Homework

This homework is designed to help you structure your study time at home. You can work on this alone or with others as you prefer. I ask you to copy four of your answers (from the last page) into Blackboard; this will count towards your participation for the week and your feedback will be used to drive the content of Wednesday's class.

In this worksheet, we will review the ideas discussed on Monday's class in a different context. Consider a company producing a certain item. For its current demand of 1000 units, the company is making a profit of $4000 and has a marginal profit of -0.5 $/units.
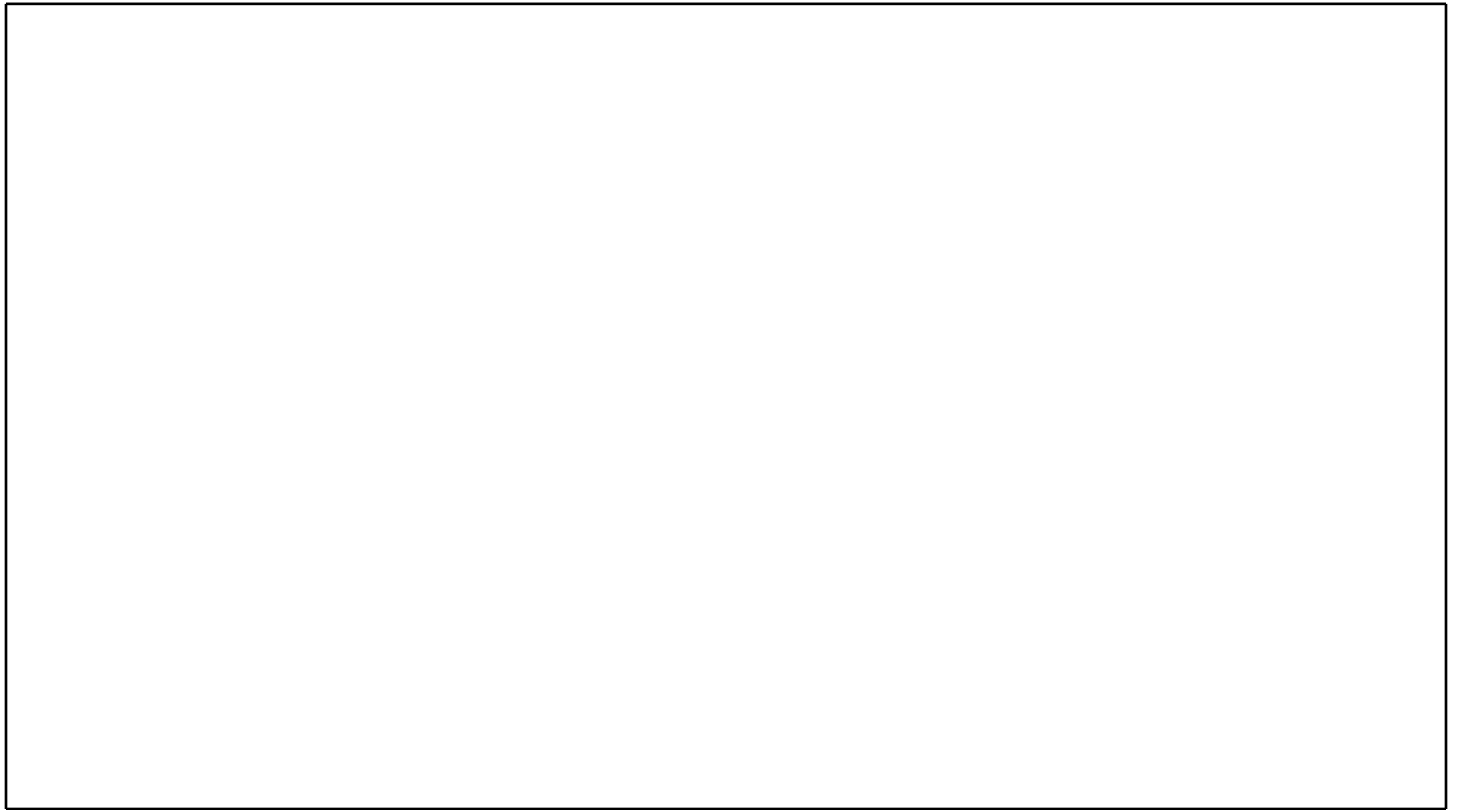
Considering this situation and the one described on Monday's class, match the terms on the left that corresponds to the ones on the right:

11:04 am	-0.5 $/unit
11:30 am	$4000
93 km/h	1000 units
14297.3 km	not matched

The company would like an estimate of their profit if their demand changes. You are to consider two scenarios and provide an estimate of the profit for each.

First scenario: the demand increases by 50 units.

