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Mark Scheme (Results)

Summer 2012

GCSE Mathematics (Linear) 1MA0
Foundation (Calculator) Paper 2F

PEARSON

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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 labeling 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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 canceling 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
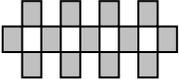dep – dependent (on a previous mark or conclusion)
indep – independent
isw – ignore subsequent working

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Question		Working	Answer	Mark	Notes
1	(a)		4216	1	B1 cao
	(b)		eight thousand	1	B1 for eight thousand or 8000
	(c)		3570	1	B1 cao
2	(i)		Cuboid	2	B1 for cuboid or (rectangular) prism
	(ii)		Pyramid		B1 for pyramid, rectangular base pyramid, square base pyramid
3	(a)		24	1	B1 cao
	(b)		10	1	B1 cao
	(c)		2 circles 3 ½ circles	2	B1 for 2 circles in Thursday B1 for 3 ½ circles oe in Friday
4		$10 \div 0.79 = 12.65\ldots$ $12 \times 79 = 948$ $1000 - 948$	52p	3	M1 for $1000 \div 79$ **or** $10 \div 0.79$ (=12.65…) **or** 12×79 **or** 12×0.79 A1 for 9.48 or 948 A1 for 52p or £0.52 or £0.52p (SC if M0 then B2 for 0.52, 0.52p or 52 as answer) (SC if M0 then B1 for 12 as answer)
5	(a)		90	1	B1 cao
	(b)		correct angle marked	1	B1 for O in an obtuse angle
	(c)		2 perpendicular lines marked	1	B1 for two perpendicular lines marked

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Question		**Working**	**Answer**	**Mark**	**Notes**
6	(a)		3*c*	1	B1 3*c* oe
	(b)		6*ef*	1	B16*ef* oe
	(c)		7*p* + 5*t*	2	B2 for 7*p* + 5*t* (B1 for either 7*p* or 5*t*)
7	(a)		2 lines of symmetry drawn	2	B2 for fully correct answer accept freehand lines (B1 for a correct line of symmetry drawn – ignore extra lines)
	(b)		6	1	B1 6, six
8	(a)		24	1	B1 cao
	(b)		22	1	B1 for 22
9	(a)		Kanon	1	B1 cao
	(b)		Office, Quikprint	1	B1 cao
	(c)		Smart	1	B1 cao
10	(i)	360 – 140 – 60 = 160	160 and reason	2	B1 for 160
	(ii)				C1 (indep) for <u>Angles</u> at a <u>point</u> add up to <u>360</u> $^{(o)}$ or <u>angles</u> in a <u>full turn</u> add up to <u>360</u> $^{(o)}$

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Question		**Working**	**Answer**	**Mark**	**Notes**
11	(a)		10 30	1	B1 10 30 **or** 22 30 **or** half past ten or 10.30 etc
	(b)		16 10	1	B1 16 10 Accept 16:10 and 16.10
	(c)		6 50 am	2	M1 for attempt to add 10 mins and 15 mins and 1 hour (= 1 hr 25 min) A1 for 6 50 or 6 50 am oe **OR** M1 for attempt to subtract 10 mins and 15 mins and 1 hour from 8 15 A1 for 6 50 or 6 50 am oe
12	(a)		4.8	1	B1 for answer in range 4.6 – 5
	(b)		37.5	2	M1 for a valid method eg reading from graph for 6 km then ×10 A1 for answer in range 35 – 40 **OR** M1 for use of conversion factor $60 \times {}^5/_8$ oe A1 for answer in range 35 – 40

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Question		**Working**	**Answer**	**Mark**	**Notes**
13	(a)		4	1	B1 cao
	(b)	34 ÷ 10	3.4	2	M1 for attempt to sum all values and divide by 10 **or** 34 ÷ 10 A1 3.4, $3\frac{4}{10}$, $3\frac{2}{5}$
	(c)		5	2	M1 for 6 – 1 **or** 1– 6, **or** –5 A1 cao
14	(a)	3.5 × 12 – 5	37	2	M1 for 3.5 × 12 – 5 or 42 - 5 A1 cao
	(b)	3.5 × –9 – –6	–25.5	2	M1 for 3.5 × –9 – –6 **or** 3.5×–9 + 6 **or** sight of –31.5 A1 for –25.5 **or** $-\frac{51}{2}$ **or** $-25\frac{1}{2}$

