Show all your steps to get full credit.

**Reading assignment**: Read Chapter 1 and Chapter 3.

**Question 1** (15 points)

A car manufacturer is currently buying tires from a supplier, but considering to produce the tires. The supplier charges $50 for each tire. To be able to produce the tires, the manufacturer would have to add a new production line at a cost of $1,200,000. It estimates that its unit cost of production would be $30.

(a) How many cars should the manufacturer sell in order to recover its initial investment? (Remember that there are four tires in a car.)

(b) Currently the company sells 5000 cars annually. At the current sales rate how long would it take to pay back the investment required for the expansion?

(c) If sales are expected to increase at a rate of 20% per year, how long will it take to pay back the investment?

**Question 2** (10 points)

Togo shoe company has determined that a 75% learning curve describes the evolution of its production time for a new line.

(a) If it takes 3 hours to produce the first unit, how long should it take to produce the 500th unit based on this learning curve?

(b) Show that the time to produce a unit is a decreasing function of the number of units that have been produced.

**Question 3** (5 points)

Find a newspaper/magazine article which discusses successful or unsuccessful operations practices in a company and their consequences. Explain how the article relates to some of the course topics.