WWW.M4THS.COM
A LEVEL MATHS

(59) Vectors (Magnitude and Direction)

WORKING AT D/E

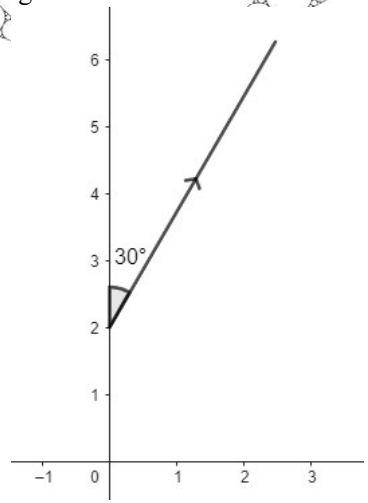
(1) Given that **a** = 2**i** +3**j** **and b** = –4**j**

(a) Show that |**a**| = $\sqrt{13}$

(b) Find the resultant of **a** and **b** in the form a**i** + b**j**

(c) Find the modulus of the resultant in the form $\sqrt{p}$

(2) The diagram below shows a vector with length 5



The vector makes an angle of 30^o with the vector **j.**

Show that the vector can be written as $\frac{5}{2}$**i** +$\frac{5\sqrt{3}}{2}$**j**

(3) Find the angle the vector 2**i** +7**j** makes with the vector **i.**

WORKING AT B/C

(1) A vector has magnitude 8 units and makes an angle of 30^o with the vector **i**. Find the vector in the form a**i** + b**j**, giving **a** as an exact value.

(2) **a** = -3**i** +4**j**

(a) Find a unit vector in the direction of **a.**

(b) Find the angle the vector makes with the vector **j**

(3) Given that | **i** +p**j**| = $5\sqrt{2}$, find the possible values of p.

WORKING AT A*/A

(1) Vector **a** has magnitude 4 and makes an angle of $\emptyset$ with the vector **i** .

Given that $\sin\emptyset = \frac{12}{13}$, find the horizontal component of the vector in the form b**i**.

(2) In triangle OAB, $\overrightarrow{OA}$ = 2**i** +8**j** and $\overrightarrow{OB}$ = 6**i** + 3**j**

(a) Find the vector $\overrightarrow{AB}$ in the form p**i** +q**j**

(b) Show that the perimeter of triangle OAB is 21.4 units to one decimal place.

(c) Find the area of the triangle to 3 significant figures.

(3) Given that the vector **a** = 3**i** +p**j** makes an angle of 30^o with the vector **j**, find the value of the constant p.