Question 1: 4.1. in Workouts in Intermediate Microeconomics.
Question 2: 4.2. in Workouts in Intermediate Microeconomics.

Question 4: Suppose that a consumer’s utility function for x1 and x2 takes the form:

\[ U(x_1, x_2) = x_1^{1/2} x_2^{1/2} \]

Prices are denoted by \( p_1 \) and \( p_2 \), and income by \( m \).

a) Find the demand functions for \( x_1 \) and \( x_2 \) (as a function of \( m \), \( p_1 \) and \( p_2 \)). Are \( x_1 \) and \( x_2 \) normal goods? Why?

b) Suppose now that the prices are given by \( p_1 = 2 \), \( p_2 = 1 \), \( m = 100 \). What is the optimal consumption bundle? (You can, of course, use the demand functions you found in part a). What is the utility level at the optimal bundle?

c) Suppose that the government imposes a per-unit tax of $1 on \( x_1 \) (that is, for every unit of \( x_1 \) they buy, the consumer has to pay $1 to the government in addition to the price). Find the new consumption bundle. What is the government’s tax revenue?

d) Suppose that the government uses a lump-sum tax instead of a quantity tax. What would the amount of the lump-sum tax need to be, for the consumer to be just as well off with the lump-sum tax as she is with the quantity tax? (Hint: Remember that a lump-sum tax does not change prices, just changes income).

e) Comparing the revenues raised by the two types of taxes and the utility levels under them, which policy would you say is better?

Question 5:

Suppose that I have a utility function \( U(x_1, x_2) = 2x_1 + x_2 \). What is my demand for \( x_1 \) for different ranges of \( p_1/p_2 \)? Hint: Remember that with linear indifference curves such as this one, what the person consumes will depend on whether the indifference curves are steeper than the budget line.

Question 6: 5.2. in Workouts in Intermediate Microeconomics.
Question 7: 5.6. in Workouts in Intermediate Microeconomics.