## 6.1

Johannes Jacobus (JJ) receives utility from two goods, mampoer (liquor) ($m$) and steak ($s$)

$$U(m, s) = m \cdot s.$$

a. Prove that an increase in the price of mampoer will not influence JJ's consumption of steak.
b. Show also that $\partial m / \partial p_s = 0$.
c. Use the Slutsky equation and the symmetry of net substitution effects to prove that the income effects involved with the derivatives in parts (a) and (b) are identical.
d. Prove part (c) explicitly using the Marshallian demand functions for $m$ and $s$.

**6.6**

Example 6.3 computes the demand functions implied by the three-good CES utility function

$$U(x, y, z) = -\frac{1}{x} - \frac{1}{y} - \frac{1}{z}.$$

a. Use the demand function for $x$ in Equation 6.32 to determine whether $x$ and $y$ or $x$ and $z$ are gross substitutes or gross complements.

b. How would you determine whether $x$ and $y$ or $x$ and $z$ are net substitutes or net complements?

## 6.8 Separable utility

A utility function is called separable if it can be written as

$$U(x, y) = U_1(x) + U_2(y),$$

where $U_i' > 0$, $U_i'' < 0$, and $U_1$, $U_2$ need not be the same function.

a. What does reparability assume about the cross-partial derivative $U_{xy}$? Give an intuitive discussion of what word this condition means and in what situations it might be plausible.
b. Show that if utility is separable then neither good can be inferior.
c. Does the assumption of reparability allow you to conclude definitively whether $x$ and $y$ are gross substitutes or gross complements? Explain.
d. Use the Cobb–Douglas utility function to show that reparability is not invariant with respect to monotonic transformations.