

**11.** [*In this question the unit vectors  $\mathbf{i}$  and  $\mathbf{j}$  are due east and due north respectively.*]

A boat travels in a straight line at constant speed.

Initially the boat has position  $(-11\mathbf{i} - 2\mathbf{j})$  km relative to a fixed origin  $O$

After 90 minutes the boat has position  $(\mathbf{i} + 6\mathbf{j})$  km relative to  $O$

(a) Show that the speed of the boat is  $p\sqrt{13}$  km h<sup>-1</sup>, where  $p$  is a constant to be found.

**(3)**

The boat continues in the same direction until it reaches point  $X$

Given that  $X$  is due north east of  $O$

(b) find the position vector of  $X$ , making your method clear.

**(4)**