

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

A stone slides horizontally across ice.

Initially the stone is at the point $A(-24\mathbf{i} - 10\mathbf{j})\text{ m}$ relative to a fixed point O .

After 4 seconds the stone is at the point $B(12\mathbf{i} + 5\mathbf{j})\text{ m}$ relative to the fixed point O .

The motion of the stone is modelled as that of a particle moving in a straight line at constant speed.

Using the model,

(a) prove that the stone passes through O ,

(2)

(b) calculate the speed of the stone.

(3)