

Appendix

The first page (of five pages) for the three-domain quiz for Fall 2015.

This quiz will be graded manually according to the following rubric.

Analytic Rubric for Quiz 1

DESCRIPTION	POINTS
Model Formulation	
The decision variables and their units are defined correctly in a legend.	6
The objective function has the correct specification (minimize versus maximize) and the correct variables with the correct signs and coefficients.	7
All constraints are included in standard form (variables on the left side and constants on the right) with correct descriptions and units specified. Each constraint has the correct variables with the correct signs and coefficients, the correct operator ($\leq, =, \geq$), and the correct right-hand side value.	12
Graphical Analysis	
The decisions are specified on the axes correctly.	6
All constraints are plotted correctly and labeled on the graph.	4
The feasible region is identified correctly.	4
At least one objective function line (isoprofit line) is plotted correctly and labeled on the graph.	5
The optimal solution is identified and labeled correctly.	4
The objective function value is calculated correctly.	2
Management Interpretation	
The brief description of the decision variables is correct.	6
The brief description of the objective is correct.	5
All constraints are described briefly and correctly.	8
The optimal solution is described correctly in terms of the decisions.	4
The objective function value is stated correctly.	2
Writing	
The grammar is excellent.	15
The punctuation is excellent.	5
The spelling is excellent.	5
TOTAL	100

The second page (of five pages) for the three-domain quiz for Fall 2015.

Formulate the problem. Attempt to solve it on the next page. This quiz is closed book/notes.

TO: Management Scientist (student)

FROM: Ely Optimizer, Production Manager, eco-Beach Toys, Inc.

RE: Tomorrow's production plan for medium and large eco-shovels

Determine the number of medium and large eco-shovels for tomorrow's production plan. Note that the switchgrass-based polymer requirements are 0.5 kg for the medium eco-shovel and 1.0 kg for the large eco-shovel. Both size eco-shovels require 4 minutes of labor to add a price tag and package the item. Labor costs \$9.00/hour and at least 8 hours of labor must be used for the plan due to worker contracts. Seek to maximize net revenue. Confer with procurement and marketing to develop your plan.

TO: Management Scientist (student)

FROM: Sally Spender, Procurement Manager, eco-Beach Toys, Inc.

RE: Tomorrow's production plan for medium and large eco-shovels

The switchgrass-based polymer costs \$2.00/kg. The supplier only has 90.0 kg of switchgrass-based polymer available that can be used in either size eco-shovel.

TO: Management Scientist (student)

FROM: Linda Grow, Marketing Manager, eco-Beach Toys, Inc.

RE: Tomorrow's production plan for medium and large eco-shovels

The advertising cost for each medium eco-shovel is \$0.09 while the advertising cost for the large eco-shovel is \$0.19. The demand for medium eco-shovels is at most 2.5 times the demand for large eco-shovels. The medium eco-shovel price is \$2.89 while the large eco-shovel price is \$3.79.

The third page (of five pages) for the three-domain quiz for Fall 2015.

Using the memo on page 2 (and the model you formulated), identify the optimal solution using the graphical solution technique. After solving the model, write your recommendations on the next page.

Optimal Solution: _____

Value of Objective Function at Optimal Solution: _____



