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GCSE MATHS

Geometry and measures

Edexcel 1MA1 | Subtopic collection Topic 49

Vectors

Foundation tier

Answers and examiner comments

7	2017-2025	Foundation
question groups	available papers	tier

Using this booklet

1. Answer numbers match the companion question booklet.
2. Follow the original question number on marking tables.
3. Examiner comments are included where available.

Name _____ **Date** _____

Some entries use full source marking material in an appendix. Any unavailable mark schemes are identified beside the relevant answer.

27	(a)		$2\mathbf{b}$	B1	oe
	(b)		$\mathbf{b} - \mathbf{a}$	B1	oe
	(c)		$-\mathbf{a} - \mathbf{b}$	B1	ft oe

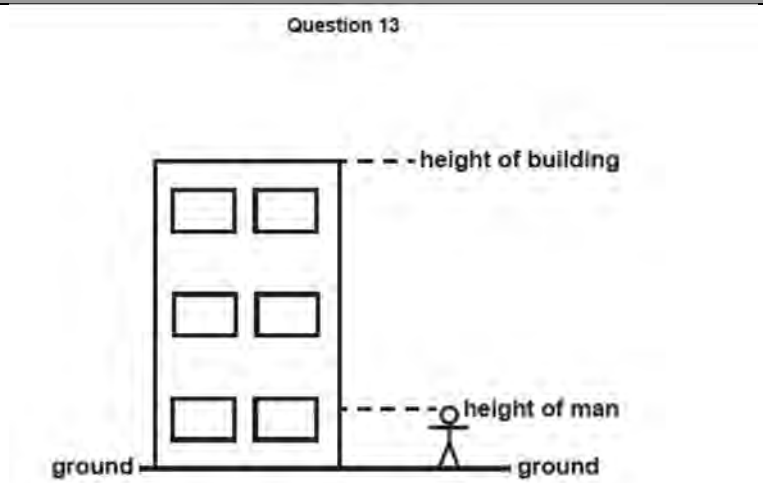
Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5°
Measurements of length: ±5 mm

PAPER: 1MA1_1F			
Question		**Modification**	**Mark scheme notes**
3	(a)	Braille only: e and f changed to p and q.	Standard mark scheme but read e and f for p and q.
6	i	Diagram enlarged. Spinner redrawn. The wording 'with a cross (x)' has been removed.	Apply a greater tolerance when judging the mark for the probability; allow indicators other than crosses and arrows.
6	ii	Diagram enlarged. Spinner repeated above the probability scale. The wording 'with a cross (x)' has been removed.	Apply a greater tolerance when judging the mark for the probability; allow indicators other than crosses and arrows.
11		Diagrams enlarged and stacked vertically. Question wording changed to 'There is a sequence of patterns made with circular tiles and square tiles: pattern number 1, pattern number 2 and pattern number 3.' A key has been added to the diagram.	Standard mark scheme
13		See notes at end	
14		Rows French and Spanish swapped around so Spanish comes first. Numbers on the table changed so that: French – 55; Spanish – 40; German – 25 Diagram enlarged and 10° intervals added.	In part (a) angles drawn are to be French: 165; Spanish: 120; German: 75 to a tolerance of ±5°. Part (b) standard mark scheme.
15		Diagram enlarged. Labels on the rectangle moved above and to the left of the diagram. Braille only: will add labels A B C D etc. and information about the diagrams.	Standard mark scheme

PAPER: 1MA1_1F			
Question		**Modification**	**Mark scheme notes**
18		Diagram enlarged. 10 metres label moved above the line.	Standard mark scheme
21		Diagram enlarged. Right axis has been labelled. Crosses have been changed to solid circles.	Standard mark scheme but in (c) accept 12 to 14
24		Diagram enlarged. Arrows removed. Dashed lines at the top and left of the square extended. Dashes made longer and thicker.	Standard mark scheme
25		Diagram enlarged. Left hand side and top of shape labelled as well. Wording added 'The marked angles are right angles.' Braille only: will add labels A B C D etc. and information about the diagrams.	Standard mark scheme
27		Diagram enlarged.	Standard mark scheme

PAPER: 1MA1_1F			
Question		**Modification**	**Mark scheme notes**
13		 Diagram changed as shown. The height of the building is 10cm and that of the man is 2cm. For Braille the height of the building is 15cm and that of the man is 3 cm.	B1 in the range 1.6 to 2 M1 for scale factor in the range 4 to 6 A1 ft for answer in the range 6.4 to 12

Original question 26

The full source mark scheme begins on page 24. Use the original paper code, tier and question number shown above.

29	$\begin{pmatrix}-2\\1\end{pmatrix}$	M1 A1	for $4 - 2 \times 3$ (= –2) or $5 - 2 \times 2$ (=1) seen as a calculation **OR** for $\begin{pmatrix}4\\5\end{pmatrix} - \begin{pmatrix}2\times3\\2\times2\end{pmatrix}$ **OR** for $\begin{pmatrix}-2\\b\end{pmatrix}$ where $b \neq 1$ or $\begin{pmatrix}a\\1\end{pmatrix}$ where $a \neq -2$ cao	May be in a column vector

Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 2F

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Measurements of length: ±5 mm

PAPER: 1MA1/2F			
Question		**Modification**	**Mark scheme notes**
2		Wording 'five' added.	Standard mark scheme
8	(a)	Change *a* and *b* to *m* and *n* - MLP and Braille.	Standard mark scheme but *a* and *b* changed to *m* and *n*.
8	(c)	Braille only: change *e* and *f* to *r* and *s*.	Standard mark scheme but *e* and *f* changed to *r* and *s*.
9		Diagram enlarged. Key moved above the diagram. Circles divided into four sections. Wording 'incomplete' added.	Standard mark scheme
10		Symbols removed from the frame and enlarged. Boxes enlarged.	Standard mark scheme
11		Question wording changed to 'Work out the value of P when $r = 5$ and $q = -4$ given that $P = 7r + 3q$.'	Standard mark scheme
13		Diagram enlarged. Width label moved to the left-hand side of the diagram. Length and width lines changed to dashed lines. Shading changed to dotty shading. Wording 'shaded' added. Grid lines added.	Standard mark scheme

