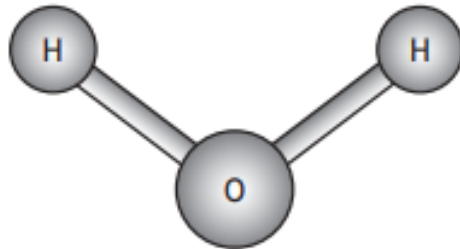


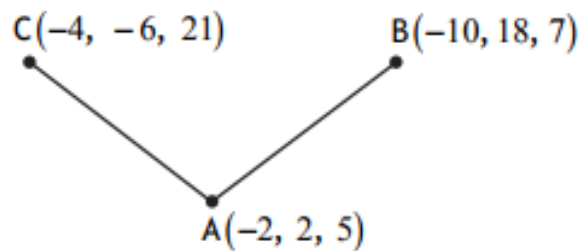
2016 P2 Q5

5. The picture shows a model of a water molecule.



Relative to suitable coordinate axes, the oxygen atom is positioned at point $A(-2, 2, 5)$.

The two hydrogen atoms are positioned at points $B(-10, 18, 7)$ and $C(-4, -6, 21)$ as shown in the diagram below.



- (a) Express \vec{AB} and \vec{AC} in component form.
- (b) Hence, or otherwise, find the size of angle BAC.

Answers

(a)
$$\begin{pmatrix} -8 \\ 16 \\ 2 \end{pmatrix}$$

(b) 104.3° or 1.82 radians

$$\begin{pmatrix} -2 \\ -8 \\ 16 \end{pmatrix}$$