

Week Five Final Assignment

Since you are the A team at Max my Dollars Petroleum, you have been assigned to visit and assist a company refinery that produces two grades of Gasoline, regular unleaded and Premium unleaded. They produce the grades by blending two available components A and B.

Component A has an Octane rating of 82 and costs \$41 per barrel, while Component B has an Octane rating of 100 and costs \$48 per barrel.

The octane rating for regular gas must be at least 87, and the Octane rating for Premium must be at least 95.

Regular gasoline is currently selling for \$50 a barrel and Premium is selling for \$60 a barrel.

Currently the company has 40 thousand barrels of Component A (80 Octane) in stock, along with 27 thousand barrels of Component B (110 octane).

The company is holding orders for 28,000 barrels of Regular and 13,500 barrels of Premium that must be filled. Assuming that all the gasoline produced can be sold at current prices, determine the maximum Profit they can earn.

Let X_1 represent the number of barrels of Component A used to make Regular gasoline.

Let X_2 represent the number of barrels of Component A used to Make Premium gasoline.

Let X_3 represent the number of barrels of Component B used to make Regular gasoline.

Let X_4 represent the number of barrels of Component B used to make Premium gasoline. The data from the write up / problem statement above are summarized in the following table.

Component	Octane Rating	Cost (\$)/barrel	Available Supply
A	82	\$41	40,000 barrels
B	100	\$48	27,000 barrels
Grade	Min Octane Rating	Selling Price (\$)/barrel	Existing Orders
Regular	87	\$50	28,000 barrels
Premium	95	\$60	13,500 barrels

The octane rating for a gas blend is simply the proportional average of the octane ratings of the Components used. So the Octane rating for regular could be figured as follows.

$$82 \frac{X_1}{X_1+X_3} + 100 \frac{X_3}{X_1+X_3}$$

Likewise you could figure the Octane rating for Premium as follows

$$82 \frac{X2}{X2+X4} + 100 \frac{X4}{X2+X4}$$

Your Team may use any method it wishes to attack this problem, to determine Maximum Profit, and how to achieve it. I strongly recommend using a problem solver like the one built into Excel.

As part of your report to the Class on your findings in week 5, Please include any computer outputs generated. Also include and submit to the president of Max my Dollars (that would be Instructor Hefferon), a type written summary that includes:

The Company Name and participating team members

A brief summary of the problem under consideration,

The objective Function to be maximized, (Remember the Objective is Maximum Profit!)

The Constraint list, (You may consult the President (Instructor) on this if help is needed)

The variables as defined above,

And of Course conclusions including a solution assuming you are able to find one.

He will need this since computer outputs are often hard for him to figure out!