2. [*In this question* **i** *and* **j** *are horizontal unit vectors directed due east and due north respectively. Position vectors are given relative to a fixed origin.*]

Two particles, A and B, are moving on a smooth horizontal surface.
Each particle is moving with constant velocity.

At time t seconds, the position vector of A is given by $\mathbf{r}$ metres.

- When $t = 2$, $\mathbf{r} = (-5\mathbf{i} + 16\mathbf{j})$
- When $t = 5$, $\mathbf{r} = (10\mathbf{i} + 4\mathbf{j})$

(a) Find, in terms of $\mathbf{i}$ and $\mathbf{j}$, the velocity of A.

(2)

(b) Find an expression for $\mathbf{r}$ at time t seconds.
Give your answer in the form $p\mathbf{i} + q\mathbf{j}$, where p and q are functions of t

(2)

At time t seconds, the position vector of B is given by $\mathbf{s}$ metres where

$$\mathbf{s} = -5\mathbf{i} + 7\mathbf{j} + t(2\mathbf{i} - 3\mathbf{j})$$

(c) Find, to the nearest degree, the bearing of B from A when $t = 5$

(3)

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Question 2 continued

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Question 2 continued

(Total for Question 2 is 7 marks)