Pearson Edexcel

Mark Scheme (Results)

January 2023

Pearson Edexcel International GCSE
In Mathematics A (4MA1) Paper 1H

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme.
  Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

- **Types of mark**
  - M marks: method marks
  - A marks: accuracy marks
  - B marks: unconditional accuracy marks (independent of M marks)
- **Abbreviations**
  - cao – correct answer only
  - ft – follow through
  - isw – ignore subsequent working
  - SC - special case
  - oe – or equivalent (and appropriate)

- dep – dependent
- indep – independent
- awrt – answer which rounds to
- eeoo – each error or omission

- **No working**

  If no working is shown then correct answers normally score full marks

  If no working is shown then incorrect (even though nearly correct) answers score no marks.
- **With working**

  If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

  If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.

  If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown.

  If there is no answer on the answer line then check the working for an obvious answer.
- **Ignoring subsequent work**

  It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.

  It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.

  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.
- **Parts of questions**

  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another.

International GCSE Maths				
Apart from Questions 2, 3, 13, 19, 22, 23 and 24 (where the mark scheme states otherwise), the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.				
Q	**Working**	**Answer**	**Mark**	**Notes**
1	$6 \times 11 + 18 \times 25 + 30 \times 23 + 42 \times 15 + 54 \times 6$ (= 2160) **or** 66 + 450 + 690 + 630 + 324 (= 2160) [lower bound products are: 0, 300, 552, 540, 288] [upper bound products are: 132, 600, 828, 720, 360]		4	M2 for at least **4** correct products added (need not be evaluated) **or** If not M2 then award: M1 for consistent use of value within interval (including end points) for at least **4** products which must be added or correct midpoints used for at least **4** products and not added
	"2160" ÷ "80"			M1 dep on at least M1 Allow division by their Σf provided addition or total under column seen
	Correct answer scores full marks (unless from obvious incorrect working)	27		A1
				Total 4 marks

2	$6-12x$ or $2-4x=\frac{5}{3}-\frac{8}{3}x$		3	M1 for expansion of bracket on the LHS or dividing the RHS by 3 with two terms
	$6-5=12x-8x$ or $1 = 4x$ or $-12x+8x=5-6$ oe or $–4x = –1$ or $\frac{8}{3}x-4x=\frac{5}{3}-2$ oe or $2-\frac{5}{3}=-\frac{8}{3}x+4x$ oe			M1 ft (dep on 4 terms) for terms in x on one side of equation; number terms on the other
	Working required	$\frac{1}{4}$		A1 oe dep on M1 awarded
				Total 3 marks

3	**Two pairs** of intersecting arcs with equal radii centre A and B		2	M1 for arcs that intersect within or on the guidelines **or** correct perpendicular bisector without arcs.
	Working required	Bisector with construction arcs		A1 for a fully correct bisector with two intersecting arcs
				Total 2 marks

4	3 × 180 (= 540) or 360 – [(180 – 90) + (180 – 135) + (180 – 67) + (180 – 119)] (= 51) or 360 – (90 + 45 + 113 + 61) (= 51)		3	M1
	90 + 135 + 67 + 119 + x = “540” oe 411 + x = “540” oe or “540” – (90 + 135 + 67 + 119) or 3 × 180 – (90 + 135 + 67 + 119) oe or 540 – 411 or 180 – “51” oe			M1
	Correct answer scores full marks (unless from obvious incorrect working)	129		A1
				Total 3 marks

5	2 : 3 : 15 oe or 20 or (1 : 5) × 3 or (1 : 5 =) 3 : 15 or 2n : 3n : 15n e.g. 4 : 6 : 30 or G(reen) = 2, O(range) = 3 , Y(ellow) = 15		3	M1
	$\frac{2}{"20"}$ ′ 280 oe or 14 × 2 or $\frac{2}{"2"+"3"+"15"}$ ′ 280 oe or $\frac{2n}{"2n"+"3n"+"15n"}$ ′ 280 oe			M1
	Correct answer scores full marks (unless from obvious incorrect working)	28		A1 or 28 : 42 : 210 or 28 , 42 , 210 If not in this order must be labelled correctly
				Total 3 marks