PAPER: 1MA1/2F			
Question		**Modification**	**Mark scheme notes**
15		Diagram enlarged. Label moved to the left-hand side of the diagram.	Standard mark scheme
19		Diagram kept the same size. Scale moved above the diagram.	Standard mark scheme
20	(b)	Diagram enlarged. Wording 'below' removed.	Standard mark scheme
21		Diagram enlarged. Wording 'below' removed.	Standard mark scheme
23		Diagram enlarged. Wording changed to 'It shows a container in the shape of a cuboid with length 30 cm, width 6 cm and height 19 cm.' Second 19 cm label added on the left of the diagram. Dashed line and 'Water' added.	Standard mark scheme
24		Diagram enlarged. Angle moved outside of the angle arc and the angle arc made smaller. Wording added: 'AC = 16 cm Angle ACB = 38° Angle ABC is a right angle.'	Standard mark scheme
28	(b)	Braille only: '*a*' changed to '*m*'.	Standard mark scheme but *a* changed to *m* for Braille.

Question	Answer	Mark	Mark scheme	Additional guidance
30	Vector drawn	M1	for $5 - 2 \times 3$ (= –1) **or** $2 - 2 \times -1$ (= 4) seen as a calculation **OR** for $\begin{pmatrix}5\\2\end{pmatrix} - \begin{pmatrix}2\times3\\2\times-1\end{pmatrix}$ **OR** for $\begin{pmatrix}-1\\b\end{pmatrix}$ **or** $\begin{pmatrix}a\\4\end{pmatrix}$ **OR** for $\begin{pmatrix}5\\2\end{pmatrix}$ **or** $\begin{pmatrix}-3\\1\end{pmatrix}$ **or** $\begin{pmatrix}-6\\2\end{pmatrix}$ drawn	May be in a column vector Condone missing arrows
		M1	for $\begin{pmatrix}-1\\4\end{pmatrix}$ **OR** for $\begin{pmatrix}-1\\4\end{pmatrix}$ drawn with no arrow or incorrect arrow **OR** for $\begin{pmatrix}-1\\b\end{pmatrix}$ **or** $\begin{pmatrix}a\\4\end{pmatrix}$ drawn with arrow, where $b \neq 4$ and $a \neq -1$	
		A1	cao	For this mark the drawn vector must include an arrow showing direction.

Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 2F

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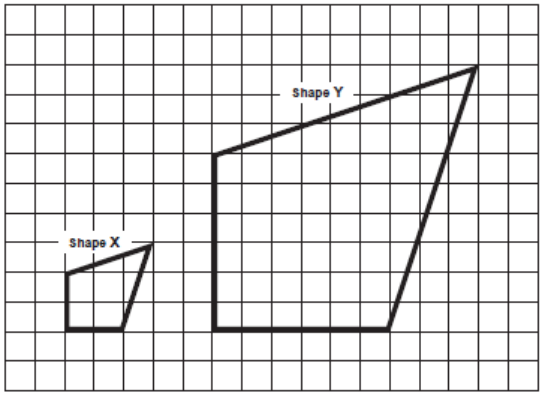
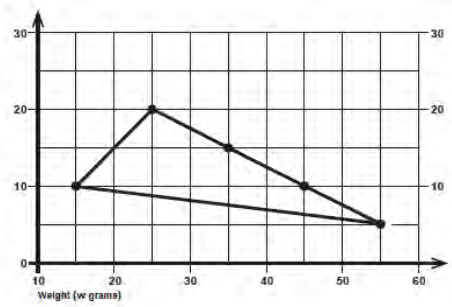
Angles: ±5°
Measurements of length: ±5 mm

PAPER: 1MA1/2F			
Question		**Modification**	**Mark scheme notes**
1		Wording added 'five'.	Standard mark scheme
8		Braille only – answer space labelled (i).	Standard mark scheme
9		Wording added 'six'.	Standard mark scheme
10		Wording changed to 'The charge for a car park in Spain is 0.024 euros per minute.' Information box removed.	Standard mark scheme
11		Diagram enlarged. Right axis labelled. Graph line made thicker. Axes labels moved to the left of the horizontal axis and above the vertical axis. Wording added 'It shows a graph used to change between stones and kilos.' Part (a) wording changed to 'Change 4 stones to kilograms.'	Standard mark scheme but apply the greater tolerance described above for taking readings.

PAPER: 1MA1/2F			
Question		**Modification**	**Mark scheme notes**
13		Diagram enlarged and changed:  Wording added 'It shows shape X and shape Y on a grid of squares. 'Question changed to 'Describe fully the single transformation that maps shape X to shape Y.' Three answer lines provided.	Mark scheme: B1 for "enlargement" B1 for "scale factor 3" Do not award any marks for a description that mentions other transformations (other than enlargement)
14		Diagram removed. Wording changed to 'Special offer 1 20 litres: 2 bags for £3.50 Special offer 2 40 litres: 3 bags for £9.	Standard mark scheme
17		Diagram enlarged. Wording added 'It shows triangle *ADC*.' ; Angle *DCA* is marked *x*.' Angles moved outside of the angle arc and angle arc made smaller.	Standard mark scheme
18	(b)	MLP only: *x* changed to *y*. MLP and Braille: *a*, *b*, *c* changed to *r*, *s*, *t*. Braille only – expressions labelled (i) to (v) and tick boxes removed.	Standard mark scheme
19		Information box moved to Diagram Book.	Standard mark scheme

PAPER: 1MA1/2F			
Question		**Modification**	**Mark scheme notes**
21		Diagram enlarged and changed:  Crosses changed to solid circles. Axes label moved to the left of the horizontal axis. Frequency changed as follows: $10 < w \leq 20$ 5 $20 < w \leq 30$ 20 $30 < w \leq 40$ 15 $40 < w \leq 50$ 10 $50 < w \leq 60$ 5 Question wording changed from '50 potatoes' to '55 potatoes'.	Standard mark scheme, but reference to the first point is now "(15,5) has been incorrectly plotted at (15,10)"
23		Wording added 'Tom and Adam have some stamps.' Information moved to Diagram Book.	Standard mark scheme
25		Diagram enlarged. Graphs labelled as 'Graph A, graph B etc'.	Standard mark scheme
29		Diagrams enlarged; models should be provided for all candidates. Wording added 'The cuboid has length 18 cm, width 8 cm and height 6 cm.'	Standard mark scheme.
30		Diagram enlarged. Wording added 'It shows a grid.' Braille only - sticky label provided a-2b Question wording changed to 'On the grid, draw the vector a-2b. Label the vector.'	Standard mark scheme

