**GearMatrix, Inc.**

GearMatrix makes gear components that it sells to automotive parts manufacturers. The company is in the process making a major capital investment decision to purchase a new Flexible Manufacturing System (FMS). It is considering alternatives from 4 different vendors of FMS machines. The four alternatives being considered are given below with their fixed cost, variable cost, and maximum capacity for production:

|  |  |  |  |
| --- | --- | --- | --- |
| FMS | Monthly Fixed Cost $ | Variable Cost ($/unit) | Maximum Monthly Capacity (units) |
| 1 | 6000 | 13.5 | 575 |
| 2 | 8500 | 11 | 800 |
| 3 | 10000 | 9.5 | 1000 |
| 4 | 13000 | 7 | 1400 |

The monthly demand for these gear components for which the FMS is being purchased is projected to be between 500 to 900 units (uniformly distributed). The sales price of a gear component is $85.

1. Which machine should the firm choose to purchase? Why? Provide a full justification using the method of cost-volume analysis. Given the firm’s preferred choice of machine, would the firm find it necessary to partner with an outsourcing manufacturer to meet the full range of demand?
2. The Sales and Marketing department of GearMatrix has just revised the sales projection based on a new market analysis and it now believes in a more conservative market forecast where the upper end of the demand range for the gear components is now believed to be a more conservative 750 units. How would your answer in part a) change as to the preferred machine to purchase?
3. How low must the upper end of the demand range fall in order for machine 1 to become the preferred alternative on the basis of average profit? Your answer only needs to be accurate to the nearest multiple of 10 [So change the upper end in multiples of 10 as in 700, 690, 680, ….]