Problem 4: Refractive indices

Find the refractive indices of a prism, n_p, and a liquid, n_l. Ignore dispersion.

a) Determine the refractive index n_p of a single prism by <u>two</u> different experimental methods.

Illustrate your solution with accurate diagrams and deduce the relations necessary to calculate the refractive index. (One prism only should be used).

b) Use two identical prisms to determine the refractive index n_L of a liquid with $n_L < n_p$. Illustrate your solution with accurate diagrams and deduce the relations necessary to calculate the refractive index.

Apparatus:

Two identical prisms with angles of 30°, 60° and 90°; a set square, a glass dish, a round table, a liquid, sheets of graph paper, other sheets of paper and a pencil.

Formulae: $\sin(\alpha \pm \beta) = \sin\alpha \cdot \cos\beta \pm \cos\alpha \cdot \sin\beta$

Additional remarks: You may mark the opaque sides of the prisms with a pencil. The use of the lamp is optional.