26	$\begin{pmatrix}-9\\14\end{pmatrix}$	M1 A1	for $2\begin{pmatrix}3\\4\end{pmatrix} - 3\begin{pmatrix}5\\-2\end{pmatrix}$ **or** $\begin{pmatrix}6\\8\end{pmatrix}$ **and** $\begin{pmatrix}15\\-6\end{pmatrix}$ **or** $\begin{pmatrix}-9\\y\end{pmatrix}$ **or** $\begin{pmatrix}x\\14\end{pmatrix}$ cao	May be seen in two separate calculations eg 2×3 + –3×5 and 2×4 + –3×–2 Condone incorrect notation if method is clear for this mark only

Paper: 1MA1/2F

30	(a)(i)	$\begin{pmatrix}1\\5\end{pmatrix}$	B1	for $\begin{pmatrix}1\\5\end{pmatrix}$	
	(ii)	$\begin{pmatrix}0\\5\end{pmatrix}$	M1	for substitution of values eg $\begin{pmatrix}2\times2-4\\3\times2-1\end{pmatrix}$ oe **OR** for $\begin{pmatrix}0\\b\end{pmatrix}$ **or** $\begin{pmatrix}a\\5\end{pmatrix}$ where a, b are integer values.	Need not be shown in brackets at this stage
			A1	for $\begin{pmatrix}0\\5\end{pmatrix}$	
	(b)	correct vector drawn	C1	for a correct vector drawn from point P	Need not be labelled but do not award if there is any ambiguity.

Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 3F

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PAPER: 1MA1_3F			
Question		**Modification**	**Mark scheme notes**
1		Word added 'four'. Numbers left aligned.	Standard mark scheme
5		The wording 'Here is a list of numbers' removed and replaced with 'Below is a list of five numbers'. Numbers left aligned.	Standard mark scheme
6		Wording added 'Look at the diagram for Question 6 in the Diagram Booklet.' The wording 'The graph shows' removed and replaced with 'It shows a graph with'. Diagram enlarged. Axes labels moved to above the vertical axis and left on the horizontal axis. Crosses changed to dots. Right axis labelled. Open headed arrows. Small squares removed	Standard mark scheme
8		Wording added 'Look at the table for Question 8 in the Diagram Booklet.' Table turned vertical. Table enlarged	Standard mark scheme
9		Wording added 'Look at the diagram for Question 9 in the Diagram Booklet. The diagram shows point A on the grid.' Axes labels moved to above the vertical axis and right on the horizontal axis. Cross changed to a dot. Open headed arrows. Diagram enlarged. In part (b) the wording 'with a cross (X)' removed.	Standard mark scheme
11		Wording added 'Look at the diagram for Question 11 in the Diagram Booklet.' The wording 'Here is a cuboid' removed and replaced with The diagram shows a cuboid with length 8cm, width 4cm and height 5cm.' Diagram enlarged. '5cm' label moved to left side.	Standard mark scheme
12		Wording added 'Look at the information in the Diagram Booklet. It shows a ratio.' Left align the ratio.	Standard mark scheme
13	(a)	Wording added 'Look at the diagram for Question 13(a) in the Diagram Booklet.' Diagram enlarged and rotated to make side CD horizontal. Wording added: 'Angle DAB = Angle ABC = 120º; Angle BCD = 80º; Angle CDA is marked x Angles moved outside angle arcs. Angle arcs made smaller.	Standard mark scheme
13	(b)	Wording added 'Look at the diagram for Question 13(b) in the Diagram Booklet.' The word 'below' removed. Wording added 'The three angles are marked 80º, 60º and 50º.' Diagram enlarged. Angles moved outside angle arcs. Angle arcs made smaller.	Standard mark scheme
14		Wording added 'Look at the diagram for Question 14 in the Diagram Booklet.' Axes labels moved to above the vertical axis and left on the horizontal axis. Open headed arrows. Diagram enlarged. Small squares removed. Right axis labelled. Graph line thickened. Part (b) changed from 80g to 75g	Standard mark scheme in (a) In (b) apply the standard mark scheme for M1 but for 75 instead of 80 A1 2000 to 2250

PAPER: 1MA1_3F			
Question		**Modification**	**Mark scheme notes**
16		Wording added 'Look at the table and the diagram for Question 16 in the Diagram Booklet.' Wording added 'in the Diagram Booklet'. Table enlarged. Diagram enlarged. The word 'this' removed and replaced with 'the' twice. Wording added 'in the Diagram Booklet' twice.	Standard mark scheme
18		Shape labelled 'shape A' and another 'shape B' added. Shading changed. The wording 'Rotate the shaded shape 90º anticlockwise about (0,0)' removed and replaced with 'Describe fully the single transformation that maps shape A onto shape B.'	**B2** for (i) rotation (ii) 90 (iii) anticlockwise (iv) (0,0) Accept 270 AND clockwise for (ii) & (iii) and "origin" for (0,0) **(B1** for two of the above aspects) If there is any indication of any other transformation award 0 marks.
19		Wording added 'Look at the diagram for Question 19 in the Diagram Booklet.' Wording added 'In the Diagram Booklet'. Diagram enlarged. Small squares removed. Axes labels moved above the vertical axis and left on the horizontal axis. Right axis labelled. Open headed arrows. Graph line thickened.	Standard mark scheme
20		Wording added 'Look at the information for Question 20 in the Diagram Booklet.' The wording 'Here' removed and replaced with 'It shows'. Frame removed. Information left aligned	Standard mark scheme
21		Value changed: a to n	Standard mark scheme but note change of letter.
22		Equations stacked vertically and moved left with equals symbols aligned.	Standard mark scheme
24		Wording added 'Look at the diagram for Question 24 in the Diagram Booklet. You may be provided with a model. It is not accurate.' Diagram enlarged. Model provided. '160cm' label moved to left side.	Standard mark scheme
25		Wording added 'Look at the diagram for Question 25 in the DB.' Diagrams stack vertically and enlarged. Angle arcs made smaller. Arcs at C and F separated more. Wording added: AC = 5 cm; BC = 4 cm; DE = 20 cm; DF = 22 cm; 'Angle ABC = Angle DEF' ; 'Angle ACB = DFE'	Standard mark scheme
26		Wording added 'Look at the diagram for Question 26 in the DB.' Diagram enlarged.	Standard mark scheme
30	(b)	Wording added 'Look at the diagram for Question 30(b) in the DB.' Diagram enlarged. Cross changed to a dot.	Standard mark scheme

