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Mark Scheme (Results)

Summer 2012

GCSE Mathematics (Linear) 1MA0
Higher (Calculator) Paper 2H

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 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.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labelling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 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: e.g. 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 e.g. algebra.

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

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions

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

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
1		180 – 47	133	3	M1 for 180 – 47 A1 for 133 C1(dep on M1) for full reasons e.g. angles on a straight line add up to 180^o **and** alternate angles are equal **OR** corresponding angles are equal **and** angles on a straight line add up to 180^o **OR** vertically opposite angles (or vertically opposite angles) are equal **and** allied angles (or co-interior angles) add up to 180^o
2	(a)	$\frac{546.7}{12.5} =$	43.736	2	B2 for 43.736 (B1 for 546.7 **or** $\frac{5467}{10}$ **or** $\frac{5467}{125}$ **or** 12.5 **or** $\frac{25}{2}$ or 43.7 **or** 43.8 **or** 43.73 **or** 43.74 **or** 40 **or** 44)
	(b)		40	1	B1 for 40 **or** ft from their answer to (a) provided (a) is written to 2 or more significant figures

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
3	(a)		reasons	2	1st aspect : time frame 2nd aspect : overlapping boxes 3rd aspect : not exhaustive (eg. no box for more than 4) B2 any two aspects (B1 any one aspect)
	(b)		How much time do you spend playing sport each week/month None 1 hr to 2 hrs 3 hrs to 5 hrs More than 5 hrs	2	B1 for a suitable question which includes a time frame and unit (the time frame and unit could appear with the response boxes) B1 for at least 3 non-overlapping response boxes (need not be exhaustive) or at least 3 response boxes exhaustive for all integer values of their time unit (could be overlapping). [Do not allow inequalities in response boxes]

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
4		<table><tr><td>x</td><td>–1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>y</td><td>–5</td><td>–2</td><td>1</td><td>4</td><td>7</td></tr></table> **OR** Using $y = mx + c$ gradient = 3 y intercept = –2	Straight line from (–1, –5) to (3, 7)	3	**(Table of values)** M1 for at least 2 correct attempts to find points by substituting values of x. M1 ft for plotting at least 2 of their points (any points plotted from their table must be correctly plotted) A1 for correct line between –1 and 3 **(No table of values)** M2 for at least 2 correct points (and no incorrect points) plotted **OR** line segment of $y = 3x–2$ drawn (ignore any additional incorrect segments) (M1 for at least 3 correct points plotted with no more than 2 incorrect points) A1 for correct line between –1 and 3 **(Use of $y = mx+c$)** M2 for line segment of $y = 3x – 2$ drawn (ignore any additional incorrect segments) (M1 for line drawn with gradient of 3 OR line drawn with a y intercept of –2 and a positive gradient) A1 for correct line between –1 and 3

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
5		$(17 – 2.8) \times 9.5 = 134.9$ $\pi \times (3.8 \div 2)^2 = 11.34...$ $134.9 – 2 \times 11.34... = 112.21$ $112.21 \div 25 = 4.488$	5	5	M1 for $(17 – 2.8) \times 9.5$ (=134.9) or $17 \times 9.5 – 2.8 \times 9.5$ (= 161.5 – 26.6 = 134.9) M1 for $\pi \times (3.8 \div 2)^2$ (= 11.33 – 11.35) M1 (dep on M1) for '134.9' – 2 × '11.34' A1 for 112 - 113 C1(dep on at least M1) for 'He needs 5 boxes' ft from candidate's calculation rounded up to the next integer
6			Farm shop	4	M1 for 12.5 ÷ 2.5 (=5) M1 for '5'×1.83 or '5' × 183 A1 for (£)9.15 or 915(p) C1 (dep on at least M1) for decision ft working shown **OR** M1 for 12.5 ÷ 2.5 (=5) M1 for 9 ÷ '5' or 900 ÷ '5' A1 for (£)1.8(0) or 180(p) C1 (dep on at least M1) for decision ft working shown **OR** M1 for 9 ÷ 12.5 (=0.72) **or** 1.83 ÷ 2.5 (=0.732) M1 for 9 ÷ 12.5 (=0.72) **and** 1.83 ÷ 2.5 (=0.732) A1 for 72(p) **and** 73.(2)(p) or (£)0.72 **and** (£)0.73(2) C1 (dep on at least M1) for decision ft working shown **OR** M1 for 12.5 ÷ 9 (= 1.388...) M1 for 2.5 ÷ 1.83 (= 1.366...) A1 for 1.38.... **and** 1.36... truncated or rounded C1 (dep on at least M1) for decision ft working shown