6	(a)	18 000 + 14 × 1160 (= 34 240) oe or 18 000 + 16 240 (= 34 240)		4	M1
		“34 240” – 32 000 (= 2240) or $\frac{\text{"34 240"}}{32\,000}$ (= 1.07)			M1
		$\frac{\text{"2240"}}{32\,000}(\times 100)$ or $\frac{\text{"34 240"}}{32\,000}\times 100$ (= 107) or “1.07” – 1 (= 0.07)			M1
		Correct answer scores full marks (unless from obvious incorrect working)	7		A1
	(b)	e.g. 1 − 0.15 (= 0.85) or 100(%) − 15(%) (= 85(%))		3	M1
		e.g. 39 865 ÷ 0.85 or 39 865 ÷ 85 × 100 oe			M1
		Correct answer scores full marks (unless from obvious incorrect working)	46 900		A1
					Total 7 marks

7	1 – (0.24 + 0.4) (= 0.36) oe or 3x + x = 1 – (0.24 + 0.4) oe		4	M1
	48 ÷ 0.24 (= 200) or “0.36” ÷ 4 (= 0.09) or “0.36” ÷ 4 × 3 (= 0.27)			M1
	“0.27” × “200” or “200” × “0.36” ÷ 4 × 3 (“200” – 48 – “80”) ÷ 4 × 3			M1 for a complete method
		54		A1
				Total 4 marks

7 **ALT**	1 – (0.24 + 0.4) (= 0.36) oe or 3x + x = 1 – (0.24 + 0.4) oe		4	M1
	48 ÷ 24 (= 2) oe or $\left(\frac{"0.36"}{4}\times 3\right)\div 0.24\left(=\frac{9}{8}=1.125\right)$ oe or $\left(\frac{"36"}{4}\times 3\right)\div 24\left(=\frac{9}{8}=1.125\right)$ oe			M1
	$"2"\times\left(\frac{"36"}{4}\times 3\right)$ oe or $"\frac{9}{8}"\times 48$ oe or $("27"\div 24)\times 48$ oe			M1 for a complete method
	Correct answer scores full marks (unless from obvious incorrect working)	54		A1
				Total 4 marks

8	$\cos 50 = \frac{18}{(AB)}$ or $\sin 40 = \frac{18}{(AB)}$ or $\frac{(AB)}{\sin 90} = \frac{18}{\sin 40}$		5	M1	M2 for $(AB =)\sqrt{18^2 + (18\tan 50)^2}$ oe (= 28.0030…) or 28
	$(AB =)\frac{18}{\cos 50}(= 28.0030...)$ oe or 28 or $(AB =)\frac{18}{\sin 40}(= 28.0030...)$ oe or 28			M1	
	$\frac{1}{2} \times \pi \times$"28.0030..."$(= 43.9...)$ oe or 44 $\pi \times$"28.0030..."$(= 87.9...)$ oe or 88			M1 for use of πd or $\frac{1}{2}\pi$d oe Allow any value of AB > 18 if M2 not scored	
	"28…" + "43.9…" (= 71.9900…) or "28" + "44"			M1ft from previous M1 Allow their d + their $\frac{1}{2}\pi$d	
	Correct answer scores full marks (unless from obvious incorrect working)	72		A1 awrt 72	
				Total 5 marks	

9	(a)		0.000 625	1	B1
	(b)	25 000 000 oe e.g. 25×10^6 or 0.25×10^8 **or** 2.5×10^n $n \neq 7$		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	2.5×10^7		A1
					Total 3 marks

10	(a)	$(y \pm 6)(y \pm 8)$ or $y(y+6)-8(y+6)$ or $y(y-8)+6(y-8)$		2	M1 or for $(y \pm a)(y \pm b)$ where $ab = -48$ or $a + b = -2$
			$(y+6)(y-8)$		A1 oe Allow any letter for y
	(b)		$x \leq 3$	1	B1 allow $3 \geq x$ Allow any letter for x
	(c)	$6-14 > 12w-7w$ oe or $7w-12w > 14-6$ oe		3	M1 Condone = rather than > or any other sign for this mark.
		$-8 > 5w$ or $-5w > 8$ or $-w > \frac{8}{5}$ or $w > -\frac{8}{5}$ or $w = -\frac{8}{5}$ oe			M1 Condone = rather than > or any other sign for this mark.
		Correct answer scores full marks (unless from obvious incorrect working)	$w < -\frac{8}{5}$		A1 oe accept $-\frac{8}{5} > w$ Must have correct sign on answer line dep on M1 (sight of correct answer in working space and just $(w =) -\frac{8}{5}$ oe on answer line gains M2 only)
					Total 6 marks

