1. The following data is given in an economy:

$$G := 50 \quad I := 20 \quad C(y) = 10 + 0,8y$$

   (a) Determine the equilibrium income graphically and analytically within the framework of the Keynesian commodity market model.

   (b) Determine the government spending multiplier.

   (c) The government increases spending by 40%, by how much does the equilibrium income increase?

   (d) Investments should now be dependent on interest rates and the money and goods markets should be linked via the interest rate:

$$I(i) = 20 - 4i \quad M = 2400 \quad p = 2 \quad L = 4y - 20i$$

       i. Determine the IS curve.

      ii. Determine the LM curve.

   Determine graphically and analytically the interest rate and income at which the money and commodity markets are in equilibrium at the same time.

   (e) Compare the result with the equilibrium income in the Keynesian commodity market model and explain the difference.

2. The following data are given in an economy:

$$\text{Commodity market}: \quad C(y) = 50 + 0,75y \quad G := 100 \quad I(i) := 350 - 25i$$

$$\text{Money market}: \quad M = 1000 \quad p = 2 \quad L(y,i) = y - 50i$$

   (a) Determine the macroeconomic equilibrium.

   (b) In order to give demand a proper boost in times of the corona crisis, the state doubles its government spending. Determine the effect this has on aggregate income.

   (c) Determine the government spending multiplier. Are you surprised?

   (d) Now calculate the stimulus that the ECB triggers when it opens the floodgates and doubles the money supply (starting from the original government spending of G=100).

   (e) What is the money multiplier?

   (f) Also show the effect of monetary and fiscal policy in a diagram.

3. The production function of a country is given by

$$y = F(K, L) = K^{\frac{1}{3}} L^{\frac{2}{3}}$$

y: Output; $K \geq 0$: Capital; $L \geq 0$: Labour:

(a) Show that this function has positive diminishing returns to scale and draw the function $y(K)$ and $y(L)$ (set $K = 1$ and $L = 1$ respectively) within a diagram.

(b) Show that the production function has constant returns to scale. From the first-order condition for the profit maximum, derive the demand for labor as a function of the real wage with the output price p, the wage w for labor and the interest rate r as the cost of capital.

(c) The utility of a household is given by

$$u(c, f) = c \cdot f$$

with c: Consumption; f: Leisure, the price p of the consumption good and the maximum working time $\bar{L} = 1 = L + f$. Assume further that a person's budget is given by their earned income wL.
Derive the labor supply function from the consumption-leisure decision, depending on the real wage $\frac{w}{p}$ (the price of leisure is the foregone wage w).

(d) Plot labor supply and labor demand as a function of the real wage in a diagram (set $K = 1$ again).