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
7	(a)		negative	1	B1 for negative
	(b)		10.3 – 11.7	2	M1 for a single straight line segment with negative gradient that could be used as a line of best fit or an indication on the diagram from 2.5 on the *x* axis A1 for an answer in the range 10.3 – 11.7 inclusive
8	(a)		Triangle with vertices (2,–1) (4, –1) (4, –4)	2	B2 for triangle with vertices (2,–1) (4, –1) (4, –4) (B1 for triangle in correct orientation **or** rotated 90° anticlockwise centre *O*
	(b)		Triangle with vertices (7, 2) (13, 2) (7, 11)	3	B3 for triangle with vertices (7, 2) (13, 2) (7, 11) (B2 for 2 vertices correct or enlargement scale factor 3 in wrong position or enlargement, centre (1,2), with different scale factor) (B1 for 1 vertex correct or enlargement, not from (1,2), different scale factor)
9			51	3	M1 200 × 25.82 (= 5164) A1 for 5164 or 5160 or 5100 or 5200 or 51.64 or 51.6(0) or 52 A1 for 51 cao **OR** M1 for 100 ÷ 25.82 (= 3.87…) **and** 200 ÷ '3.87…' (= 51.64) A1 for 5164 or 5160 or 5100 or 5200 or 51.64 or 51.6(0) or 52 A1 for 51 cao

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
10	(a)		–1, 0, 1, 2, 3	2	B2 for all 5 correct values; ignore repeats, any order. (–1 for each omission or additional value)
	(b)	$7x - 3x < 4 + 9$ $4x < 13$	$x < 3.25$	2	M1 for a clear intention to use a correct operation to collect x terms or non-x terms in an (in)equality A1 for $x < 3.25$ oe (SC: B1 for 3.25 oe seen if M0 scored)
11		$x = 4$ gives 40 $x = 5$ gives 95 $x = 4.1$ gives 44.(321) $x = 4.2$ gives 48.(888) $x = 4.3$ gives 53.(707) $x = 4.4$ gives 58.(784) $x = 4.5$ gives 64.(125) $x = 4.6$ gives 69.(736) $x = 4.7$ gives 75.(623) $x = 4.8$ gives 81.(792) $x = 4.9$ gives 88.(249) $x = 4.61$ gives 70.3(12..) $x = 4.62$ gives 70.8(91..) $x = 4.63$ gives 71.4(72..) $x = 4.64$ gives 72.0(57..) $x = 4.65$ gives 72.6(44..)	4.6	4	B2 for a trial $4.6 \leq x \leq 4.7$ evaluated (B1 for a trial $4 \leq x \leq 5$ evaluated) B1 for a different trial $4.6 < x \leq 4.65$ evaluated B1 (dep on at least one previous B1) for 4.6 Accept trials correct to the nearest whole number (rounded or truncated) if the value of x is to 1 dp but correct to 1dp (rounded or truncated) if the value of x is to 2 dp. (Accept 72 for $x = 4.64$) NB : no working scores no marks even if the answer is correct.

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
12		0.3 × 400	120	2	M1 for 0.3 × 400 oe A1 cao
13		5×3+15×8+25×11+35×9+45×9 =1130 1130 ÷ 40	28.25	4	M1 for finding fx with x consistent within intervals (including the end points) allow 1 error M1 (dep) for use of all correct mid-interval values M1 (dep on first M1) for $\Sigma fx \div 40$ or $\Sigma fx \div \Sigma f$ A1 for 28.25 or $28\frac{1}{4}$