11		$2x+y\le 6$ $2y\le 5x+1$ $3y+2x\ge 4$	3	B3 oe for all three correct (B2 oe for any two correct) (B1 oe for any one correct) $2x+y\le 6$ equivalent to $y\le -2x+6$ oe $2y\le 5x+1$ equivalent to $y\le 2.5x+0.5$ oe $3y+2x\ge 4$ equivalent to $y\ge -\frac{2}{3}x+\frac{4}{3}$ oe Allow the following inequalities $2x+y<6$ oe $2y<5x+1$ oe $3y+2x>4$ oe
				Total 3 marks

12	(a)		$\frac{9}{10}$	1	B1 oe
	(b)		-6	1	B1
					Total 2 marks

13	$3x(2x-5)=6x^2-15x$ **or**		3	M1 for multiplying $3x$ by $(2x-5)$ with **both** terms correct or
	$(2x-5)^2=4x^2-10x-10x+25$ **or**			for multiplying $(2x-5)$ by $(2x-5)$ with 3 out of 4 terms correct or
	$(2x-5)^2=4x^2-20x+25$			for multiplying $(2x-5)$ by $(2x-5)$ and getting $4x^2-20x\ldots$ **or** $\ldots -20x+25$ (not for $4x^2+25$)
	$(6x^2-15x)(2x-5)=12x^3-30x^2-30x^2+75x$ oe **or**			M1ft (dep) for multiplying the product of $3x$ and $(2x-5)$ by $(2x-5)$ with 3 out of 4 terms correct or
	$(6x^2-15x)(2x-5)=12x^3-60x^2+75x$ oe **or**			for multiplying the product of $3x$ and $(2x-5)$ by $(2x-5)$ and getting $12x^3-60x^2\ldots$ **or** $\ldots -60x^2+75x$
	$3x(4x^2-10x-10x+25)=12x^3-30x^2-30x^2+75x$ oe **or**			for multiplying the product of $(2x-5)$ and $(2x-5)$ by $3x$ with 3 out of 4 terms correct or
	$3x(4x^2-20x+25)=12x^3-60x^2+75x$			for multiplying the product of $(2x-5)$ and $(2x-5)$ by $3x$ with 2 out of 3 terms correct or
				Expansion in one stage will lead to $12x^3-30x^2-30x^2+75x$ without firstly expanding two factors – award M2 for 3 out of 4 terms correct M1 for 2 out of 4 terms correct
	Working required	$12x^3-60x^2+75x$		A1 dep on M1
				Total 3 marks

14	(a)		12 and 4.5	1	B1 allow $\frac{9}{2}$ oe May be awarded if plotted correctly on the graph
	(b)		Correct graph	2	M1 ft for at least 5 points plotted correctly (± half square)
		Correct answer scores full marks (unless from obvious incorrect working)			A1 for correct curve between x = 0.5 and x = 5 (clear intention to go through all the points and which must be curved) **Note**: If a fully correct graph is shown, but an incomplete table is shown in (a), then award the marks for (a)
					Total 3 marks

15	(a)		$\frac{2}{9}, \frac{7}{9}$	2	B1 for correct probabilities for the first card Allow equivalent probabilities e.g $0.\dot{2}$
			$\frac{1}{8}, \frac{7}{8}, \frac{2}{8}, \frac{6}{8}$		B1 for correct probabilities for the second card Allow equivalent probabilities
	(b)	"$\frac{2}{9}$"×"$\frac{1}{8}$" or 1 – "$\frac{2}{9}$"×"$\frac{7}{8}$" – "$\frac{7}{9}$"×"$\frac{2}{8}$"– "$\frac{7}{9}$"×"$\frac{6}{8}$"		2	M1ft (All probabilities must be less than 1)
		Correct answer scores full marks (unless from obvious incorrect working)	$\frac{1}{36}$		A1ft oe probability must be less than 1 Allow equivalent decimal to at least 2 sf (truncated or rounded) for $\frac{1}{36}$ (= 0.027(77..))
	(c)	"$\frac{2}{9}$"×"$\frac{7}{8}$" or "$\frac{7}{9}$"×"$\frac{2}{8}$"oe or "$\frac{2}{9}$"×"$\frac{1}{8}$"**and** "$\frac{7}{9}$"×"$\frac{6}{8}$"oe or "$\frac{1}{36}$"**and** "$\frac{7}{9}$"×"$\frac{6}{8}$"oe		3	M1ft (All probabilities must be less than 1)
		"$\frac{2}{9}$"×"$\frac{7}{8}$"+"$\frac{7}{9}$"×"$\frac{2}{8}$" or $2\times\frac{14}{72}$ oe or 1 – "$\frac{2}{9}$"×"$\frac{1}{8}$"– "$\frac{7}{9}$"×"$\frac{6}{8}$" oe or 1 – "$\frac{1}{36}$"– "$\frac{7}{9}$"×"$\frac{6}{8}$" oe			M1ft

