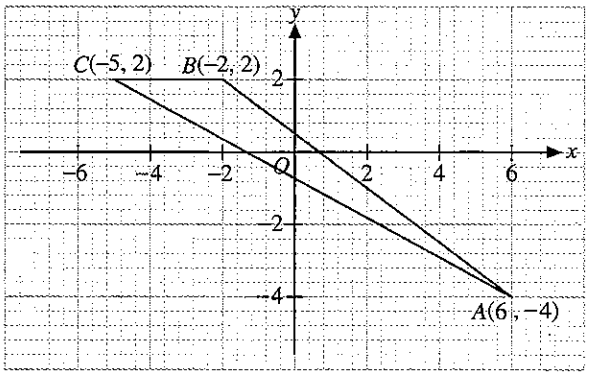
12. The vertices of $\triangle ABC$ are $A(6, -4)$, $B(-2, 2)$ and $C(-5, 2)$. Find

(a) the lengths of AB, BC and CA,

(b) the equation of the line AC,

(c) the equation of the line which passes through A and has the same gradient as BC,

(d) the value of cos $\angle ABC$.

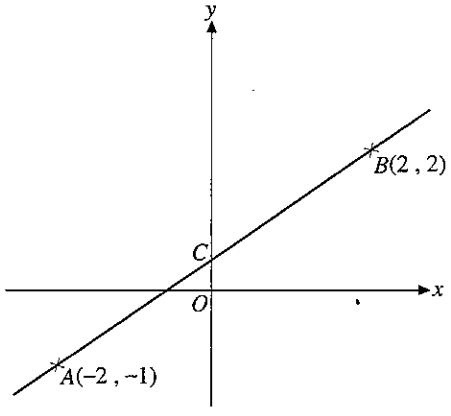


13. The diagram shows the line joining $A(-2, -1)$ and $B(2, 2)$. The line cuts the y-axis at C.

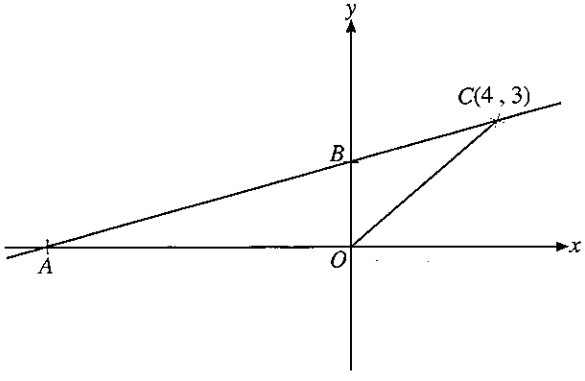
(a) Find the coordinates of C.

(b) The graph of $y = k(2^x)$ passes through C. Find the value of the constant k.

(c) Copy the diagram and draw the graph of $y = k(2^x)$ on it.



14.



In the diagram, the point $C(4, 3)$ lies on the line AB. The length of OA is 4 times the length of OB.

(a) Find the gradient of the line AB.

(b) Find the equation of the line AB.

(c) Find the lengths AB and BC.

(d) Find $\dfrac{\text{area of } \triangle OAB}{\text{area of } \triangle OBC}$.

(e) Suppose D is a point such that $\overrightarrow{OD} = \overrightarrow{OA} + \overrightarrow{OC}$.

(i) Express $\overrightarrow{OD}$ and $\overrightarrow{AD}$ as column vectors.

(ii) What type of quadrilateral is the quadrilateral $AOCD$?