Linear Programming, Computer solution - Product mix and sensitivity analysis

A garden store prepares three grades of pine bark for mulch: Nuggets, mininuggets, and chips. The process requires pine bark, machine time , labor time, and storage space. Profits are $9 per bag of nuggets, $9 per bag of mininuggets, and $6 per bag of chips.
there are 600 pounds of bark available, 480 hours of labor, 660 minutes of machine time and enough storage space for 150 bags. Each bag of nuggets takes 5 pounds of bark, 2 minutes of machine time, and 2 hours of labor. A bag of mininuggets takes 6 pounds of bark, 4 minutes on the machine, and 4 hours of labor. A bag of chips takes 3 pounds of bark, 5 minutes on the machine, and 3 hours of labor. All this leads to the following printout for a linear programming optimization:

A) What is the optimum solution?

B) How low could the profit on mininuggets go before a different solution would be better?

C) If you could buy more bark for $2.10/ lb., how much would you buy?

D) If you could sell some of your labor for $5 per hour, how much are you sure you would sell?

E) If you could sell some of your storage space for $3 per bag-space, how much are you sure it would be worthwhile to sell?

F) How high would the profit on chips have to go before you would change the production mix to make more chips?

Computer Printout

	Nuggets	Mininuggets	Chips		RHS= Availabl e
Unit Profit-->	9	9	6		
constraint					
Bark	5	6	3	<=	600
Machine	2	4	5	<=	660
Labor	2	4	3	<=	480
Storage	1	1	1	<=	150

Range of Optimality for Objective Function Coefficients

	Value	Current Coefficient	Lower Limit	Upper Limit
Variable				
Nuggets	75	9	8	10
Mininuggets	0	9	-infinity	11
Chips	75	6	5	9

Objective Function Value = 1125.0000

Range of Validity for Shadow Prices

	RHS	Slack	Shadow Price	Lower Limit	Upper Limit
Constraint					
Bark	600	0	2	510	750
Machine	660	135	0	525	infinity
Labor	480	105	0	375	infinity
Storage	150	0	2	120	164