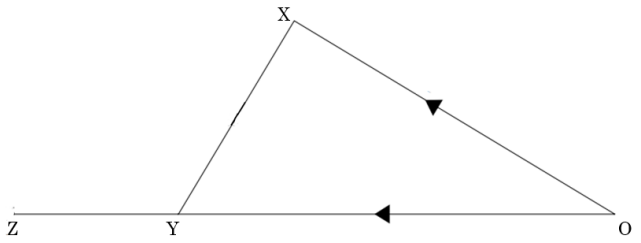
Vectors Exam Practice

Q1. In the diagram below, $\overrightarrow{OX} = \mathbf{a}$, $\overrightarrow{OY} = \mathbf{b}$ and OYZ is a straight line.



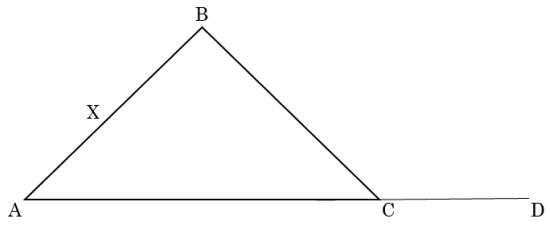
a) Find $\overrightarrow{XY}$ in terms of **a** and **b**

[2]

b) Given that Y divides the line OZ so that YZ : OY is 3 : 5, find $\overrightarrow{ZX}$ in terms of **a** and **b**

[3]

Q2. In the triangle ABC below, X is the midpoint of AC, and Y is on the line BC so that BY : YC is 5 : 4, and AC : AD is 3 : 5.



Prove that XYD is not a straight line.

[5]

Q3. A ship sets off from a harbour H, which is located at (-4, 8) and is heading towards a port P which is located at (32.25, -21). The ship is travelling at $\begin{pmatrix} 5 \\ -4 \end{pmatrix}$ km/hour.

a) Find what time the boat reaches the port if it sets off at 3.15pm.

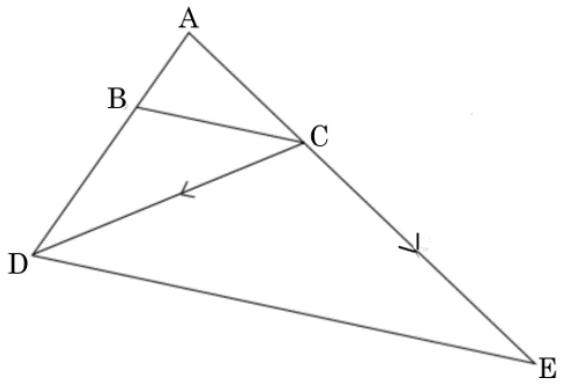
[3]

b) Calculate the bearing on which the ship is travelling. Give your answer to the nearest degree.

[3]

Q4. In the diagram below, ADE is a triangle.
You are given that $\overrightarrow{CD} = \mathbf{b} - \mathbf{a}$, and $\overrightarrow{CE} = -\mathbf{a} - \mathbf{3b}$, and that $\overrightarrow{CA} = \frac{1}{3}\overrightarrow{EC}$ and that $\overrightarrow{AB} = -\frac{1}{3}\mathbf{a}$

Prove that BC is parallel to DE.



[4]