Problem 1: Suppose that the utility function of the consumer is $U(x, y) = 2xy - x$, price of x is $P_x = 3$ and income $I = 64$.

(a) Derive the demand for good y (as a function of its price P_y)

For the further part of the problem assume that the price of y is $P_y = 4$

(b) Find the optimal consumption of good y

(c) Calculate price elasticity at this optimum

(d) If you were monopolist in this market would you rise/lower/maintain the price of y (with respect to price elasticity of demand)? Explain!

Problem 2: Calculating Slutsky's substitution and income effect. Suppose that the consumer has a demand function for beer of the form

$$x_1 = 10 + \frac{I}{10p_1}$$

His income I is \$120 per week and the price of beer is $p_1 = 3. Determine the substitution and income effect if the price of beer falls to \$2.

Problem 3: Suppose that the price elasticity, ϵ, for cigarettes is -4, the price of cigarettes is \$3 per pack and we want to reduce smoking by 20%. What should we do?

Problem 4: Consumer consumes two goods with their prices $P_X = 10$, $P_Y = 80$ and has income $I = 5000CZK$. The demand function is given by $X = 80 - 0.8P_X^2 - 0.5P_Y + 0.04I$.

(a) Are X and Y substitutes or complements?

(b) Is X normal or inferior good?

(c) What is price elasticity of demand for good X? What information does this give to the producer of good X?

(d) What is cross elasticity of demand for good X if price of Y changes?

(e) What is income elasticity of demand for good X?

Problem 5: Consider the following utility function: $U(x_1, x_2) = 3x_1 + 2x_2$, where x_1, x_2 are the consumption of good 1 (food) and good 2 (clothing) respectively. Let p_1, p_2 and I denote the corresponding prices and income. Suppose that $p_1 = 2, p_2 = 1$. Derive the optimal choice of food and clothing. Draw the Engel curves for food and clothing. Is food a normal good? What about clothing?