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Question		**Working**	**Answer**	**Mark**	**Notes**
15	(a)			1	B1 for correct pattern
	(b)		31	2	M1 for correct diagram of pattern number 10 with or without shading A1 cao **OR** M1 for any 4 consecutive terms in the sequence 4, 7, 10, ... A1 cao **OR** M1 for use of $3n + 1$ with $n = 10$ A1 cao
	(c)		No with appropriate reason	2	M1 for attempt to divide 45 by 3 A1 for 'No' and comment that this is the number needed for pattern number 15 **OR** M1 for starts at 4 and builds up correctly to 46 or 55 A1 for 'No' and comments that 55 are needed for pattern 18 or 46 are needed for pattern 15 oe **OR** M1 for use of $3n + 1$ with $n = 18$ A1 for 'No' and comments that 55 are needed for pattern 18 oe **OR** M1 for $3n + 1 = 46$ A1 for 'No' and comments 46 are needed for pattern 15 oe

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Question		Working	Answer	Mark	Notes
16			eg. 10, 12, 5, 2	3	M1 for at least 2 factors of 60 clearly identified M1 for 20 < sum of '4 distinct natural numbers' < 35 A1 cao
17	(a)	$84 \div 7$ (=12) $120 \div 12$	10	2	M1 for $84 \div 7$ (=12) or $7 \div 84$ (=0.083..) A1 cao
	(b)		Don't know + reason	1	B1 'Don't know' or 'No' with reason eg. Need to know how many medals Russian Federation won **or** pie chart shows proportion not number of medals won
18	(i)		$\frac{7}{18}$	3	B1 for $\frac{7}{18}$ oe
	(ii)		$\frac{12}{18}$		B1 for $\frac{12}{18}$ **or** $\frac{2}{3}$ oe
	(iii)		0		B1 for 0 or $\frac{0}{18}$ or zero oe
19	(a)		19	1	B1 cao
	(b)		8	1	B1 cao
	(c)		$2\frac{1}{4}$	2	M1 for $4m = 15 - 6$ **or** clear attempt to subtract 6 from both sides of the equation A1 for $2\frac{1}{4}$ **or** 2.25 **or** $\frac{9}{4}$

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Question	Working	Answer	Mark	Notes
20	$250 - 0.42 \times 250 - 250 \div 5 \times 2$ $= 250 - 105 - 100$ **OR** $250 \times \left(1 - \left(\dfrac{42}{100} + \dfrac{2}{5}\right)\right) =$ $250 \times \dfrac{9}{50}$ **OR** $250 \times \left(\dfrac{100 - 42 - 40}{100}\right) =$ $250 \times \dfrac{18}{100}$ **OR** $250 - 250 \times \left(\dfrac{42}{100} + \dfrac{2}{5}\right) =$ $250 - 250 \times \dfrac{41}{50} = 250 - 205$ **OR** $250 - 250 \times \left(\dfrac{42}{100} + \dfrac{40}{100}\right) =$ $250 - 250 \times \dfrac{82}{100} = 250 - 205$	45	4	M1 for $\dfrac{42}{100} \times 250$ oe (=105) M1 for $\dfrac{2}{5} \times 250$ oe (=100) M1 for $250 -$ '105' $-$ '100' A1 cao **OR** M1 for $\dfrac{42}{100} + \dfrac{2}{5}\left(=\dfrac{82}{100}\right)$ or $\left(=\dfrac{41}{50}\right)$ M1 for $1 - '\dfrac{82}{100}'$ or $1 - '\dfrac{41}{50}'$ M1 for $'\dfrac{9}{50}' \times 250$ A1 cao **OR** M1 for $\dfrac{2}{5} \times 100$ or $\dfrac{2}{5} = \dfrac{2 \times 20}{5 \times 20}$ or 2×20 M1 for $100 - 42 - '40'$ (= 18) M1 for '0.18' $\times$ 250 A1 cao (continued overleaf)

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Question	**Working**	**Answer**	**Mark**	**Notes**
				OR M1 for $\dfrac{42}{100}+\dfrac{2}{5}\left(=\dfrac{82}{100}\right)$ or $\left(=\dfrac{41}{50}\right)$ M1 for $'\dfrac{41}{50}'\times250$ M1 for 250 - '205' A1 cao **OR** M1 for $\dfrac{2}{5}\times100$ or $\dfrac{2}{5}=\dfrac{2\times20}{5\times20}$ or 2×20 M1 for '(42 + '40)'/100 $\times$ 250 M1 for 250 - '205' A1 cao

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Question		**Working**	**Answer**	**Mark**	**Notes**
21		<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>	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* = 3*x*–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*=m*x*+c)** M2 for line segment of *y* =3*x*–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

