

A consumer has preferences of

a)  $u(x_1, x_2) = 3x_1^2 x_2^3$  (Cobb-Douglas)

b)  $u(x_1, x_2) = 3\sqrt{x_1} + x_2$  (quasilinear).

In both cases, her budget line is  $p_1 x_1 + p_2 x_2 = m$

Find her individual demands in each case by using the Lagrange method.

Hint: Start with setting up the Lagrange function. Differentiate to get the three first-order conditions (see e.g. appendix to ch. 5 on p. 94). From the first two conditions derive the tangency condition (which is  $|MRS|=p_1/p_2$ ). In a) you need to plug in the tangency condition into the third condition (=budget line) to find individual demand, while in b) you find demand for good 1 from tangency condition since the tangency condition does not have any  $x_2$  expression.

In a) you should get the solution  $x_1 = \frac{2m}{5p_1}, x_2 = \frac{3m}{5p_2}$

In b) you should get  $x_1 = \frac{9p_2^2}{4p_1^2}, x_2 = \frac{m - \frac{9p_2^2}{4p_1}}{p_2}$