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
14	(a)	$p^2 - 4p + 9p - 36$	$p^2 + 5p - 36$	2	M1 for all 4 terms correct (condone incorrect signs) or 3 out of 4 terms correct with correct signs A1 cao
	(b)	$5w - 8 = 3(4w + 2)$ $5w - 8 = 12w + 6$ $-8 - 6 = 12w - 5w$ $-14 = 7w$	-2	3	M1 for attempting to multiply both sides by 3 as a first step (this can be implied by equations of the form $5w - 8 = 12w + ?$ or $5w - 8 = ?w + 6$ i.e. the LHS must be correct M1 for isolating terms in w and the number terms correctly from $aw + b = cw + d$ A1 cao **OR** M1 for $\frac{5w}{3} - \frac{8}{3} = 4w + 2$ M1 for isolating terms in w and the number terms correctly A1 cao
	(c)		$(x + 7)(x - 7)$	1	B1 cao
	(d)		$3x^4y^{\frac{3}{2}}$	2	B2 for $3x^4y^{\frac{3}{2}}$ or $3x^4y^{1.5}$ or $3x^4y^{1\frac{1}{2}}$ (B1 for any two terms correct in a product eg. $3x^4y^n$)

<table>
<tr><th colspan="5">1MA0_2H</th></tr>
<tr><th colspan="2">Question</th><th>Working</th><th>Answer</th><th>Mark</th><th>Notes</th></tr>
<tr><td>*15</td><td></td><td>180 × 365 =65700
65700 ÷1000 =65.7
65.7 × 91.22 =5993.154
5993.154÷100 + 28.20 =88.13...

<table><tr><th>D</th><th>U</th><th>C</th><th>T</th></tr><tr><td>366</td><td>65880</td><td>6010</td><td>88.30</td></tr><tr><td>365</td><td>65700</td><td>5993</td><td>88.13</td></tr><tr><td></td><td>65000</td><td>5929</td><td>87.49</td></tr><tr><td></td><td>66000</td><td>6020</td><td>88.40</td></tr><tr><td>364</td><td>65520</td><td>5976</td><td>87.96</td></tr><tr><td>360</td><td>64800</td><td>5911</td><td>87.31</td></tr><tr><td><s>336</s></td><td><s>60480</s></td><td>5517</td><td>83.37</td></tr></table></td><td>Decision (Should have a water meter installed)</td><td>5</td><td>Per year
M1 for 180 × ‘365’ (= 65700)
M1 for ‘65700’ ÷ 1000 (= 65.7 or 65 or 66)
M1 for ‘65.7’ × 91.22 (= 5993...)
A1 for answer in range (£)87 to (£)89
C1 (dep on at least M1) for conclusion following from working seen

OR (per day)
M1 for 107 ÷ ‘365’ (= 0.293…)
M1 for 180 ÷ 1000 × 91.22 (= 16.4196)
M1 for 28.2 ÷ ‘365’ + ‘0.164196’ (units must be consistent)
A1 for 29 – 30(p) and 24 – 24.3(p) oe
C1 (dep on at least M1) for conclusion following from working seen

OR
M1 for (107 – 28.20) ÷ 0.9122 (= 86.384..)
M1 for ‘86.384..’× 1000 (= 86384.5…)
M1 for ‘365’ × 180 (= 65700)
A1 for 65700 and 86384.5...
C1 (dep on at least M1) for conclusion following from working seen

NB : Allow 365 or 366 or 52×7 (=364) or 12 × 30 (=360) or 365¼ for number of days</td></tr>
</table>

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
16		$\cos x = \frac{6.4}{9.6}$ $x = \cos^{-1}\frac{6.4}{9.6} =$	48.2	3	M1 for $\cos x = \frac{6.4}{9.6}$ or $\cos x = 0.66(6...)$ or $\cos x = 0.67$ M1 for $\cos^{-1}\frac{6.4}{9.6}$ or $\cos^{-1} 0.66(6...)$ or $\cos^{-1} 0.67$ A1 for 48.1 – 48.2 **OR** Correct use of Pythagoras and then trigonometry, no marks until M1 for $\sin x = \frac{'7.155'}{9.6}$ or $\tan x = \frac{'7.155'}{6.4}$ or $\sin x = \frac{'7.155'}{9.6} \times \sin 90$ or $\cos x = \frac{6.4^2 + 9.6^2 - '7.155'^2}{2 \times 6.4 \times 9.6}$ M1 for $\sin^{-1}\frac{'7.155'}{9.6}$ or $\tan^{-1}\frac{'7.155'}{6.4}$ or $\sin^{-1}\left(\frac{'7.155'}{9.6} \times \sin 90\right)$ or $\cos^{-1}\left(\frac{6.4^2 + 9.6^2 - '7.155'^2}{2 \times 6.4 \times 9.6}\right)$ A1 for 48.1 – 48.2 SC B2 for 0.841... (using rad) or 53.5... (using grad)