	Correct answer scores full marks (unless from obvious incorrect working)	$\frac{7}{18}$		A1ft oe probability must be less than 1 Allow equivalent decimal to at least 2 sf (truncated or rounded) for $\frac{7}{18}$ (= 0.38(88..))
				Total 7 marks

16	$\frac{\sin ABC}{24} = \frac{\sin 64}{31}$ oe		5	M1
	$(ABC =)\sin^{-1}\left(\frac{24\times\sin 64}{31}\right)(=44.\ldots)$			M1
	180 – "44.…" – 64 (= 71.9…)			M1 accept 72
	$(DE^2 =)16^2+19^2-2\times16\times19\times\cos"71.9..."$ or $(DE =)\sqrt{16^2+19^2-2\times16\times19\times\cos"71.9..."}$ or $(DE =)\sqrt{617-181.8...}$ or $\sqrt{428.166...}$			M1 for DE^2 or DE
	Correct answer scores full marks (unless from obvious incorrect working)	20.7		A1 awrt 20.7
				Total 5 marks

17	$y = \frac{k}{\sqrt{x}}$ or $ky = \frac{1}{\sqrt{x}}$ or $\sqrt{x} = \frac{k}{y}$ oe		3	M1 (NB. Not for $y = \frac{1}{\sqrt{x}}$) Constant of proportionality must be a symbol such as k (Allow c for k for this mark only)	M2 for $c^4 = \frac{k}{\sqrt{c^2}}$ oe
	$c^4 = \frac{k}{\sqrt{c^2}}$ oe or $k = c^4 \times \sqrt{c^2}$ oe			M1 for substitution of x and y into a correct formula	
	Correct answer scores full marks (unless from obvious incorrect working)	$y = \frac{c^5}{\sqrt{x}}$		A1 oe e.g $y = c^5 \times \frac{1}{\sqrt{x}}$ Award 3 marks if answer is $y = \frac{k}{\sqrt{x}}$ on the answer line and $k = c^5$ clearly given in the body of working of the script	
					Total 3 marks

18	(a)		$\frac{k}{x}$	1	B1 allow kx^{-1}
	(b)(i)		-46	1	B1 cao
	(ii)	$\frac{3(2-3x^4)}{2-(2-3x^4)}$ or $\frac{6-9x^4}{2-2+3x^4}$ oe or $\frac{6-9x^4}{3x^4}$ oe		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	$\frac{2-3x^4}{x^4}$		A1 allow $\frac{2}{x^4} - 3$ oe
					Total 4 marks

19	45.225 or 45.235 or 5.115 or 5.125 or 8.45 or 8.55		5	B2 for all 6 correct (B1 for 4 or 5 correct) Accept $45.234\dot{9}$ for 45.235 $5.124\dot{9}$ for 5.125 $8.54\dot{9}$ for 8.55
	$\frac{45.235-5.115}{8.45}$ (= 4.7479…)			M1 for correct substitution into the UB $a=\frac{v-u}{t}$ where $45.23 < v_{(UB)} \leq 45.235$ $5.115 \leq u_{(LB)} < 5.12$ $8.45 \leq t_{(LB)} < 8.5$
	$\frac{45.225-5.125}{8.55}$ (= 4.6900…)			M1 for correct substitution into the LB $a=\frac{v-u}{t}$ where $45.225 \leq v_{(LB)} < 45.23$ $5.12 < u_{(UB)} \leq 5.125$ $8.5 < t_{(UB)} \leq 8.55$
	Working required	4.7 and correct reason		A1 dep on M2 4.7 and both answers round to 4.7 oe e.g.1 dp or 2 sf
				Total 5 marks

