Vectors Past Paper Answers GCSE Edexcel – Non Calculator

1.

3 : 4	P1	starts process eg $\overrightarrow{AB}$ = **b** – **a** oe	
	P1	for process to find $\overrightarrow{OM}$ = **a** + $\frac{1}{2}$ "(**b** – **a**)"oe (= $\frac{1}{2}$(**a** + **b**))	
	P1	for process to find $\overrightarrow{AP}$ = –**a** + $\frac{3}{5}$ "($\frac{1}{2}$**a** + $\frac{1}{2}$**b**)" oe **or** (indep) for $\overrightarrow{AN}$ = –**a** + "k"**b**	
	P1	process to find "k" using $\overrightarrow{AN}$ = –**a** + "k"**b** as a multiple of $\overrightarrow{AP}$	
	A1	cao	
	P1 P1 P1 P1 A1	**ALTERNATIVE** for producing OM to C such that AC is parallel to OB for process to show that MC = OM, using congruent triangles ACM and BOM for process to find PC as a multiple of OM/5 (= 7OM/5) for process to find ON as a multiple of AC(OB) (= 3OB/7) using similar triangles ACP and NOP cao	Formal geometric reasoning relating to congruent and similar triangles is not required

2.

on	Answer	Mark	Mark scheme	Additional guidance
(a)	Diagram	B1	for correct vector drawn including arrow	May be drawn anywhere on the grid. Condone missing label
(b)	$\binom{3}{-4}$	M1	for **a** + 2**b** drawn with resultant vector **or** for writing **a** and **b** as column vectors **and** attempt to add **a** + 2**b** , eg $\binom{1}{2}$ + 2 ×$\binom{1}{-3}$ **or** $\binom{1+2}{c}$ **or** $\binom{d}{2+-6}$ **or** $\binom{-4}{3}$	Accept consistent incorrect notation for M1
		A1	cao	

3.

Answer	Mark	Notes
$\frac{2}{5}$	P1	for process to find $\overrightarrow{AB}$ (= **b** – **a**) or $\overrightarrow{BA}$ (= **a** – **b**)
	P1	for process to find $\overrightarrow{MN}$ (= $-\frac{1}{2}$**b** + **a** + 2**a**) or $\overrightarrow{PN}$ (= –k(**b** – **a**) + 2**a**) or $\overrightarrow{MP}$ (= $-\frac{1}{2}$**b** + **a** + k(**b** – **a**) or $\frac{1}{2}$**b** + (1 – k)(**a** – **b**))
	P1	for process to find two of $\overrightarrow{MN}$, $\overrightarrow{PN}$ and $\overrightarrow{MP}$
	P1	for process to find k, using $\overrightarrow{MN}$ as a multiple of $\overrightarrow{PN}$ or using $\overrightarrow{MN}$ as a multiple of $\overrightarrow{MP}$ or using $\overrightarrow{PN}$ as a multiple of $\overrightarrow{MP}$
	A1	for $\frac{2}{5}$ oe

4.

Answer	Mark	Notes
$\dfrac{2}{5}$	P1	for first step to solve the problem e.g. $\overrightarrow{AC} = -\mathbf{a} + \mathbf{c}$ or $\overrightarrow{OX} = \dfrac{1}{2}\mathbf{a} + \dfrac{1}{2}\mathbf{c}$ or demonstrates the location of D and X on the diagram
	P1	for a correct vector statement using $\overrightarrow{CD}$ eg $\overrightarrow{CD} = \overrightarrow{CX} + \overrightarrow{XD}$ or $\overrightarrow{CD} = \overrightarrow{OD} - \overrightarrow{OC}$ or $\overrightarrow{OD} = \dfrac{7}{2}\mathbf{c}$ or $\overrightarrow{CD} = 2.5\mathbf{c}$ oe
	P1	for a correct equation or ratio using k eg equating $\overrightarrow{XD} = 3\mathbf{c} - \dfrac{1}{2}\mathbf{a} = \dfrac{1}{2}(-\mathbf{a} + \mathbf{c}) + \dfrac{1}{k}\mathbf{c}$ or $\dfrac{\overrightarrow{OD}}{\overrightarrow{OC}} = \dfrac{k+1}{k}$ or $k = \dfrac{1}{2.5}$ or using a ratio approach eg $(\overrightarrow{OC} : \overrightarrow{CD}) = k : 1 = 1 : 2.5$
	A1	cao

5.

$\dfrac{1}{4}$	P1	starts process eg $\overrightarrow{AB} = 2\mathbf{b} - 2\mathbf{a}$	
	P1	process to find $\overrightarrow{AP}$ or $\overrightarrow{BP}$	
	P1	complete process to find $\overrightarrow{OP}$	
	A1	for $\dfrac{1}{4}$ oe	

6.

	Notes
M1	states AB as $6\mathbf{b} - 3\mathbf{a}$
M1	for $AX = \tfrac{1}{3}AB$ or $\tfrac{1}{3}$"$(6\mathbf{b} - 3\mathbf{a})$" or ft to $2\mathbf{b} - \mathbf{a}$
M1	for $\overrightarrow{CY} = \overrightarrow{CB} + \overrightarrow{BY}$ or $6\mathbf{b} + 5\mathbf{a} - \mathbf{b}$ $(=5\mathbf{b} + 5\mathbf{a})$
M1	for $\overrightarrow{CX} = 3\mathbf{a} + "2\mathbf{b} - \mathbf{a}"$ or $\overrightarrow{CX} = 6\mathbf{b} - \tfrac{2}{3}"(6\mathbf{b} - 3\mathbf{a})"$ $(= 2\mathbf{a} + 2\mathbf{b})$
C1	for $\dfrac{2}{5}\overrightarrow{CY} = \dfrac{2}{5}(5\mathbf{a} + 5\mathbf{b}) = 2(\mathbf{a} + \mathbf{b}) = \overrightarrow{CX}$

7.

Working	Answer	Notes	
$\overrightarrow{OM}$ = **3a** $\overrightarrow{AB}$ = 6**b** − 6**a** $\overrightarrow{MC}$ = 3**a** + 2(6**b** − 6**a**) $\quad$ = 12**b** − 9**a** $\quad$ = 3(4**b** -3**a**) $\overrightarrow{MN}$ = k**b** −3**a** MNC is a straight line so $\overrightarrow{MC}$ is a scalar multiple of $\overrightarrow{MN}$	4	P1	For process to start e.g. $\overrightarrow{OM}$ = 3a **or** $\overrightarrow{MA}$ = **3a**
		P1	For process to find $\overrightarrow{AB}$ (=6**b** − 6**a**)
		P1	For process to find $\overrightarrow{MC}$ (=3**a** + 2(6**b** − 6**a**) **and** $\overrightarrow{MN}$ (= k**b** −3**a**)
		P1	For correct process to find k e.g. 3kb - 9a = 12b - 9a
		A1	