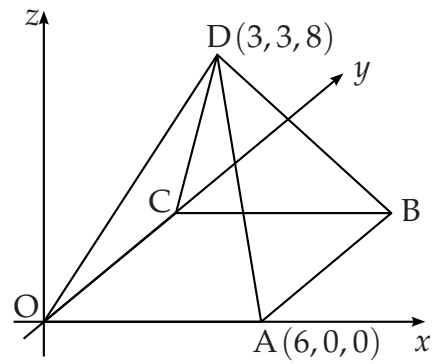
thrid point vectors

[SQA] 1. The diagram shows a square-based pyramid of height 8 units.

Square OABC has a side length of 6 units.

The coordinates of A and D are $(6,0,0)$ and $(3,3,8)$.

C lies on the y-axis.



(*a*) Write down the coordinates of B. **1**

(*b*) Determine the components of $\overrightarrow{DA}$ and $\overrightarrow{DB}$. **2**

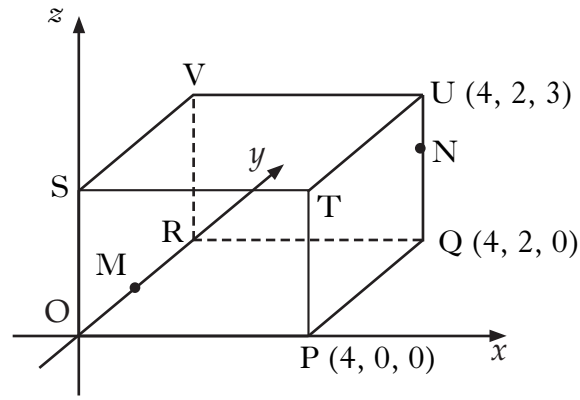
(*c*) Calculate the size of angle ADB. **4**

2. The diagram shows a cuboid OPQR,STUV relative to the coordinate axes.

P is the point $(4,0,0)$, Q is $(4,2,0)$ and U is $(4,2,3)$.

M is the midpoint of OR.

N is the point on UQ such that $UN = \frac{1}{3}UQ$.



(*a*) State the coordinates of M and N. **2**

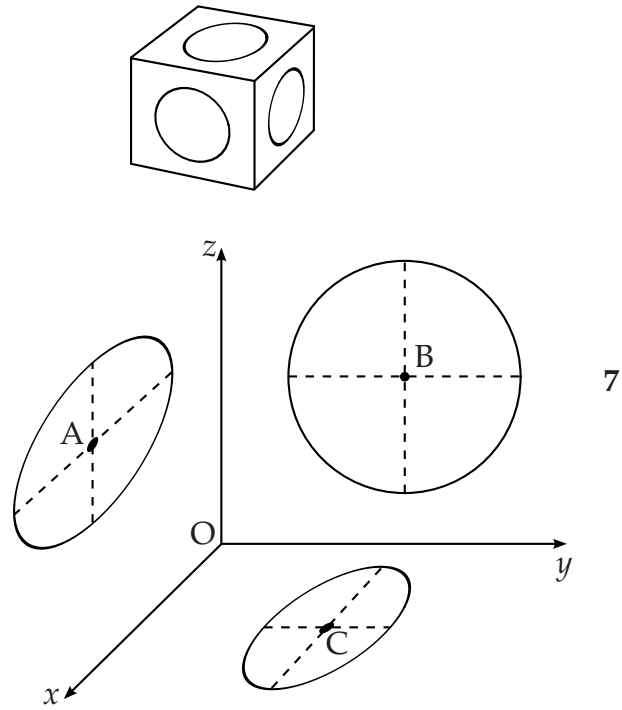
(*b*) Express the vectors $\overrightarrow{VM}$ and $\overrightarrow{VN}$ in component form. **2**

(*c*) Calculate the size of angle MVN. **5**

[SQA] 3. A box in the shape of a cuboid is designed with **circles** of different sizes on each face.

The diagram shows three of the circles, where the origin represents one of the corners of the cuboid. The centres of the circles are $A(6,0,7)$, $B(0,5,6)$ and $C(4,5,0)$.

Find the size of angle ABC. **7**



[END OF QUESTIONS]