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
17		$6200 \times 1.025^3 =$ OR $6200 + \frac{2.5}{100} \times 6200 = 6355$ $6355 + \frac{2.5}{100} \times 6355 = 6513.875$ $6513.875 + \frac{2.5}{100} \times 6513.875 =$	6676.72	3	M2 for 6200×1.025^3 (= 6676.72...) (M1 for 6200×1.025^n, $n \neq 3$) A1 for 6676.72, accept 6676.71 or 6676.73 **OR** M1 for 6200×1.025 **or** for $6200 + \frac{2.5}{100} \times 6200$ oe **or** for 6355 or 155 or 465 or 6665 M1 (dep) for a complete compound interest method shown for 3 years A1 for 6676.72, accept 6676.71 or 6676.73 [SC B2 for 476.71 or 476.72 or 476.73 seen]

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
18		$BD^2 + 12^2 = 16^2$ oe BD= $\sqrt{256-144}$ (=10.58...) sin 40 = $\frac{'10.58'}{CD}$ $CD = \frac{'10.58'}{\sin 40}$	16.5	5	M1 for $BD^2 + 12^2 = 16^2$ oe or $16^2 - 12^2$ or 112 seen M1 for $\sqrt{256-144}$ or $\sqrt{112}$ (=10.58...) M1 for sin 40 = $\frac{'10.58'}{CD}$ or cos 50 = $\frac{'10.58'}{CD}$ M1 for (CD =) $\frac{'10.58'}{\sin 40}$ or $\frac{'10.58'}{\cos 50}$ A1 for 16.4 – 16.5 **OR** M1 for $BD^2 + 12^2 = 16^2$ oe or $16^2 - 12^2$ or 112 seen M1 for $\sqrt{256-144}$ or $\sqrt{112}$ (=10.58..) M1 for (BC =) '10.58'× tan 50 or $\frac{'10.58'}{\tan 40}$ (=12.6…) M1 for $\sqrt{'12.6'^2 + '10.58...'^2}$ A1 for 16.4 – 16.5

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
19		$\sqrt{\frac{8.5\times10^9 - 4\times10^8}{8.5\times10^9 \times 4\times10^8}}$ $= \sqrt{\frac{8.1\times10^9}{3.4\times10^{18}}}$ $= \sqrt{2.3823529...\times10^{-9}}$ **OR** $\sqrt{\frac{1}{4\times10^8} - \frac{1}{8.5\times10^9}}$ $= \sqrt{2.5\times10^{-9} - 1.17647\times10^{-10}}$ $= \sqrt{2.3823529...\times10^{-9}}$	4.9×10^{-5}	3	B3 for 4.88×10^{-5} to 4.9×10^{-5} (B2 for digits 238(23529) or 24 or 488(09353) or 49) (B1 for digits 81 or 34) **OR** B3 for 4.88×10^{-5} to 4.9×10^{-5} (B2 for digits 238(23529) or 24 or 488(09353) or 49) (B1 for digits 25 or 117(647))
20		$2d - 2t = 4t + 7$ $2d - 7 = 4t + 2t$ $2d - 7 = 6t$ $\frac{2d-7}{6}$	$\frac{2d-7}{6}$	3	B1 for $2d - 2t$ or $2t + \frac{7}{2}$ oe M1 for rearranging 4 terms correctly to isolate terms in t e.g. '$2d$' $- 7 = 4t +$ '$2t$' or $2d - 7 = 6t$ or $-6t = 7 - 2d$ seen A1 for $\frac{2d-7}{6}$ oe
21		$4n^2 + 12n + 3^2 - (4n^2 - 12n + 3^2)$ $= 4n^2 + 12n + 9 - 4n^2 + 12n - 9$ $= 24n$ $=8 \times 3n$	Proof	3	M1 for 3 out of 4 terms correct in expansion of either $(2n + 3)^2$ or $(2n - 3)^2$ **or** $((2n + 3) - (2n - 3))((2n + 3) + (2n - 3))$ A1 for $24n$ from correct expansion of both brackets A1 (dep on A1) for $24n$ is a multiple of 8 or $24n = 8 \times 3n$ or $24n \div 8 = 3n$

