Question 1

(a) Then

\[ \text{The value of his endowment is 180.} \]

(b) \( MRS = \frac{x_t}{2x_e} = 1.5/3 = 1/2 \) implies \( x_e = x_t \). The budget line equation is \( 1.5x_e + 3x_t = 180 \). Thus,

\[ x_e = 40, \ x_t = 40. \]

Question 2

\( MRS = \frac{3x_2}{x_1} = 1 \). Thus,

\[ \text{The equation of the income offer curve is } x_2 = \frac{1}{3}x_1. \]

In addition, \( x_1^2x_2 = 6,912 \). Thus, \( x_1 = 20,736 \).

The expenditure minimizing consumption is

\[ x_1 = 12, x_2 = 4. \]

\[ \text{The person needs $32.} \]

Question 3

\( MRS = \frac{c_2}{0.9c_1} = 1.15 \). Thus, the income offer curve is \( c_2 = 1.035c_1 \). The budget line equation is \( 1.15c_1 + c_2 = 2,000(1.15) + 19,550 = 21,850 \). Thus, \( 2.185c_1 = 21,850 \). Therefore,

\[ \text{Joe’s consumption is } c_1 = 10,000, c_2 = 10,350. \]

This year, Joe borrows $8,000

Suppose Joe’s credit card has a credit limit of 1,000 Dollars, and he cannot get credit from any other source. Then

Joe borrows $1,000

Question 4

\( MRS = \frac{c}{R} = w \). Before tax, \( c = 10R \). The budget line equation is \( 10R + c = 1,200 + 200 = 1,400 \). Thus, \( 20R = 1,400 \), i.e., \( R = 70 \).

After tax, \( c = 8R \). The budget line equation is \( 8R + c = 960 + 200 = 1,160 \). Thus, \( 16R = 1,160 \), i.e., \( R = 72.5 \).

The person’s labor supply before the tax is introduced is \[ 50 \]

The person’s labor supply after the tax is introduced is \[ 47.5 \]
Question 5  MRS = \( c/R = 14.4 \), i.e., \( c = 14.4R \). In addition, \( Rc = 25,000 \) in order for utility to be at the after-tax level. Thus, \( 14.4R^2 = 25,000 \), i.e.,

\[
\begin{align*}
R &= 41.667, \\
c &= 600
\end{align*}
\]

The value of this consumption at prices \( w = 14.4 \) and 1 is \( \$1,200 \).

\( wR = 1,440 \) when \( w = 14.4 \).

**Thus, the loss to the person is 240**

Total tax revenue is \( 50(4.4) = 220 \). The deadweight loss is therefore 20. Thus, the deadweight loss is **9.1%** of the tax revenue.

Question 6

**After tax utility is 20**.

In order to obtain the after-tax utility at before-tax prices \( (p_1 = 2, p_2 = 3) \) the person’s income would have to be \( m = 40 \).

Thus, the deadweight loss generated by the tax is **20**.

The government’s tax revenue is **0**.

Question 7  The expected utility from playing the lottery is \( 4.59710 \).

The lotteries’ certainty equivalent is **99.20**. Thus, playing the lottery is equivalent to losing **80** cents with certainty.