WeHaul Trucking is planning its truck purchases for the coming year. It allocated $600,000 for the purchase of additional trucks, of which three sizes are available. A large truck costs $150,000 and will return the equivalent of $15,000 per year to profit. A medium-sized truck costs $90,000 and will return the equivalent of $12,000 per year. A small truck costs $50,000 and will return the equivalent of $6,000 per year. WeHaul has maintenance capacity to service either four large trucks, five medium-sized trucks, or eight small trucks, or some equivalent combination. WeHaul believes that it will be able to hire a maximum of seven new drivers for these added trucks.

a) Formulate a linear programming model to be used for determining how many of each size of truck to purchase if the company wants to maximize its profit. Ignore the time value of money.

b) At optimality, how much profit will result and what is the optimal combination of trucks? If your solution is a fractional number of trucks, that is acceptable for this analysis. *You must submit your linear programming formulations and show the linear programming software solution to this problem to receive credit.*

c) Using your sensitivity analysis output, provide two sensitivity analysis interpretations. One must be for the objective function and one must be for a constraint. *You must indicate the source of your answers from the sensitivity analysis output.*

d) Now suppose that there is a requirement that the number of small trucks used must be less than or equal to 50% of the combined total of large and medium sized trucks. Write the constraint for this requirement. *However, you do not need to resolve the problem.*