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
22		$a = 3, b = -4, c = -2$ $x = \frac{--4 \pm \sqrt{(-4)^2 - 4 \times 3 \times -2}}{2 \times 3}$ $= \frac{4 \pm \sqrt{16 + 24}}{6} = \frac{4 \pm \sqrt{40}}{6}$ = 1.72075922 or = – 0.3874258867 OR $x^2 - \frac{4}{3}x - \frac{2}{3} = 0$ $\left(x - \frac{2}{3}\right)^2 - \left(\frac{2}{3}\right)^2 - \frac{2}{3} = 0$ $x - \frac{2}{3} = \sqrt{\left(\frac{2}{3}\right)^2 + \frac{2}{3}}$ $x = \frac{2}{3} \pm \sqrt{\frac{10}{9}}$	1.72, –0.387	3	M1 for $\frac{--4 \pm \sqrt{(-4)^2 - 4 \times 3 \times -2}}{2 \times 3}$ (condone incorrect signs for –4 and –2) M1 for $\frac{4 \pm \sqrt{40}}{6}$ or $\frac{2 \pm \sqrt{10}}{3}$ A1 for one answer in the range 1.72 to 1.721 and one answer in the range – 0.387 to – 0.38743 **OR** M1 for $\left(x - \frac{2}{3}\right)^2$ oe M1 for method leading to $\frac{2}{3} \pm \sqrt{\frac{10}{9}}$ oe A1 for one answer in the range 1.72 to 1.721 and one answer in the range – 0.387 to – 0.38743

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
23	(a)(i)	Explanation : Each member of the population has an equal chance of selection	Each member of the population has an equal chance of selection	2	B1 for explanation
	(ii)	Description : Eg. number each student and use random select on a calculator	Valid method		B1 for an acceptable description
	(b)	239+257+248+190+206=1140 $\frac{239}{1140}\times 100$	21	2	M1 for $\frac{239}{'1140'}\times 100$ oe or 20.96… A1 cao

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
24		$\frac{AC}{\sin 49} = \frac{8.7}{\sin 64}$ $AC = \frac{8.7}{\sin 64} \times \sin 49$ (= 7.305…) $\frac{1}{2}$ × 8.7 × 7.305... × sin (180 – 64 – 49)	29.3	5	M1 for $\frac{AC}{\sin 49} = \frac{8.7}{\sin 64}$ oe M1 for $(AC =) \frac{8.7}{\sin 64} \times \sin 49$ A1 for 7.3(05…) M1 for $\frac{1}{2}$ × 8.7 × '7.305' × sin(180 – 64 – 49) A1 for 29.19 – 29.3 **OR** M1 for $\frac{BC}{\sin(180 – 64 – 49)} = \frac{8.7}{\sin 64}$ oe M1 for $(BC =) \frac{8.7}{\sin 64} \times \sin'67'$ A1 for 8.9(10...) M1 for $\frac{1}{2}$ × 8.7 × '8.910' × sin 49 A1 for 29.19 – 29.3 **OR** (*X* is point such that *AX* is perpendicular to *BC*) M1 for *AX* = 8.7×sin 49 (= 6.565…) **or** *XB* = 8.7×cos 49 (= 5.707...) M1 for *XB* = 8.7×cos 49 (= 5.707...) **and** *CX* = '6.565' ÷ tan 64 oe (= 3.202…) A1 for 8.9(10...) **or** 5.7(07...) and 3.2(02...) M1 for ½ × '6.565…' × ('5.707' + '3.202') oe A1 for 29.19 – 29.3

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
25		$\frac{12}{20}\times\frac{11}{19}+\frac{5}{20}\times\frac{4}{19}+\frac{3}{20}\times\frac{2}{19}$ $1-\left(\frac{12}{20}\times\frac{11}{19}+\frac{5}{20}\times\frac{4}{19}+\frac{3}{20}\times\frac{2}{19}\right)$	$\frac{222}{380}$	4	B1 for $\frac{12}{19}$ or $\frac{5}{19}$ or $\frac{3}{19}$ (could be seen in working or on a tree diagram) M1 for $\frac{12}{20}\times\frac{5}{19}$ *or* $\frac{12}{20}\times\frac{3}{19}$ *or* $\frac{5}{20}\times\frac{12}{19}$ *or* $\frac{5}{20}\times\frac{3}{19}$ *or* $\frac{3}{20}\times\frac{12}{19}$ *or* $\frac{3}{20}\times\frac{5}{19}$ M1 for $\frac{12}{20}\times\frac{5}{19}+\frac{12}{20}\times\frac{3}{19}+\frac{5}{20}\times\frac{12}{19}+\frac{5}{20}\times\frac{3}{19}+\frac{3}{20}\times\frac{12}{19}+\frac{3}{20}\times\frac{5}{19}$ A1 for $\frac{222}{380}$ oe or 0.58(421...) **OR** B1 for $\frac{8}{19}$ or $\frac{15}{19}$ or $\frac{17}{19}$ M1 for $\frac{12}{20}\times\frac{8}{19}$ *or* $\frac{5}{20}\times\frac{15}{19}$ *or* $\frac{3}{20}\times\frac{17}{19}$ M1 for $\frac{12}{20}\times\frac{8}{19}+\frac{5}{20}\times\frac{15}{19}+\frac{3}{20}\times\frac{17}{19}$ A1 for $\frac{222}{380}$ oe or 0.58(421...) **OR** (continued overleaf…)

