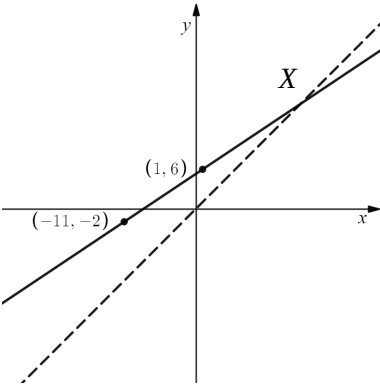


Question	Scheme	Marks	AOs
11.			
(a)	Finds distance $\sqrt{12^2 + 8^2}$	M1	1.1b
	Full attempt to find speed = $\frac{\sqrt{12^2 + 8^2}}{1.5}$	dM1	1.1b
	Speed = $\frac{8}{3}\sqrt{13}$ (kmh ⁻¹)	A1	1.1b
		(3)	
(b)	Deduces that X has position vector $(\alpha\mathbf{i} + \alpha\mathbf{j})$	B1	2.2a
	Uses the fact that the points lie in a straight line E.g. $(\alpha + 11)\mathbf{i} + (\alpha + 2)\mathbf{j} = k \times \{12\mathbf{i} + 8\mathbf{j}\}$	M1	3.1b
	Complete method to find position of X. $(\alpha + 11) = 12k, (\alpha + 2) = 8k \Rightarrow \frac{\alpha + 11}{12} = \frac{\alpha + 2}{8} \Rightarrow \alpha = \dots$	M1	2.1
	$\alpha = 16 \Rightarrow \overrightarrow{OX} = 16\mathbf{i} + 16\mathbf{j}$	A1	1.1b
		(4)	
(7 marks)			
Notes:			

(a)

M1: Attempts to find the distance (or distance ²) travelled. Must be using a difference in coordinates

dM1: Complete attempt to find the speed in kmh⁻¹

A1: $\frac{8}{3}\sqrt{13}$ (kmh⁻¹).

(b)

B1: Deduces that X has position vector $(\alpha\mathbf{i} + \alpha\mathbf{j})$ or lies on the line $y = x$

M1: Uses the fact that the points lie in a straight line.

See scheme or attempts to find the equation of the straight line through $(-11, -2)$ and $(1, 6)$

M1: Complete method to find position of X. See scheme.

Alternatively finds the simultaneous solution of their straight line $\left(y = \frac{2}{3}x + \frac{16}{3}\right)$ with the line $y = x$

A1: $\alpha = 16 \Rightarrow \overrightarrow{OX} = 16\mathbf{i} + 16\mathbf{j}$