Example 1, Section 3.4

(Exercise 1, p. 71)

There are 3 factories on the Momiss River (1, 2 and 3). Each emits two types of pollutants (1, 2) into the river. If the waste from each factory is processed, the pollution in the river can be reduced.

- It costs $15.00 to process a ton of waste from Factory 1, and each ton processed reduces the amount of pollutant 1 by 0.10 tons and the amount of pollutant 2 by 0.45 tons.

- It costs $10.00 to process a ton of waste from Factory 2, and each ton processed reduces the amount of pollutant 1 by 0.20 tons and the amount of pollutant 2 by 0.25 tons.

- It costs $20.00 to process a ton of waste from Factory 3, and each ton processed reduces the amount of pollutant 1 by 0.40 tons and the amount of pollutant 2 by 0.30 tons.

The state wants to reduce the amount of pollutant 1 in the river by at least 30 tons and the amount of pollutant 2 in the river by at least 40 tons. Formulate an LP problem that will minimize the cost of reducing the pollutants by the desired amounts. Do you think that the LP assumptions (Proportionality, Additivity, Divisibility, and Certainty) are reasonable for this problem?