

## Problem Set #4

### Production

For problems 1-5, identify whether the production function exhibits increasing returns to scale, decreasing returns to scale, or constant returns to scale. Also, determine if the production function exhibits diminishing marginal productivity.

1.  $Q = k^2 l^2$

2.  $Q = \text{Min}\{k, l\}$

3.  $Q = 4k + 2l$

4.  $Q = \frac{k^2}{2} + \frac{l^2}{2}$

5.  $Q = k^{3/4} l^{3/4}$

6. Why don't the following production functions represent the same technology?

$$Q = kl$$

$$Q = k^2 l^2$$

7. Prove that Cobb Douglas production functions always have an elasticity of substitution equal to 1.

For each of the production functions listed below graph the short run production function. (Assume that the firm has 4 units of capital.)

8.  $Q = k^{1/2} l^{1/2}$

9.  $Q = \text{Min}\{4k, l\}$

10.  $Q = 2k + 10l$