

PHYSICS 501
1st HOMEWORK
Dr. V. Lempesis

Hand in: Saturday 21st September at 23:59

1. Two vectors **A**, **B** have precisely the same magnitudes. For the magnitude of **A+B** to be three times larger than the magnitude of **A-B** what must be the angle between them?

(5 marks)

2. Find the vector $(\mathbf{A} - \mathbf{B}) \times (\mathbf{A} + \mathbf{B})$.

(5 marks)

3. The points A(2, 4), B(5, 8), C(13, 8), D(10,4) define a parallelogram. Find the area of the parallelogram.

(5 marks)

4. We have two vectors $\mathbf{A} = (2, 4)$ and $\mathbf{B} = (-2, 1)$. The components are given with respect to a coordinate system $x-y$. We chose now another system of axis $x'-y'$ which is rotated at an angle $\varphi = -30^\circ$ with respect to $x-y$. Find out: a) The components of the two vectors in the **new** system b) The scalar product of the two vectors in **both** systems

(5 marks)