20	$(V=)\pi x^2\left(\frac{800}{\pi x}-x\right)$ or $800x-\pi x^3$ oe		5	M1 for volume of cylinder (in terms of one variable, e.g. x or r)
	$\left(\frac{dV}{dx}=\right)800-3\pi x^2$			M1ft for differentiating an expression in one variable to find 800 **or** $\pm 3\pi x^2$ (must come from a cubic in the form $800x\pm\pi x^3$ or $800x\pm ax^3$ or $bx\pm\pi x^3$ where $a\neq 0$ and $b\neq 0$)
	"$800-3\pi x^2$" $=0$			M1ft dep on previous M1 for equating their $\frac{dV}{dx}$ to zero (must be a quadratic in the form $800\pm ax^2$ or $b\pm 3\pi x^2$ where $a\neq 0$ and $b\neq 0$)
	$(x=)\sqrt{\frac{800}{3\pi}}\left(=\sqrt{84.8(8263...)}\right)$ or $\frac{\sqrt{9600\pi}}{6\pi}$ or 9.2(13177…)			A1 for a correct value of x Allow use of quadratic formula
	Award marks within the range from correct working	4914		A1 accept 4910 – 4914
				Total 5 marks

21	$\pi \times 4.8^2 \times \frac{72}{360}$ (= 14.4(76…)) oe		5	M1 for finding the area of the sector
	$\frac{1}{2} \times 4.8^2 \times \sin 72$ (= 10.9(56…) or 11) oe or $\frac{1}{2} \times 5.6(4...) \times 3.8(8...)$ oe			M1 for finding the area of the triangle (Allow use of cosine rule/sine rule/SOHCAHTOA/Pythagoras to find AC (5.6(427.8…)) and OM (3.8(8328…)) where M is the midpoint of AC)
	"14.4(76…)" – "10.9(56…)" (= 3.520…)			M1 for finding the shaded area with all figures from correct working
	"3.5(20…)" × 14 × 3 × 60 "3.5(20…)" × 2520			M1
	Award marks within the range from correct working	8870		A1 accept 8820 – 8950 from correct working
				Total 5 marks

22	$2t+1+(n-1)3=14t-5$		4	M1 for the use of nth term = a + (n – 1)d to find n
	$(n=)\,4t-1$ or $(n=)\,-1+4t$			A1
	$(S_n=)\frac{"4t-1"}{2}\left[2(2t+1)+("4t-1"-1)3\right]$ or $(S_n=)\frac{"4t-1"}{2}\left[2t+1+14t-5\right]$ oe			M1 for the use of S_n formula (must be in terms of t) Allow their expression for n dep on M1
	Working required	p = 2 q = 4 r = 2		A1 dep on M2 allow $(S_n=)\,2(4t-1)^2$ Values of p, q and r must come from correct working
				Total 4 marks

23	$y = \frac{3}{5}x\left(+\frac{6}{5}\right)$ or $y = 0.6x(+1.2)$ **or** (gradient =) $\frac{3}{5}$ or 0.6 oe		6	M1 for correct gradient which may be seen in an equation. Condone $\frac{3}{5}x$ or 0.6x
	$k = -2$			B1 for $k = -2$
	$\left(\frac{"-2"+8}{2}, \frac{1+7}{2}\right)$ oe or (3, 4)			M1 for finding the midpoint (use of their k where $k < 0$)
	$"\frac{3}{5}"m = -1$ **or** $(m =)"-\frac{5}{3}"$			M1ft their gradient for use of $m_1 \times m_2 = -1$ Allow $-\frac{5}{3} = -1.67$ or better
	$"4" = "-\frac{5}{3}" \times "3" + c$ or c = 9 or $y - "4" = "-\frac{5}{3}"(x - "3")$			M1 dep on M3
	Working required	5x + 3y = 27		A1 allow equation in any form where p, q and r are integers
				Total 6 marks