26	$\begin{pmatrix}20\\5\end{pmatrix}$	M1 A1	for $2\begin{pmatrix}7\\4\end{pmatrix} + 3\begin{pmatrix}2\\-1\end{pmatrix}$ **or** $\begin{pmatrix}14\\8\end{pmatrix}$ **and** $\begin{pmatrix}6\\-3\end{pmatrix}$ or $\begin{pmatrix}20\\y\end{pmatrix}$ or $\begin{pmatrix}x\\5\end{pmatrix}$ for $\begin{pmatrix}20\\5\end{pmatrix}$ or $5\begin{pmatrix}4\\1\end{pmatrix}$	For M1 condone without bracket and/or with fraction line. Correct answer spoilt scores M1A0

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PAPER: 1MA1_1F			
Question		**Modification**	**Mark scheme notes**
1		Letter ‘e’ changed to ‘p’	Standard mark scheme but note the change in letter
6		Wording added: ‘Look at the table for Question 6 in the Diagram Booklet.’	Standard mark scheme
7		Wording added: ‘Look at the diagram for Question 7 in the Diagram Booklet. It shows an incomplete bar chart.’ p changed to pence. Wording added: ‘in the Diagram Booklet’ Diagram enlarged. Horizontal intermediates added. Braille: wording added ‘Drawing film and Bumpons are provided if you wish to use them.’	Standard mark scheme
8	(a)	Wording changed: ‘Look at the diagram for Question 8(a) in the Diagram Booklet. It shows…’ Wording added: ‘in the Diagram Booklet’ Diagram enlarged. Braille: wording added ‘Drawing film and Bumpons are provided if you wish to use them.’	Standard mark scheme
	(b)	Wording added: ‘Look at the diagram for Question 8(b) in the Diagram Booklet. You may be provided with a model. They are not accurate. Diagram 1 and the model show a solid shape. Diagram 2 shows the top view of the solid shape. Diagram 3 shows a side view of the solid shape.’ Diagram enlarged. 2D views added. Model provided.	Standard mark scheme
12		Wording changed: ‘Look at the diagram for Question 12 in the Diagram Booklet. It shows…’ Stafford row removed from the table.	Standard mark scheme
13		Wording changed: ‘Look at the diagram for Question 13 in the Diagram Booklet. It shows…’ Diagram enlarged. Open headed arrows.	Standard mark scheme
16		Wording changed: ‘Look at the diagram for Question 16 in the Diagram Booklet.’ Wording added: ‘Angle DEC = 40° Angle DBA = 70°’ Diagram enlarged. Angles moved outside of angle arcs and angle arcs made smaller.	Standard mark scheme

PAPER: 1MA1_1F			
Question		**Modification**	**Mark scheme notes**
17		g changed to grams.	Standard mark scheme
18		Wording added: 'Look at the diagram for Question 18 in the Diagram Booklet. It shows an incomplete stem and leaf diagram.' Wording changed: 'Show this information in the stem and leaf diagram in the Diagram Booklet.' Diagram enlarged.	Standard mark scheme
20		Wording added: Look at the table for Question 20 in the Diagram Booklet.	Standard mark scheme
21	(a)	Wording added: 'below'. Wording added: 'There are four spaces to fill.' Braille: Wording added 'by writing the missing values labelled (i) to (iv).' Table turned vertical.	Standard mark scheme
	(b)	Wording added: 'Look at the diagram for Question 21(b) in the Diagram Booklet. It shows a grid.' Diagram enlarged. Open headed arrows. Braille: Wording added 'Drawing film and bumpons are provided if you wish to use them.'	
24		Wording added: 'Look at the diagram for Question 24 in the Diagram Booklet.' Diagram enlarged.	Standard mark scheme
25		Wording changed: 'Look at the diagram for Question 25 in the Diagram Booklet. It shows straight line L on a grid.' Diagram enlarged. Open headed arrows.	Standard mark scheme

PMT



Mark Scheme (Results)

Summer 2018

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Foundation (Non-Calculator) Paper 1F

PMT

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

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General marking guidance

These notes offer general guidance, but the specific notes for examiners appertaining to individual questions take precedence.

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

Where some judgement is required, mark schemes will provide the principles by which marks will be awarded; exemplification/indicative content will not be exhaustive. When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the response should be sent to review.

2 All the marks on the mark scheme are designed to be awarded; mark schemes should be applied positively. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme. If there is a wrong answer (or no 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.

Questions where working is not required: In general, the correct answer should be given full marks.
Questions that specifically require working: In general, candidates who do not show working on this type of question will get no marks – full details will be given in the mark scheme for each individual question.

3 **Crossed out work**
This should be marked **unless** the candidate has replaced it with an alternative response.

4 **Choice of method**
If there is a choice of methods shown, mark the method that leads to the answer given on the answer line.

If no answer appears on the answer line, mark both methods **then award the lower number of marks.**

5 **Incorrect method**
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 for your Team Leader to check.

6 **Follow through marks**
Follow through marks which involve a single stage calculation can be awarded without working as you can check the answer, 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.

7 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 or its context. (eg. an incorrectly cancelled fraction when the unsimplified fraction would gain full marks).

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect (eg. incorrect algebraic simplification).

8 Probability

Probability answers must be given as a fraction, percentage or decimal. 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 fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

9 Linear equations

Unless indicated otherwise in the mark scheme, full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously identified 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 (embedded answers).

