Problem Set on Labor Markets and Unemployment

1. The production function for Belgium is given by \( Y = AK^{\frac{1}{2}}N^{\frac{1}{2}} \) and \( K = 25 \) is given. The labor supply curve is given by \( N_s = 100[(1 - t)w]^2 \) where \([1 - t)w] \) is the after-tax real wage rate. Suppose \( A = 9 \).

(a) Draw the labor demand curve. Then, draw the labor supply curve (with after-tax wage on the vertical axis). Draw the pictures as accurately as you can (using the above information).

(b) How does labor supply respond to an increase in the tax rate \( t \)?

(c) Assume \( t = 0 \). Compute the
   i. market-clearing real wage,
   ii. employment, and
   iii. labor income of all workers.

(d) Does a beneficial supply shock \([K is still fixed at 25]\) help or hurt the labor income of all workers in Belgium? Explain.

(e) Assume \( t = 0.6 \). Compute the
   i. market-clearing real wage,
   ii. employment, and
   iii. after-tax labor income of all workers.

(f) Why does employment fall when \( t \) rise?

(g) Will a minimum wage of \( w_{\text{min}} = 2 \) increase the total after-tax income of all employed workers if \( t = 0.6 \)? Explain.

(h) Will a minimum wage of \( w_{\text{min}} = 2 \) increase the total after-tax income of all employed workers if \( t = 0 \)? Explain.