

NATCOR - Xpress case study

Margaret Oil produces three products: gasoline, jet fuel, and heating oil. The average octane levels must be at least 8.5 for gasoline, 7 for jet fuel, and 4.5 for heating oil. To produce these products, Margaret purchases crude oil at a price of £11 per barrel. Each day, at most 15000 barrels can be purchased.

Before crude can be used to produce products for sale, it must be distilled. It costs £0.10 to distill a barrel of oil and the result of the distillation is 0.25 barrels of distilled 1, 0.25 barrels of distilled 2, and 0.5 barrels of naphtha. Distilled naphtha can be used only to produce gasoline or jet fuel. Distilled oil can be used to produce all three products.

The octane level of each type of oil is as follows: distilled 1, 9; distilled 2, 4; naphtha, 8. All gasoline produced can be sold at £18 per barrel, all jet fuel produced, £16 per barrel; and all heating oil produced, £14 per barrel. Marketing considerations dictate that at least 3000 barrels of each product must be produced daily. How can Margaret Oils maximize its daily profit?

| | Gasoline | Jet fuel | Heating oil |
|----------------|----------|----------|-------------|
| Minimum octane | 8.5 | 7 | 4.5 |
| Price (£) | 18 | 16 | 14 |

| | Distilled 1 | Distilled 2 | Naphtha |
|-------------------|-------------|-------------|---------|
| Distill (barrels) | 0.25 | 0.25 | 0.5 |
| Octane | 9 | 4 | 8 |