1. Landsburg, Ch.4, numerical exercises, #N1.

2. Landsburg, Ch.4, problem set, #23.

3. Landsburg, Ch.4, problem set, #24.

4. In 2003, tolls were raised on seven bridges across the Delaware River, connecting Pennsylvania to New Jersey. In the first two months of the year, bridge traffic fell by 17%, but revenue increased by 123% because of the higher tolls. What is the price elasticity of demand for using these bridges to cross the Delaware River? (A problem from the previous edition.)

解答

1 (a) \( \text{Slope} = -\frac{MU_x}{MU_y} = -\frac{y}{x} \).

(b) The budget line is:

\[
 x + y = 40 \tag{1}
\]

The optimal cannot be a corner solution, otherwise the utility is 0, the lowest possible value. At the interior solution,

\[
 \frac{y}{x} = \frac{MU_x}{MU_y} = \frac{p_x}{p_y} = 1. \tag{2}
\]

(1) and (2) imply \( x = y = 20 \).

(c) The budget line is:

\[
 4x + y = 40. \tag{3}
\]

Moreover, at the optimal,

\[
 \frac{y}{x} = 4. \tag{4}
\]

From the above two equations, \( x = 5, y = 20 \).

(d) (20,$1), (5,$4).

(e) The indifference curve is: \( \{(x,y)|xy = 400, x, y \geq 0\} \). At the new consumption point, (4) is satisfied. So, \( x = 10, y = 40 \).

(f) Substitution effect: \( (10,40) - (20,20) = (-10,20) \). Income effect: \( (5,20) - (10,40) = (-5,-20) \).

2 (a) See the following figure:

(b) point a

(c) point b
(d) substitution effect: \( \vec{a} \); leisure decreases
income effect: \( \vec{b} \); leisure increases (decreases) if it is a normal (inferior) good

(e) true
(f) Suppose leisure is a normal good, and according to the problem, we consider a positively sloped labor supply curve. One obvious difference between these two types of workers is the income effect felt due to an increase of wage rate. For a person whose income is derived entirely from wages, the income effect must be more significant and hence offsets the substitution effect more. The change of his leisure hours (or working hours) is smaller. When we draw the labor supply curve, we put the wage on the vertical axis, and working hours on the horizontal axis. A person whose income is entirely from wages is expected to have a steeper labor supply curve.

3 a) $2250. $0. 
b) $0. 
c) The slope = $-1.25$. 
d) Finding $400 shifts the budget line out parallel to itself till it passes through (2200, 0) and (0, 2350). Being informed of a $500 raise next year does the same thing. A rise in the interest rate to 50% 
e) Both would lead to the same budget line, hence the same optimum point, hence the same amount of spending both today and tomorrow. 
f) The tangency is at (1000,1000). 
g) You decrease current spending, increase future spending, and are happier. 
h) The substitution effect is leftward and upward along the illustrated indifference curve. You cannot determine the direction of the income effect.

4 Revenue \( r = pq \). \( r + \Delta r = (p + \Delta p)(q + \Delta q) \). Dividing the above equation by \( r \) at each side gives: \( 1 + \Delta r/r = (1 + \Delta p/p)(1 + \Delta q/q) \). It means: \( 1 + 1.23 = (1 + \Delta p/p)(1 + 0.17) \). So \( \Delta p/p \approx 1.687 \) and \( \eta = -0.17/1.687 \approx -0.10 \).