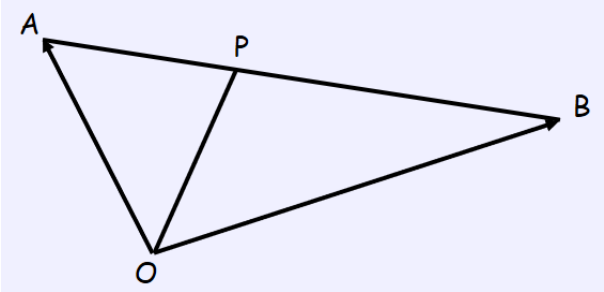
11E Geometric Problems

1. In the diagram the points A and B have position vectors **a** and **b** respectively. The point P divides line AB in the ratio 1:2. Find the position vector of P



2. In triangle ABC, $\overrightarrow{AB} = 3\boldsymbol{i} - 2\boldsymbol{j}$ and $\overrightarrow{AC} = \boldsymbol{i} - 5\boldsymbol{j}$. Find the size of $\angle BAC$ in degrees.

3. OABC is a parallelogram. P is the point where OB and AC intersect.

   The vectors **a** and **c** represent OA and OC respectively.

   Prove that the diagonals bisect each other.