Q1 (AQA AS Specimen Paper 2 Q4)

4	Selects an appropriate method – **either** differentiates, at least as far as: $\frac{dy}{dx} = 2x....$ **or** commences completion of the square: $\left(x - \frac{5}{2}\right)^2 + ...$	AO1.1a	M1	$y = \left(x - \frac{5}{2}\right)^2 - \frac{25}{4} + a$ y minimised when squared bracket is 0 $\left(\frac{5}{2},\ a - \frac{25}{4}\right)$ **ALT** $\frac{dy}{dx} = 2x - 5$ so $2x - 5 = 0$ for minimum $x = \frac{5}{2}$ $y = \left(\frac{5}{2}\right)^2 - 5\left(\frac{5}{2}\right) + a = a - \frac{25}{4}$
	Fully differentiates **and** sets derivative equal to zero **or** fully completes square Allow one error	AO1.1a	M1	
	Obtains both coordinates	AO1.1b	A1	
	Total		**3**	

Q2 (AQA AS Specimen Paper 1 Q7)

Q	Marking Instructions	AO	Marks	Typical Solution
7	Explains that equal gradients implies that lines are parallel	AO2.4	E1	Parallel lines have equal gradient
	Finds the gradient of the given line CAO	AO1.1b	B1	$2x + 3y + 4 = 0 \Rightarrow y = -\frac{2}{3}x - \frac{4}{3}$ So gradient is $-\frac{2}{3}$
	Finds the gradient of the line through the 2 given points CAO	AO1.1b	B1	Gradient of line through (9, 4) and (3, 8) is $\frac{8-4}{3-9} = -\frac{2}{3}$
	Deduces that the two lines are parallel	AO2.2a	R1	So line with equation $2x + 3y + 4 = 0$ is parallel to the line joining the points with coordinates (9, 4) and (3, 8) as both have gradient $-\frac{2}{3}$
	Total		**4**	

Q3 (OCR JUNE 2018 AS PAPER 1 Q7)

Question			Answer	Mks	AO	Guidance	
7	(i)	(b)	$\mathbf{a} + \frac{1}{2}(\mathbf{c} - \mathbf{a})$ or $\mathbf{c} + \frac{1}{2}(\mathbf{a} - \mathbf{c})$	M1	3.1a	$\mathbf{a} + \frac{1}{2}$ their (a) or $\mathbf{c} - \frac{1}{2}$ their (a)	
			$= \frac{1}{2}(\mathbf{a} + \mathbf{c})$ or $\frac{1}{2}\mathbf{a} + \frac{1}{2}\mathbf{c}$	A1	1.1b	Correct ans without wking: M1A1	
				[2]			
	(ii)		$\overrightarrow{OB} = (\mathbf{a} + \mathbf{c})$	M1	3.1a	$\overrightarrow{PB} = \mathbf{a} + \frac{1}{2}(\mathbf{c} - \mathbf{a})$ or $\mathbf{a} + \frac{1}{2}$ their (i)(a) or $\mathbf{c} + \frac{1}{2}(\mathbf{a} - \mathbf{c})$ (= $\frac{1}{2}$(a+c) oe), ft their (i)(a) NB $\overrightarrow{PB} = \frac{1}{2}(\mathbf{a} + \mathbf{c})$ without justification: M0A0A0E0	or $\overrightarrow{PB} = \mathbf{c} - \frac{1}{2}$ their (i)(a)
			$\Rightarrow \overrightarrow{OP} = \frac{1}{2}\overrightarrow{OB}$ Must see previous line	A1*	1.1	$\Rightarrow \overrightarrow{PB} = \overrightarrow{OP}$	or similar with $\overrightarrow{BP}$ or $\overrightarrow{BO}$
			$\Rightarrow$ *P* is midpt of *OB* or *OPB* is a straight line and *OP* = *PB*	dep* A1	2.1		
			Hence diagonals of //m bisect one another	E1	2.2a	dep M1A1A1	
				[4]			

Q4 (OCR AS PRACTICE PAPER 1 Q7)

Question			Answer	Marks	AO	Guidance	
7	(i)	(a)	$\lvert\overrightarrow{OB}\rvert = \sqrt{1^2 + 2^2}$	M1	1.2		
			Mag = $\sqrt{5}$ or 2.24 (3 sf)	A1	1.1		
				[2]			
		(b)	Direction (= $\tan^{-1}(0.5)$) = 27°	M1	1.1a		
			& (180° + 27° or $\tan^{-1}(-0.5)$) = 207°	A1f	1.1	ft their 27°	
				[2]			
7	(ii)		For max & min *OC*, *C* lies on *OA*	M1	2.1	May be implied, eg by diagram	
			OC = *OA* ± 2	M1	3.1a	Their *OA* (from (i)) ± 2	
			Max *OC* = $\sqrt{5} + 2$ or 4.24 (3 sf)	A1	2.2a		
			Min *OC* = $\sqrt{5} - 2$ or 0.236 (3 sf)	A1	1.1		
				[4]			