24	e.g. $\left(\overrightarrow{AB}=\right)2\mathbf{b}-2\mathbf{a}$ oe or $\left(\overrightarrow{BA}=\right)2\mathbf{a}-2\mathbf{b}$ oe or $\left(\overrightarrow{BD}=\right)2(2\mathbf{b}-2\mathbf{a})(=4\mathbf{b}-4\mathbf{a})$ oe or $\left(\overrightarrow{AD}=\right)3(2\mathbf{b}-2\mathbf{a})(=6\mathbf{b}-6\mathbf{a})$ oe		5	M1
	e.g. $\left(\overrightarrow{OE}=\right)2\mathbf{b}+2(2\mathbf{b}-2\mathbf{a})+7\mathbf{a}+3\mathbf{b}\ (=3\mathbf{a}+9\mathbf{b})$ oe or $\left(\overrightarrow{OC}=\right)2\mathbf{a}+\lambda(2\mathbf{b}-2\mathbf{a})=(2-2\lambda)\mathbf{a}+2\lambda\mathbf{b}$ oe **or** $2\mathbf{b}+\lambda(2\mathbf{a}-2\mathbf{b})$ or $\left(\overrightarrow{CE}=\right)(2\mathbf{b}-2\mathbf{a})-\lambda(2\mathbf{b}-2\mathbf{a})+2(2\mathbf{b}-2\mathbf{a})+7\mathbf{a}+3\mathbf{b}=(1+2\lambda)\mathbf{a}+(9-2\lambda)\mathbf{b}$			M2 for 2 correct paths seen M1 for 1 correct path seen Any correct path for OC passing through A or B involving a variable
	e.g. $\frac{2-2\lambda}{2\lambda}=\frac{1+2\lambda}{9-2\lambda}$ oe or $\frac{2-2\lambda}{2\lambda}=\frac{3}{9}$ oe or $\frac{(1+2\lambda)}{(9-2\lambda)}=\frac{1}{3}$ oe or $\lambda=\frac{3}{4}$ or $(2-2\lambda)\mathbf{a}+2\lambda\mathbf{b}=\mu(3\mathbf{a}+9\mathbf{b})$ or $\lambda=\frac{3}{4}$ or $\mu=\frac{1}{6}$ or $2\mathbf{b}+\lambda(2\mathbf{a}-2\mathbf{b})=\mu(3\mathbf{a}+9\mathbf{b})$ or $\lambda=\frac{1}{4}$ or $\mu=\frac{5}{6}$			M1 for comparing coefficients of **a** and **b** for (OC and CE) **or** **(**OC and OE) **or** (CE and OE) OC is a multiple of OE Two different paths for OC
		1 : 5		A1 dep M2 oe e.g 2 : 10
	Working required			**Total 5 marks**

24 ALT	e.g. $\left(\overrightarrow{AB}=\right)2\mathbf{b}-2\mathbf{a}$ oe or $\left(\overrightarrow{BA}=\right)2\mathbf{a}-2\mathbf{b}$ oe or $\left(\overrightarrow{BD}=\right)2\left(2\mathbf{b}-2\mathbf{a}\right)\left(=4\mathbf{b}-4\mathbf{a}\right)$ oe or $\left(\overrightarrow{AD}=\right)3\left(2\mathbf{b}-2\mathbf{a}\right)\left(=6\mathbf{b}-6\mathbf{a}\right)$ oe		5	M1
	e.g. $\left(\overrightarrow{OE}=\right)2\mathbf{b}+2\left(2\mathbf{b}-2\mathbf{a}\right)+7\mathbf{a}+3\mathbf{b}\ \left(=3\mathbf{a}+9\mathbf{b}\right)$ oe			M1
	e.g. $\left(\overrightarrow{AE}=\right)2\mathbf{b}-2\mathbf{a}+2\left(2\mathbf{b}-2\mathbf{a}\right)+7\mathbf{a}+3\mathbf{b}\left(=\mathbf{a}+9\mathbf{b}\right)$ oe			M1
	$\left[\overrightarrow{AE}=\lambda\overrightarrow{AD}+\mu\overrightarrow{OE}\right]$ $\mathbf{a}+9\mathbf{b}=\lambda\left(6\mathbf{b}-6\mathbf{a}\right)+\mu\left(3\mathbf{a}+9\mathbf{b}\right)$ oe or $1=-6\lambda+3\mu$ oe and $9=6\lambda+9\mu$ oe or or $\lambda=\frac{1}{4}$ or $\mu=\frac{5}{6}$			M1
		1 : 5		A1 dep on M2 oe e.g 2 : 10
	Working required			**Total 5 marks**

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