

# Problem Set

MA17Q4-E

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December 14, 2017

## [1] Cobb–Douglas production function

Let  $0 < \alpha < 1$ . Consider the following production function,

$$Y = F(K, AL) = K^\alpha (AL)^{1-\alpha}.$$

1. Show that  $F$  has constant returns to scale.
2. Let  $r + \delta = \frac{\partial F}{\partial K}$  and  $w = \frac{\partial F}{\partial L}$ . Compute the capital share,  $(r + \delta)K/Y$  and labor share,  $wL/Y$ .
3. Define  $k = K/AL$  and  $y = Y/AL$ . Derive the function form that relates  $y$  to  $k$ ; that is,  $y = f(k)$ .

Consider the Solow model with the Cobb–Douglas production function defined above.

4. Compute the golden-rule capital stock  $k_G^*$ , for which  $f'(k_G^*) = \delta + g + n$  is met.
5. What saving rate,  $s_G$ , must the economy have to achieve the golden-rule capital stock as its steady state?

Answer sheet. Please write your name and id number.