Classroom to Campus: Math and Stats Challenge

Grade 12 – MAP4C

Topic A: Mathematical Models
A Mathematical Approach to Dynamic Pricing and Profit Maximization

A group of high school students is organizing an online fundraiser by selling custom-designed T-shirts. To maximize their profits, they decide to implement a flexible pricing strategy, adjusting the price based on sales performance and demand. They collect data on the price per T-shirt (p) and the corresponding number of T-shirts sold per week (q), as shown below.

The data is as follows:

Price per T-Shirt (p) in \$	10	15	20	25	30	35	40
Number of T-Shirts Sold per Week (q)	1000	1490	1750	1920	1810	1490	1100

a) Plot the data points on a graph with the price per T-shirt (p) on the horizontal axis and the number of T-shirts sold per week (q) on the vertical axis. *(Clearly label axis.)*

b) Analyze the plotted data to determine an appropriate mathematical model that describes the relationship between price and quantity sold. Develop the demand function $q = f(p)$ based on the chosen model.

c) Determine the price per T-shirt that maximizes the total revenue per week. *(Round your final answer to the nearest cent.)*

d) Calculate the maximum revenue achievable under this pricing strategy. *(Round your final answer to the nearest cent.)*

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