Home-work 2
use MATLAB

We want to cross the river, and our boat is going twice as slow as the river's current. In which direction (angle!) do we have to steer the boat so that the distance to the starting point is the shortest?

$$d(\alpha)=\frac{L\cos(\alpha)}{\sin(\alpha)}+\frac{L\eta}{\sin(\alpha)}$$ (set L=1, width of the river is normalised)

Let η be a ratio of V_r and V_b, where V_r is the velocity of river and V_b velocity of boat.

$$\eta=\frac{V_r}{V_b}$$

a) Explain (sketch vectors) what means if *η<1, η=1* and *η>1.*

b) Find optimal angles for *η=1.5, 2.0, 2.5 and 3.0*.

c) Plot four functions on the same plot, for *η=1.5, 2.0, 2.5 and 3.0*.

$$d(\alpha)=\frac{L\cos(\alpha)}{\sin(\alpha)}+\frac{L\,\eta}{\sin(\alpha)}$$

d) Calculate distance *d* (displacement from the origin x_0) for η=2 and optimal angle $\alpha=120^{O}$.