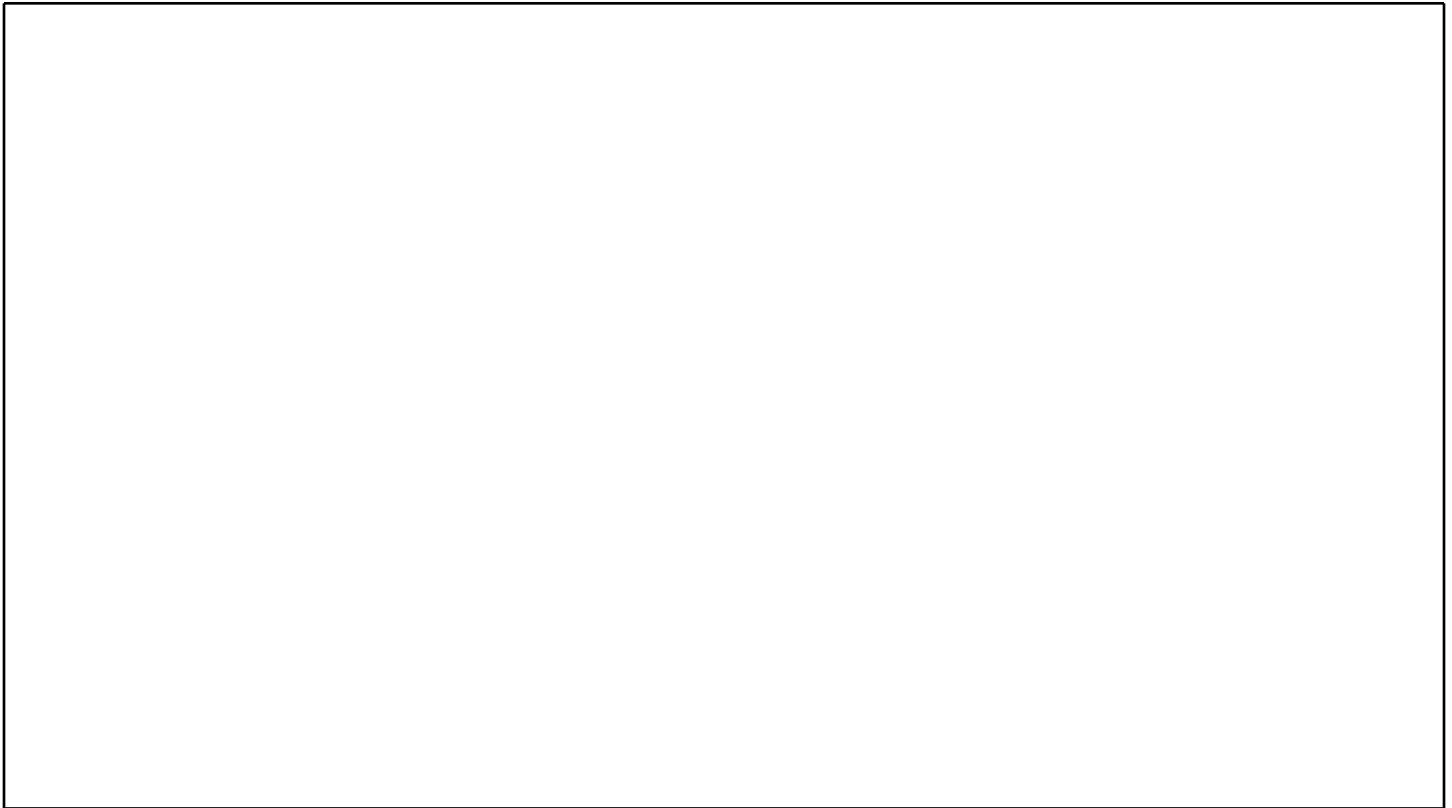**Second scenario**: the demand decreases by 30 units.

Generalize your above computations and find a formula to compute $L_{1000}[q]$ which is the estimated profit for a demand of q units given the information known at the current demand of 1000 units.

Draw a set of axis with the horizontal axis representing units and the vertical axis representing dollars and then represent on it the following:

- the known information about the company at its current demand of 1000 units,
- your estimated profit for each of the two scenario considered,
- the line connecting those points.

What is the equation of the line you drew above?

Out of your two estimates of profit, which one are you more confident in and why?

The following are questions asked on Blackboard. Copy your answers there when done.

How does this relate to the formula of $L_{1000}[q]$ that you found earlier?

What additional information would help us quantify the maximal potential error made in your estimate?

Looking back at the work you did during Monday's class on the moving car, we discussed that it is unknown how accurate our linear approximation guess is. What additional information at 11:04 am would give us an estimate on the size of our error?

Explain in your own words why we call the estimation process a *linear approximation*.