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Question	Working	Answer	Mark	Notes
22	$45 \div (5 - 2)$ (=15) '15'×2 **OR** $45 \times \dfrac{2}{3}$ **OR** <table><tr><td>P</td><td>J</td><td>T</td><td>D</td></tr><tr><td>2</td><td>5</td><td>7</td><td>3</td></tr><tr><td>4</td><td>10</td><td>14</td><td>6</td></tr><tr><td>6</td><td>15</td><td>21</td><td>9</td></tr><tr><td>8</td><td>20</td><td>28</td><td>12</td></tr><tr><td>10</td><td>25</td><td>35</td><td>15</td></tr><tr><td>12</td><td>30</td><td>42</td><td>18</td></tr><tr><td>14</td><td>35</td><td>49</td><td>21</td></tr><tr><td>16</td><td>40</td><td>56</td><td>24</td></tr><tr><td>18</td><td>45</td><td>63</td><td>27</td></tr><tr><td>20</td><td>50</td><td>70</td><td>30</td></tr><tr><td>22</td><td>55</td><td>77</td><td>33</td></tr><tr><td>24</td><td>60</td><td>84</td><td>36</td></tr><tr><td>26</td><td>65</td><td>91</td><td>39</td></tr><tr><td>28</td><td>70</td><td>98</td><td>42</td></tr><tr><td>30</td><td>75</td><td>105</td><td>45</td></tr></table>	30	3	M1 for $45 \div (5 - 2)$ M1 for '15'×2 A1 cao for 30 **OR** M2 for $45 \times \dfrac{2}{3}$ oe (M1 for $45 \times \dfrac{1}{3}$) A1 cao for 30 **OR** M1 for (2, 5); 4, 10; 6, 15; 8, 20 M1 for a completly correct list up to 30, 75 A1 cao (SC If M0 then B1 for 18 given as the answer)

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Question	Working	Answer	Mark	Notes
23		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 for decision ft working shown dep on at least M1 **OR** M1 for 12.5 ÷ 2.5 (=5) M1 for 9 ÷ 5 or 900 ÷ '5' A1 for (£)1.8(0) or 180(p) C1 for decision ft working shown dep on at least M1 **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 for decision ft working shown dep on at least M1 **OR** M1 for 12.5 ÷ 9 (= 1.388...) oe M1 for 2.5 ÷ 1.83 (= 1.366.)oe A1 for 1.38.... **and** 1.36... truncated or rounded to at least 3SF C1 for decision ft working shown dep on at least M1

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Question		**Working**	**Answer**	**Mark**	**Notes**
24	(a)		Triangle with vertices (2,1) (2, 4) (4,4)	2	B2 for triangle with vertices (2,1) (2,4) (4,4) (B1 for triangle reflected in any line parallel to *x*–axis **or** for correct reflection in *y* axis (triangle at (–2,–1) (–2,–4) (–4,–4)) (B1 for a configuration which is the original triangle reflected successively in the x and y axes to give 3 triangles)
	(b)		Enlarged shape	2	M1 for any 3 sides enlarged correctly A1 for correctly enlarged shape (SC : B1 for correct enlargement with a scale factor of 2 or 4 or for a geometrically correct shape in a wrong orientation)

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Question		**Working**	**Answer**	**Mark**	**Notes**
25	(a)		51	3	M1 200 × 25.82 (= 5164) A1 for 5164 or 5200 or 5100 or 51.64 or 51.6(0) or 5160 or 52 A1 for 51 **OR** M1 for 100 ÷ 25.82 (3.87…) and 200 ÷ '3.87…' (=51.64..) A1 for 5164 or 5200 or 5100 or 51.64 or 51.6(0) or 5160 or 52 A1 for 51 cao
	(b)		15.49	3	M1 for 400 ÷ 25.82 A1 for 15.4918… A1 for £15.49 or £15.50 **OR** M1 for 4 × '3.87…' from (a) A1 15.4918… A1 for £15.49 or £15.50

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Question		Working	Answer	Mark	Notes
26	(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
*27		(17–2.8)×9.5 =134.9 π×(3.8÷2)^2 =11.34.. 134.9 – 2×11.34 =112.21 112.21 ÷ 25 = 4.488	5	5	M1 for (17–2.8)×9.5 (=134.9) or 17×9.5– 2.8×9.5 (=161.5 - 26.6 = 134.9) M1 for π×(3.8÷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.

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*28		180 × 365 =65700 65700÷1000 =65.7 65.7×91.22 =5993.154 5993.154÷100 + 28.20= 88.13..	Decision (Should have a water meter installed)	5	**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 – (£)89 C1(dep on at least M1) for conclusion following from working seen

Working table (below the calculations):

D	U	C	T
366	65880	6010	88.30
365	65700	5993	88.13
	65000	5929	87.49
	66000	6020	88.40
364	65520	5976	87.96
360	64800	5911	87.31
~~336~~	~~60480~~	5517	83.37

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

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