Long-Run Economic Growth
Additional Homework Problems
ECON 3133
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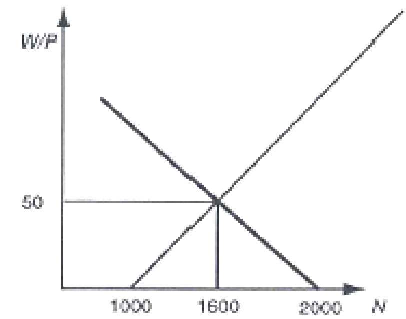
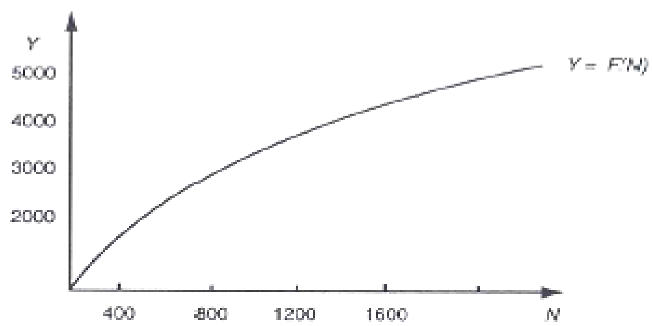
Answers

1.
   a. $1{,}000 + 12\times W/P = 2{,}000 - 8\times W/P$
      $W/P = 50$ and $N = 1{,}600$.



b)



   Yes, it exhibits diminishing marginal product.

   c. $N = 1{,}600$; $Y = 4{,}000$ in equilibrium.

2.
   a. For $A = 1$, output $Y = K^{1/2}\times N^{1/2} = 900^{1/2}\times 400^{1/2} = 600$.
      Output per worker $Y/N = (K/N)^{1/2} = (900/400)^{1/2} = 1.5$.

   b. For $A = 1$, output $Y = K^{1/2}\times N^{1/2} = 1350^{1/2}\times 600^{1/2} = 900$, 50 percent more output.
      Output per worker $Y/N = (K/N)^{1/2} = (1350/600)^{1/2} = 1.5$, unchanged Y/N.

   c. For $A = 1$, output $Y = K^{1/2}\times N^{1/2} = 1350^{1/2}\times 500^{1/2} = 821.6$, 36.9 percent more output.
      Output per worker $Y/N = (K/N)^{1/2} = (1350/500)^{1/2} = 1.64$, 9.3 percent more Y/N.

3. Equilibrium employment is the number employed when the labor market is in equilibrium. The fraction of the labor force not working at this point is the natural rate of unemployment. Potential GDP and equilibrium output both refer to the level of output that can be produced at equilibrium employment.

4. Use the equation at the bottom of the first page of the Long-Run Economic Growth notes: $(Y/AP)_n = (Y/AP)\times(1 + G)^n$.
   $G = (164/100)^{1/25} - 1 = 1.0199 = 0.0199 \approx 2$ percent.

5. On the balanced growth path, balanced growth investment per worker, $n\times K/N$, equals savings per worker, $s\times Y/N$:

$$s\times Y/N = n\times K/N$$
$$s\times (K/N)^{1/2} = n\times K/N$$
$$0.04\times (K/N)^{1/2} = 0.01\times K/N$$
$$0.04/0.01 = (K/N)^{1/2}$$
$$4 = (K/N)^{1/2}$$
$$(K/N) = 4^2$$
$$(K/N)^* = 16$$