1. Consider you own a small restaurant business. You collected data on the average variable

costs of your business for the past 12 months. You have been adjusted the cost data for

inflation by deflating with an appropriate price index. Your output (Q) and the associated

average variable cost (*AVC)* data are presented below:

|  |  |  |
| --- | --- | --- |
| ***Obs*** | ***Q*** | ***AVC*** |
| 1 | 22 | $208 |
| 2 | 31 | 202 |
| 3 | 31 | 206 |
| 4 | 25 | 214 |
| 5 | 41 | 174 |
| 6 | 41 | 203 |
| 7 | 45 | 172 |
| 8 | 45 | 158 |
| 9 | 45 | 173 |
| 10 | 62 | 170 |
| 11 | 62 | 152 |
| 12 | 70 | 175 |

a. Use the data to run the appropriate regression to estimate the parameters for the empirical

cost function:

*AVC a + bQ* + *cQ2*

(Paste your computer printout here)

b. Using a 10 percent significance level, discuss suitability of the parameter estimates obtained

in part *a*. Consider both the algebraic signs and statistical significance of the parameter

estimates.

c. Present the estimated average variable cost, total variable cost, and short-run marginal cost

functions.

d. At what level of output does *AVC* reach its minimum value? What is the minimum value

of *AVC* at its minimum?

e. (i) Compute *AVC* and *SMC* when you produce 20 units of output.

(ii) Is *AVC* rising or falling when you produce 20 units? Explain.

f. At what level of output does *SMC* equal *AVC*? How did you get this answer?

2. Gaton, Inc. is a firm operating in a competitive market. The manager of Gaton

forecasts product price to be $28 in 2010. Gaton’s average variable cost function in

2009 is estimated to be

*AVC = 10 - 0.003Q + 0.0000005Q2*

Gaton expects to face fixed costs of $12,000 in 2010.

a.  At what level of output will Gaton's average variable cost reach its minimum value? 

b. What is the minimum average variable cost? 

c. What is the profit-maximizing (or loss-minimizing) output for Gaton? 

d. How much profit (loss) does the company expect to earn? 

3. The market demand for a monopoly firm is estimated to be:

*Qd = 100,000 – 500P + 2M + 5000PR*

Where *Qd* is quantity demanded, *P* is price, *M* is income, and *PR* is the price of a related good. The manager has forecasted the values of *M* and *PR* will be $50,000 and $20, respectively, in 2010. (*Hint: You need to first derive several functional relationships to be able to answer the question).* The firm’s AVC function is estimated to be:

*AVC = 520 – 0.03Q + 0.000001Q2*

  In addition, fixed cost is estimated to be $4 million.

a. If the firm wishes to maximize profit, how many units should it produce in 2010?

b. What price should the firm charge for its output in 2010?

c. How much profit does the company expect to make in 2010. 