

Question number	Scheme	Marks
6 (a)	eg $\vec{SR} = \vec{SP} + \vec{PR} = (3\mathbf{i} - 15\mathbf{j} - \mathbf{i} + 18\mathbf{j})$ $= 2\mathbf{i} + 3\mathbf{j}$ or eg $\vec{QR} = \vec{QP} + \vec{QR} = (-2\mathbf{i} - 3\mathbf{j} - \mathbf{i} + 18\mathbf{j})$ $= -3\mathbf{i} + 15\mathbf{j}$	M1 A1  M1 A1
	eg $\vec{PQ} = \vec{SR}$ or $\vec{PS} = \vec{QR}$ oe	M1
	(As opposite sides are equal in length and parallel) PQRS is a parallelogram *	A1cso [4]
(b)	$\vec{QS} = \vec{QP} + \vec{PS} = (-2\mathbf{i} - 3\mathbf{j} - 3\mathbf{i} + 15\mathbf{j})$ $= -5\mathbf{i} + 12\mathbf{j}$	M1 A1
	Unit vector = $(\pm)\frac{1}{13}(-5\mathbf{i} + 12\mathbf{j})$	M1 A1 [4]
(c)	$\vec{PT} = 2\mathbf{i} + 3\mathbf{j} + \frac{5}{13}(-5\mathbf{i} + 12\mathbf{j}) = \frac{1}{13}\mathbf{i} + \frac{99}{13}\mathbf{j}$	M1 A1 [2]
Total 10 marks		

Part	Mark	Notes
(a)	M1	For stating a correct valid vector path, e.g. $\vec{SR} = \vec{SP} + \vec{PR}$
	A1	For $\pm(2\mathbf{i} + 3\mathbf{j})$ or $\pm(-3\mathbf{i} + 15\mathbf{j})$
	M1	For a correct vector statement leading to a conclusion eg $\vec{PQ} = \vec{SR}$
	A1*cso	For some form of conclusion.
(b)	M1	For using e.g. $\vec{QS} = \vec{QP} + \vec{PS}$ or $\vec{SQ}$
	A1	For $-5\mathbf{i} + 12\mathbf{j}$
	M1	For an attempt to use Pythagoras with a plus sign, allow use of their vector $\pm \vec{QS}$
	A1	For $(\pm)\frac{1}{13}(-5\mathbf{i} + 12\mathbf{j})$ oe Must be one vector only ie can't list as $\pm$
(c)	M1	For using e.g. $\vec{PT} = \vec{PQ} + \frac{5}{13}(\text{their } \vec{QS})$
	A1	For $\frac{1}{13}\mathbf{i} + \frac{99}{13}\mathbf{j}$ oe