

Question	Scheme	Marks
3(a)	$\overrightarrow{OA} = \overrightarrow{OB} - \overrightarrow{AB} = 7i + 2aj - (i + 3aj) = 6i - aj$	M1A1
	$\left  \overrightarrow{OA} \right  = \sqrt{6^2 + a^2} = 3\sqrt{5} \Rightarrow 6^2 + a^2 = 45 \Rightarrow a^2 = 9 \Rightarrow a = 3$	M1A1 [4]
(b)	$\overrightarrow{OA} = 6i - '3'j$	B1ft
	{Unit vector parallel to $\overrightarrow{OA}$ is} $\{ \pm \} \frac{1}{3\sqrt{5}} (6i - 3j)$ oe ,isw	B1 [2]
Total 6 marks		

Part	Mark	Notes
(a)	M1	For the correct vector statement with vector $\overrightarrow{OA}$ or $\overrightarrow{AO}$ e.g. $\overrightarrow{OA} = \overrightarrow{OB} - \overrightarrow{AB}$ or $\{ \overrightarrow{OA} = \} 7i + 2aj - (i + 3aj)$ oe
	A1	For the correct simplified or unsimplified vector $\overrightarrow{OA}$ or $\overrightarrow{AO}$
	M1	For using the correct Pythagoras theorem on their $\overrightarrow{OA}$ or $\overrightarrow{AO}$ with $3\sqrt{5}$ , leading to a value for $a^2$ or $a$
	A1	For the correct value of $a=3$ only (must reject $a=-3$ if present)  <b>NB:A value of <math>a=3</math> must come from a correct vector of OA with no incorrect work seen.</b>
(b)	B1ft	For the correct vector for $\overrightarrow{OA}$ or $\overrightarrow{AO}$ using their $a$ (which $a>0$ ), (Substitutes their a value to $\overrightarrow{OA} = 6i - aj$ or $\overrightarrow{AO} = -6i + aj$
	B1	Correct unit vector $\frac{1}{3\sqrt{5}} (6i - 3j)$ oe, can be in either direction, so accept + or - isw

Extra notes:

- Allow working in column vectors throughout.
- Condone missing arrow on their vectors.
- Special Case for part a:** Correct answer with minimum work, no incorrect working shown  
e.g.  $\sqrt{6^2 + a^2} = 3\sqrt{5}$  M1A1M1  $\rightarrow 6^2 + a^2 = 45 \rightarrow a^2 = 9 \rightarrow a = 3$  A1