10 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 all numbers within the range.

11 Number in brackets after a calculation

Where there is a number in brackets after a calculation E.g. 2 × 6 (=12) then the mark can be awarded **either** for the correct method, implied by the calculation **or** for the correct answer to the calculation.

12 Use of inverted commas

Some numbers in the mark scheme will appear inside inverted commas E.g. “12” × 50 ; the number in inverted commas cannot be any number – it must come from a correct method or process but the candidate may make an arithmetic error in their working.

13 Word in square brackets

Where a word is used in square brackets E.g. [area] × 1.5 : the value used for [area] does **not** have to come from a correct method or process but is the value that the candidate believes is the area. If there are any constraints on the value that can be used, details will be given in the mark scheme.

14 Misread

If a candidate misreads a number from the question. Eg. uses 252 instead of 255; method or process marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review.

PMT

Guidance on the use of abbreviations within this mark scheme	
M	method mark awarded for a correct method or partial method
P	process mark awarded for a correct process as part of a problem solving question
A	accuracy mark (awarded after a correct method or process; if no method or process is seen then full marks for the question are implied but see individual mark schemes for more details)
C	communication mark
B	unconditional accuracy mark (no method needed)
oe	or equivalent
cao	correct answer only
ft	follow through (when appropriate as per mark scheme)
sc	special case
dep	dependent (on a previous mark)
indep	independent
awrt	answer which rounds to
isw	ignore subsequent working

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1	6000	B1	cao	Accept 6 thousand or six thousand
2 (a)	−6,−5,0,6,12	B1	for −6,−5,0,6,12 accept 12, 6, 0, −5,−6	
(b)	0.078,0.708, 0.78,0.87	B1	for 0.078, 0.708, 0.78, 0.87 accept 0.87, 0.78, 0.708, 0.078	Accept any additional '0's at the end of a decimal, eg 0.780 or 0.870
3	$\frac{20}{100}$	B1	$\frac{20}{100}$ oe, eg $\frac{2}{10}$ or $\frac{1}{5}$	Ignore any incorrect simplification of $\frac{20}{100}$ oe and award the mark if $\frac{20}{100}$ oe is seen
4	$\frac{3}{9}$	B1	for $\frac{3}{9}$ accept $\frac{1}{3}$	
5	14	B1	cao	
6 (a)	$12t$	B1	$12t$	Accept $t12$ but **not** $12 \times t$ or $t \times 12$
(b)	$7a$	B1	$7a$	Accept $a7$ or $7 \times a$ or $a \times 7$ Partial simplification of $5a + 2a$ or $8a - a$ does NOT get the mark

PMT

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
7 (a)	D	B1	cao	
(b)	B	B1	cao	
(c)	Shown	M1	for number of green counters, eg $12 - (3+1+2) = 6$ **OR** for $\frac{3}{12}$ oe **or** $\frac{1}{12}$ oe **or** $\frac{2}{12}$ oe linked to the appropriate colour	This is awarded for a correct first step
		M1	for $1 - (\text{"}\frac{3}{12}\text{"} + \text{"}\frac{1}{12}\text{"})$ $(= \frac{8}{12})$ or "$\frac{2}{12}$"+ $\frac{\text{"6"}}{12}$ $(= \frac{8}{12})$ **OR** for method to find $\frac{2}{3}$ of 12, eg. $12 \div 3 \times 2$ $(= 8)$	This is awarded for a fully correct method from which the correct answer of $\frac{2}{3}$ can be found Sight of $\frac{8}{12}$ gets M2
		C1	for correct conclusion supported by accurate figures, eg $\frac{8}{12} = \frac{2}{3}$ **or** $\frac{2}{3}$ of 12 = 8 **and** number of yellow + green = 2 + 6 = 8	
8	36	M1	for method to find cost of 1 kg, eg $54 \div 3$ $(= 18)$ or $54 \div 3 \times 2$ oe	
		A1	cao	
9 (a)	Radius	B1	cao	Accept spelling mistakes
(b)	Tangent	B1	cao	Accept spelling mistakes

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
10	535	P1	for a start to the process eg 1280+640+220 (=2140) **or** 1280÷4 (=320) **or** 640÷4 (=160) **or** 220÷4 (=55)	
		P1	for a full process to find cost per adult eg "2140" ÷ 4 **or** "320" + "160" + "55"	Can have arithmetical error as long as the complete processes, in the correct order, are present.
		A1	cao SC: B1 for answer of 1495 if P0 scored	
11 (a)	Example	C1	for a correct example, eg 3 × 4 = 12 or 12 ÷ 3 = 4 **or** a statement eg '3 is a factor of 12' or '1 is a factor of every number'	This may be seen, for example, in a factor tree or in a list of factors, but there must be no incorrect factors on the tree or in the list
(b)	Example	C1	for an example, eg 23 **or** a statement eg. 'the tens digit may be even' or 'the last digit only needs to be odd'	

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
12 (a)	100	B1	for answer in the range 95 to 100	
(b)	660	M1	for reading at least 3 of the required figures from the graph eg 3 of "100", 260, 120, 340, 160, 440 **OR** for 260 – "100" (= 160) **or** 340 – 120 (= 220) **or** 440 – 160 (= 280) **OR** for"100" + 60 (= 160) **or** 80 + 100 + 40 (= 220) **or** 40 + 100 + 100 + 40 (= 280)	Figures may be seen on graph
		M1	(dep) for adding their 3 differences eg "160" + "220" + "280"	
		A1	for 660 or ft their answer to part (a)	
(c)	Tablets	B1	Tablets	
	and statement	C1	Statement eg the bars get proportionally longer over time (most in 2017 and least in 2015) **or** they (more than) double each year **or** for an increase of 280 **or** numbers range from 60 to 340	Values quoted for tablets must be correct. Ignore any calculations relating to laptops and/or desktop computers whether correct or not. Award previous mark if "tablets" is not specifically stated but can be implied from statement.
(d)	Statement (supported)	C1	for statement, eg (No because) we do not know costs or prices or profit.	Answer of 'Yes' gets C0 Answer of 'No' without justification gets C0

