Example 1. The elasticity of the demand for butter is 0.62. What do you expect to happen to demand if there is a 25% decrease in price? What do you expect to happen to demand if there is a 90% increase in price?
Example 2. In Fall 2013, the undergraduate enrollment at Loyola University Maryland was 3875 and the tuition was $41850 per year (information taken from the 2013–2014 Loyola Catalogue). According to http://centerforcollegeaffordability.org/archives/1336 the elasticity of demand for a 4 year college is 0.10.

(a) Will a 5% increase in tuition cause total revenue to go up or go down?
(b) Can you find a way to predict this answer without repeating all the calculations?

Solution.

(a) Since the elasticity is 0.10, a 5% increase in tuition should cause a 0.05 decrease in attendance. Thus, the attendance is predicted to be $3875(1-0.05) = 3856.25$.

Now we compare the old and new revenues:

\[
R = pq
\]

old revenue: $3875 \times 41850 = $162,168,750$

new revenue: $3856 \times 41850(1-0.05) = $169,442,280$

So the revenue went up by $7,273,530.

(b) It’s more efficient to calculate everything as a percentage change:

\[
\text{% change } R = \frac{R - R_0}{R} = p \cdot q + p \cdot q - p \cdot q = p \cdot q - p \cdot q + p \cdot q = p \cdot q - p \cdot q = E \cdot \text{% change } p
\]

see Section 3.4, Example 1

\[
E = \left(1 - \frac{1}{E}\right) \cdot \text{% change } p
\]

In this problem we have \(\text{% change } R = (1-0.05) = 0.045\).

Thus, we expect revenue to go up approximately 4.5%. (Indeed, in part (a) we saw that it went up by $7,273,530, and this is 4.3% of $162,168,750.)
Example 3. The demand function of T-shirts is \( q = 1500 - 125p \).
(a) Find \( R \) when \( p = 5 \).
(b) Find \( E \) when \( p = 5 \).
(c) When \( p = 5 \), find out if \( R \) is increasing or decreasing (i.e. will increasing \( p \) make \( R \) increase or decrease). Do the problem in two different ways: by using the Elasticity, and by finding \( R \) as a function of \( p \) and using the derivative.