Parabolas for Profit – Seaside Scoops (Draft 4 of 4)

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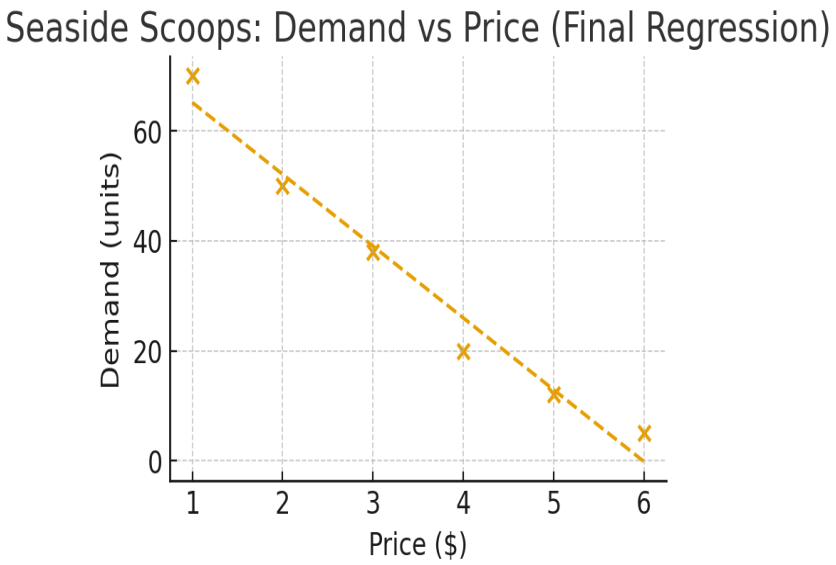
Overview: For this final report, I used regression to model demand and then created a full profit equation. The goal was to find the best price for Seaside Scoops to maximize daily profit.

Survey Data Table:

Price ($)	Demand (people)
1	70
2	50
3	38
4	20
5	12
6	5

1. Demand Model



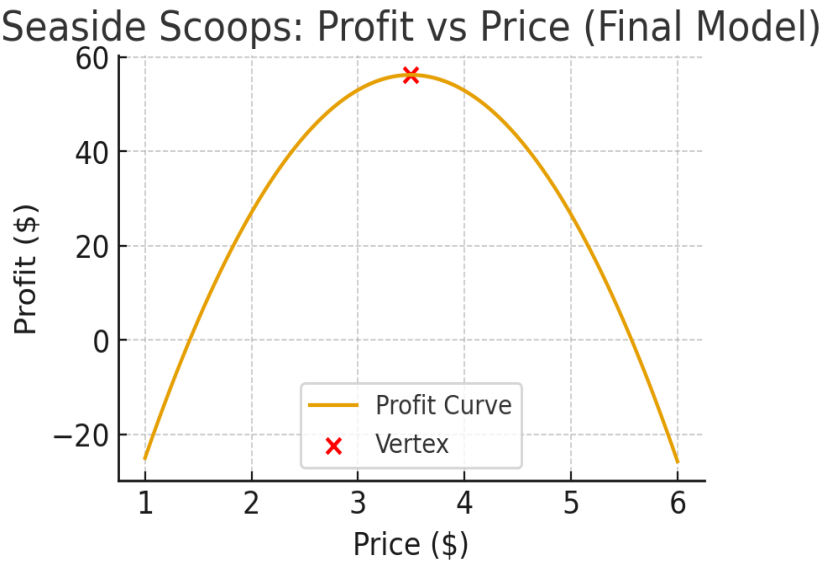
Linear Regression Equation: D(p) = -13.06p + 78.20
This shows demand decreases as price increases, which is realistic for most products.

2. Profit Model Derivation

Profit Function: $P(p) = (p - c)(m \cdot p + b) - F$
$\rightarrow P(p) = (-13.06)p^2 + (91.26)p - (103.20)$

Substituting the constants: c = $1.00, F = $25.00.

3. Profit Graph and Optimal Price



The vertex occurs at $p^* = -B/(2A) = -(91.26) / (2 \cdot -13.06) \approx \$3.49$.
Maximum estimated profit ≈ $56 per day.

4. Conclusion and Recommendations

Seaside Scoops should charge around **$3.49** per cup to maximize daily profit. This price balances customer interest with revenue per item. To verify, the shop could run a two-week test pricing at $3.00 and $3.25 to compare results.

Teacher Feedback:

- Excellent final submission. Correct regression, quadratic derivation, and vertex interpretation.
- Clear explanation connecting math to real-world meaning.
- No major errors; well-formatted and polished report.