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
13	3	P1	for a start to the process eg 240 − (2 × 45) (= 150) oe **or** (2 × 45) + 40 (= 130) oe	
		P1	for complete process eg "150" ÷ 40 (= 3.75) – can be implied by 40 + 40 + 40 = 120 **or** "130" + 40 + 40 (= 210)	Considering just one piece of 45 cm is not a misread but (240 – 45) ÷ 40 (= 4.875) oe should be awarded P1 only
		A1	cao	
14	Isabel (supported)	P1	for process to work with $\frac{3}{4}$ eg $1-\frac{3}{4}$ $(=\frac{1}{4})$ oe, eg 25% or $\frac{25}{100}$ **or** $\frac{3}{4}$ = 75% or $\frac{75}{100}$ **or** value of salary (say 1000) × 3 ÷ 4 (= 750)	
		P1	for process to work with ratio 3 : 7 eg $\frac{3}{3+7}$ oe **or** $\frac{7}{3+7}$ oe **or** value of salary (say 1000) ÷ (3+7) (= 100)	
		A1	for (28(%)), 25(%) and 30(%) **or** 72(%), 75(%), 70(%) **or** 0.28, 0.25, 0.3 **or** for using value of salary (say 1000) giving 280, 250, 300 **or** 720, 750, 700	
		C1	(dep P2) for Isabel or ft their comparative values	"Isabel" alone without supported evidence, gets 0 marks.

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
15	24	M1	for method to find 15% of 160, eg 160 $\times \frac{15}{100}$ oe (= 24) **or** 10% = 160 ÷ 10 (= 16) plus 5% = "16" ÷ 2 (= 8) (= 24)	When using partitioning methods, the method to find individual %s must be clear including the need to show an intention to sum eg. 10% = 16 + 5%=8
		A1	cao SC B1 for answer of 136 or 184 if M0 scored	
16 (a)	14	M1	for 4 × 5 and 3 × −2, the substitution may be seen in two separate calculations, eg 4 × 5 (= 20) and 3 × −2 (= −6)	
		A1	cao	
(b)	$4e^2 + 8e$	B2	for $4e^2 + 8e$	
		(B1	for $4e^2$ or $8e$)	Note: $4e^2 + 8e = 12e^3$ for example gets B1 only
(c)	11	M1	for a correct first step eg 3 × m – 3 × 4 = 21 oe **or** m – 4 = 21 ÷ 3 (= 7) oe	Showing ÷3 by each side of equation is sufficient
		A1	cao	
17	1 : 3	M1	for $\frac{1}{4} : \frac{3}{4}$ oe **OR** for any correct un-simplified ratio, eg 25 : 75	
		A1	cao SC: B1 for an answer of 3 : 1 or 1 : $\frac{1}{3}$ if M0 scored	Ignore 'units' such as 1 nuts : 3 no nuts 1 : 3n gets M1A0

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
18 (a)	15, 17, 19, 20, 21, 23, 25	M1	for listing either set eg 15,20,25 **or** 15,17,19,21,23,25 with no incorrect numbers	The 'lists' may be seen in a Venn Diagram or in the working space in part (b) provided they are not contradicted by incorrect lists in part (a)
		A1	15,17,19,20,21,23 and 25 with no repeats	If repeats (but no incorrect numbers) award M1 only.
(b)	Statement or 15 and 25	C1	eg odd multiples of 5 (between 14 and 26) oe NB Could be a general description, eg numbers that are in both (A and B), **or** 15 and 25 (ft from their sets A and B in part (a)) **or** numbers ending in 5 (between 14 and 26)	
19 (a)	$\frac{95}{28}$	M1	for a method to add using common denominators with at least one fraction correct (matching numerator with common denominator) eg $\frac{60}{28}+\frac{35}{28}$ **or** $(2)\frac{4}{28}+(1)\frac{7}{28}$	Use of decimals gets no credit unless it leads to a correct fraction
		A1	$\frac{95}{28}$ oe eg $3\frac{11}{28}$	
(b)	$1\frac{3}{5}$	M1	for $\frac{6}{5}\times\frac{4}{3}$ **or** $\frac{24}{20}\div\frac{15}{20}$ **or** $\frac{8}{5}$ oe eg $1\frac{9}{15}$	Use of decimals gets no credit unless it leads to a correct fraction
		A1	cao	

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
20	140	P1 P1 A1	for beginning to solve the problem eg 50 ÷ 5 × 8 (= 80) **or** 14 : 8 : 5 oe **or** 14 : 8 and 8 : 5 oe (linked) for a full process to solve the problem eg "80" ÷ 4 × 7 **or** $\frac{50}{5}$ × "14" **or** 140 : 80 : 50 cao	80 may be seen in the ratio 80 : 50 If 140 clearly identified as houses in working award full marks
21	30	P1 P1 P1 A1	for full process to find the number of bags sold eg 5 × 1000 ÷ 250 (= 20) **OR** for process to find selling price of 1 kg of sweets eg 0.65 × 4 (= 2.60) for [number of bags] × 0.65 **or** "20" × 0.65 (= 13) **or** "2.60" × 5 (= 13) **OR** for 10 ÷ "20" oe (= 0.50) **OR** for 0.65 × 4 (= 2.60) **and** 10 ÷ 5 (= 2) (dep on previous P1) for a process to find the percentage profit eg ("13" – 10) ÷ 10 × 100 **or** (0.65 – "0.50") ÷ "0.50" × 100 **or** ("2.60" – "2") ÷ "2" × 100 **OR** "13" ÷ 10 ×100 (= 130) oe cao	This could be by repeated addition Calculations can be in £ or pence [number of bags] can only come from 5 × 10 ÷ 250 (= 0.2) or 5 × 100 ÷ 250 (= 2) or 5 ÷ 250 (= 0.02) 3/10 or 0.3 is not enough but should be awarded 2 marks Award P3 for 130(%)

