Slide 2: Defined variables – why did you decide on these two options

Slide 3: Images of T-shirt design(s) – show me what you would show your clients

Slide 4: Rationale for design – why did you want to make a shirt for this particular activity/club/event and how much you will charge

Slide 5: Cost Inequality – include the cost for each shirt and explain what led you to believe these would be your costs

Slide 6: Additional inequalities dealing with production constraints

Slide 7: Sales Prices and Profit Equation – explain choice of prices and how you found the profit equation

Slide 8: Graph – must include labeled axes, labeled lines, and correct shading; label corner points

Slide 9: Corner Points/Points of Intersection – include calculations when substituted into the profit equation

Slide 10: Conclusion – describe your solution in the context of the problem and state what your maximum profit would be