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
25 contd					B1 for $\frac{11}{19}$ or $\frac{4}{19}$ or $\frac{2}{19}$ M1 for $\frac{12}{20}\times\frac{11}{19}$ *or* $\frac{5}{20}\times\frac{4}{19}$ *or* $\frac{3}{20}\times\frac{2}{19}$ M1 for $1-\left(\frac{12}{20}\times\frac{11}{19}+\frac{5}{20}\times\frac{4}{19}+\frac{3}{20}\times\frac{2}{19}\right)$ A1 for $\frac{222}{380}$ oe or 0.58(421...) **NB** if decimals used they must be correct to at least 2 decimal places **SC : with replacement** B2 for $\frac{111}{200}$ oe **OR** e.g. B0 M1 for $\frac{12}{20}\times\frac{8}{20}$ *or* $\frac{5}{20}\times\frac{15}{20}$ *or* $\frac{3}{20}\times\frac{17}{20}$ M1 for $\frac{12}{20}\times\frac{8}{20}+\frac{5}{20}\times\frac{15}{20}+\frac{3}{20}\times\frac{17}{20}$ A0

1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
26	(a)		$\mathbf{b} - \mathbf{a}$	1	B1 for $\mathbf{b} - \mathbf{a}$ or $-\mathbf{a} + \mathbf{b}$
	(b)	$\overrightarrow{OP} = \overrightarrow{OA} + \overrightarrow{AP}$ $\overrightarrow{AP} = \frac{3}{4} \times (\mathbf{b} - \mathbf{a})$ $\overrightarrow{OP} = \mathbf{a} + \frac{3}{4} \times (\mathbf{b} - \mathbf{a})$ OR $\overrightarrow{OP} = \overrightarrow{OB} + \overrightarrow{BP}$ $\overrightarrow{BP} = \frac{1}{4} \times (\mathbf{a} - \mathbf{b})$ $\overrightarrow{OP} = \mathbf{b} + \frac{1}{4} \times (\mathbf{a} - \mathbf{b})$	$\frac{1}{4}(\mathbf{a} + 3\mathbf{b})$	3	B1 for $\frac{3}{4} \times$ '$(\mathbf{b} - \mathbf{a})$' M1 for $(\overrightarrow{OP} =) \overrightarrow{OA} + \overrightarrow{AP}$ or $(\overrightarrow{OP} =) \overrightarrow{OA} + \frac{3}{4}\overrightarrow{AB}$ or $\mathbf{a} \pm \frac{3}{4} \times$ '$(\mathbf{b} - \mathbf{a})$' A1 for $\frac{1}{4}(\mathbf{a} + 3\mathbf{b})$ or $\frac{1}{4}\mathbf{a} + \frac{3}{4}\mathbf{b}$ **OR** B1 for $\frac{1}{4} \times$ '$(\mathbf{a} - \mathbf{b})$' M1 for $(\overrightarrow{OP} =) \overrightarrow{OB} + \overrightarrow{BP}$ or $(\overrightarrow{OP} =) \overrightarrow{OB} + \frac{1}{4}\overrightarrow{BA}$ or $\mathbf{b} \pm \frac{1}{4} \times$ '$(\mathbf{a} - \mathbf{b})$' A1 for $\frac{1}{4}(\mathbf{a} + 3\mathbf{b})$ or $\frac{1}{4}\mathbf{a} + \frac{3}{4}\mathbf{b}$

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