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
22 (a)	Estimated value	P1	for using a rounded value in a correct process eg 3000 ÷ 15 **or** 15 × 8 **or** 20 × 8	Their rounded value must be used in a calculation Rounding may appear after a correct process eg 15.12 × 8 = 120.96 ≈ 100 followed by eg 3069.25 ÷ 100
		P1	for a full process to find the number of days eg "3000" ÷ "15" ÷ "10" (= 20) **or** "3000" ÷ "15" ÷ 8 (= 25)	Accept 3069.25 ÷ 15.12 ÷ 8 oe
		A1	for a correct answer following through their rounded values	
(b)	Explanation	C1	eg less days required **or** it doesn't affect the answer because I would still round 16.27 down to 15 (or up to 20)	Refers to time taken

PMT

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
23 (a)	isosceles triangle, base 6 cm, height 4 cm	M1	for drawing an isosceles triangle **or** for drawing a triangle of base 6cm and height 4cm	Accept a freehand drawing Only a single triangle is acceptable; do **not** accept any attempted nets or 3-D diagrams
		A1	for a fully correct diagram	Condone a perpendicular drawn from base to vertex
(b)	96 cm^2	M1	for a method to find the area of a triangular face eg ½ × 6 × 5 (= 15)	
		M1	(dep) for finding the total surface area eg 4 × "15" + 6 × 6	
		A1	for a numerical answer of 96 SC B1 for an answer of 84 if M0 scored	Ignore incorrect or absent units for this mark [The SC is from: 4 × ½ × 6 × 4 + 6 × 6]
		B1	cm^2	Ignore incorrect or absent numerical answer for this mark

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
24	(22, 20)	P1	for process to find width or height of diagram eg 38 − 6 (= 32) **or** 36 – 7 (= 29)	Figures may be shown on the diagram
		P1	for process to find length of side of square eg "32" ÷ 4 (= 8) **or** process to find half width of diagram eg "32" ÷ 2 (= 16)	
		P1	for process to find x coordinate eg 6 + 2 × "8" (= 22) **or** 6 + "16" (= 22) **or** (6 + 38) ÷ 2 (= 22)	If (6 + 38) ÷ 2 leads to an answer other than 22, award P2 only
		P1	for process to find y coordinate eg 36 – 2 × "8" (= 20) **or** 36 – "16" (= 20) **or** 7 + 8 + "29"– 3 × "8" (= 20)	
		A1	cao SC: award 4 marks for (20, 22)	Award for P3 for (22, y) or (x, 20) or x = 22 or y = 20

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
25	Line drawn	B3 (B2 (B1	for a correct line between $x = -3$ and $x = 3$ for a correct straight-line segment through at least 3 of $(-3, 13)$, $(-2, 9)$, $(-1, 5)$, $(0, 1)$, $(1, -3)$, $(2, -7)$, $(3, -11)$ **or** for all of these points plotted but not joined **or** for a line drawn with a negative gradient through (0, 1) **and** clear intention to use a gradient of -4, eg line through (0,1) and (0.5, −1) for at least 2 correct points stated or plotted **or** for a line drawn with a negative gradient through (0, 1) **or** a line with gradient -4)	Ignore any incorrect points Table of values x: −3, −2, −1, 0, 1, 2, 3 y: 13, 9, 5, 1, −3, −7, −11 Ignore any incorrect points coordinates may be in a table or in working
26	$\begin{pmatrix} 9 \\ 11 \end{pmatrix}$	M1 A1	for $\binom{2\times5}{2\times2}$ [= $\binom{10}{4}$] or $2 \times 5 - 1$ (= 9) or $2 \times 2 + 7$ (= 11) cao	

PMT

Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

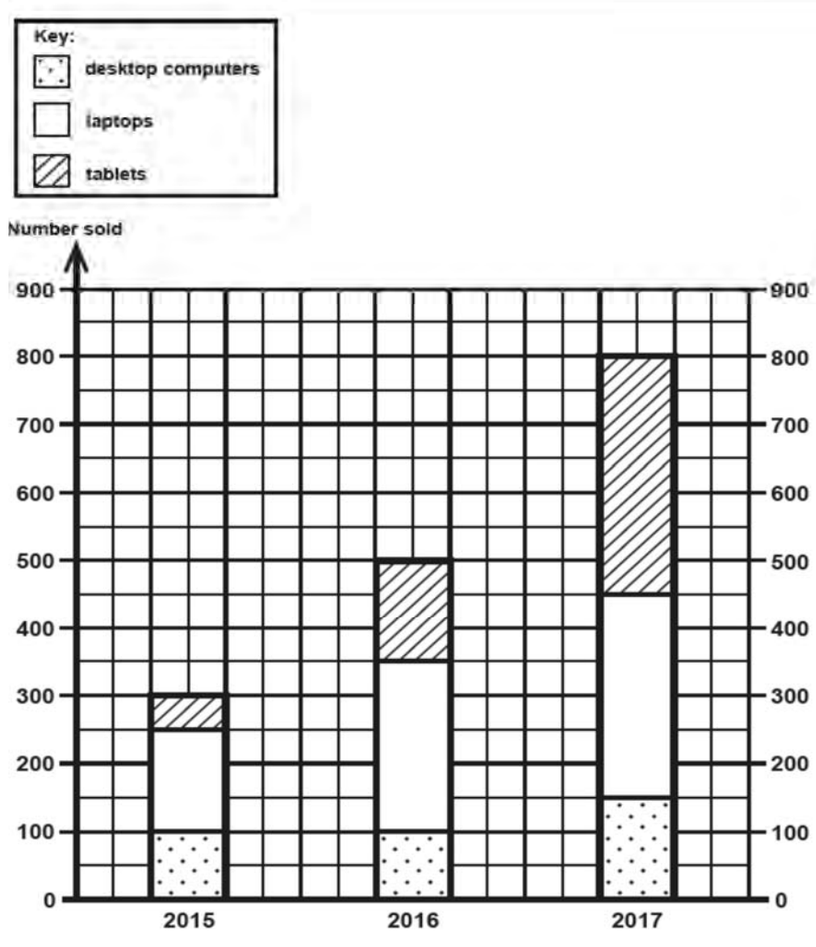
The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5°
Measurements of length: ±5 mm

