
Name: Student Number:

Case Study: A Toy Manufacturing Case for Linear Programming

Problem Description

RMC, Inc., is a small firm that produces a variety of chemical products. In a particular production process, three raw materials are blended (mixed together) to produce two products: a **fuel additive** and a **solvent base**. Each unit of fuel additive is a mixture of 1 ton of Material I, 2 tons of Material II, and 1 ton of Material III. One unit of solvent base is a mixture of 3 tons of Material II and 1 ton of Material III. After deducting relevant costs, the profit contribution is \$5 for every unit of fuel additive produced and \$7 for every unit of solvent base produced.

RMC's production is constrained by the limited availability of the three raw materials. For the current production period, RMC has available 6 tons of Material I, 19 tons of Material II, and 8 tons of Material III.

Questions

Assuming that RMC is interested in maximizing the total profit contribution, answer the following:

- (a) What is the linear programming model for this problem?
- (b) What is the standard form of the program?
- (c) How many units of each product should be produced, and what is the projected total profit contribution?
- (d) Is there any unused material? If so, how much?
- (e) Are any of the constraints redundant? If so, which ones?

Notes & Solutions Workspace