# Hand-out week 2

**This week:**    1.2. Budget Constraint

1.3. Utility Maximization

first order condition

demand functions

properties of demand

indirect utility function

**Readings:**    Varian chapters 4, 5 and 6, DM 2.2

**Practice Problems:**

1. Can a budget line shift parallel to itself without a change in income.

2. How can a budget line rotate clockwise without the horizontal intercept changing if the price of the good on the vertical axis has not changed?

3. Interpret the first order condition of utility maximization graphically and show graphically that any deviation from this condition cannot be an optimum.

4. Find the demand functions which subject to the budget constraint $I = px + qy$ maximize $U(x, y) = sqrt(x) + sqrt(y)$. Use both the Lagrangean method and substitution.

5. Show that for this utility function the MRS is constant along any ray from the origin. Calculate the expenditure shares. Find the income elasticity of both demands. Do you see any connections here?

6. Let $U(x, y) = x - 1/y$. Derive the cross-price elasticity of both demands. Can you say whether they are substitutes or complements?