Paper: 1MA1/1F			
Question		**Modification**	**Mark scheme notes**
2	(a)	Wording ‘five’ added	Standard mark scheme
2	(b)	Wording ‘four’ added	Standard mark scheme
6	(b)	Change to *n*	Standard mark scheme but *a* changed to *n*
7		Probability scale enlarged and crosses changed to solid circles; Lines at zero, a half and 1 lengthened	Standard mark scheme
9	(a)	Diagram enlarged. Wording added ‘It shows a circle.’ Deleted wording ‘cross (x).’ replaced with ‘solid dot.’ Cross changed to solid dot.	Standard mark scheme
9	(b)	Diagram enlarged	Standard mark scheme

PMT

Paper: 1MA1/1F			
Question		**Modification**	**Mark scheme notes**
12		Diagram enlarged. Right axis labelled. Key moved above and to the left of the diagram. Vertical axis label moved above the vertical axis. Shading changed. Intermediates added on both the horizontal and vertical axes. Graph lines changed as follows: 2015 – Laptops changed from 260 to 250; Tablets changed from 260 to 250 and 320 to 300. 2016 – Desktops changed from 120 to 100; Laptops changed from 120 to 100 and 340 to 350. 2017 - Desktops changed from 160 to 150; Laptops changed from 160 to 150 and 440 to 450 Tablets changed from 440 to 450 and 780 to 800	(a) Standard mark scheme (b) M1 for reading at least 3 of the required figures from the graph eg. 3 of 100, 250, 100, 350, 150 or 450 or finding 2 differences from 250 – 100 (= 150), 350 – 100 (= 250), 450 – 150 (= 300) M1 (dep) for complete method shown eg 150 + 250 + 300 A1 cao for 700

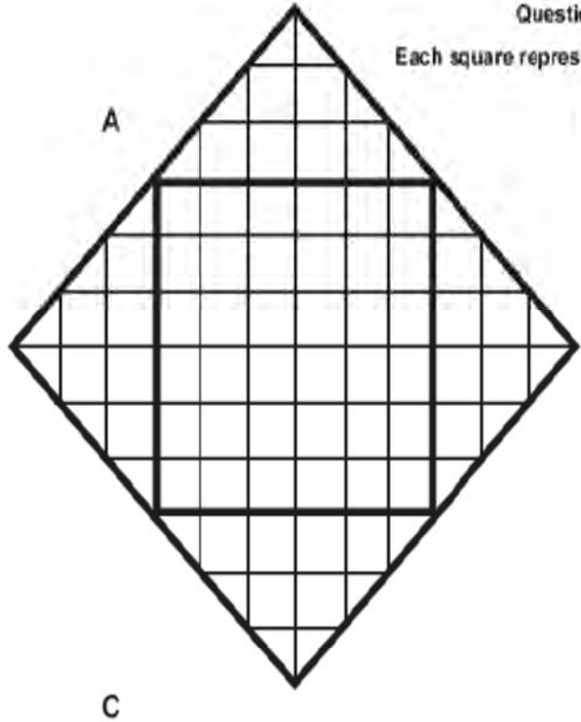
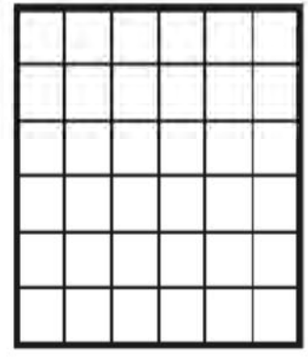
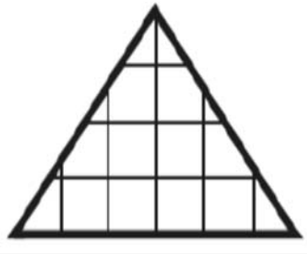
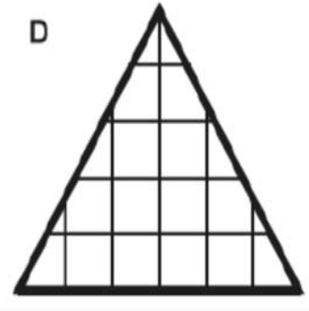
PMT

Paper: 1MA1/1F			
Question		**Modification**	**Mark scheme notes**
12 cont.			

PMT

Paper: 1MA1/1F			
Question		**Modification**	**Mark scheme notes**
16	(a)	MLP only: *x* and *y* changed to *s* and *t*.	Standard mark scheme, except for MLP in the mark scheme read *s* for *x*, and *t* for *y*.
16	(b)	Braille only: e changed to q.	Standard mark scheme, except for Braille in the mark scheme read *q* for *e*
23	(a)	Model and a diagram provided. Diagram enlarged. Dashed lines made longer and thicker. Dotted lines made more obvious. Question reversed: Four different options of the front view of the pyramid have been provided. The pyramid has been put on page one for question 23(a) and the four shapes labelled A to D have been put on page two for question 23(a). Question changed to 'Look at the model or at the diagrams for Question 23(a) in the Diagram Book. They are shown on two pages in the Diagram Book. Page one shows a solid square-based pyramid, VABCD. The base of the pyramid is a square of side 6 cm. The height of the pyramid is 4 cm. M is the midpoint of BC and VM = 5 cm. Page two for Question 23 shows four shapes, labelled A, B, C and D. Each square represents a one centimetre square. Which shape shows the accurate front elevation of the pyramid from the direction of the arrow?'	Award 1 mark for an answer of D Award 2 marks for an answer of C NB: Accept any other unambiguous indication of the answer such the diagram indicated by circling etc.

PMT

Paper: 1MA1/1F			
Question		**Modification**	**Mark scheme notes**
23 cont.		Question 23 – page two Each square represents a one centimetre square. A  B  C  D 	

PMT

Paper: 1MA1/1F			
Question		**Modification**	**Mark scheme notes**
24		Diagram enlarged. Crosses changed to solid dots. Wording changed to 'It shows a pattern made from four identical squares.'	Standard mark scheme
25		Diagram enlarged. Y axis has been cut to go from -14 to 14.	Standard mark scheme

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Question 29

Many students were able to score at least one mark, and often two, in this question, showing some understanding of vector arithmetic. $\begin{pmatrix}4\\5\end{pmatrix}-\begin{pmatrix}6\\4\end{pmatrix}$ was often seen but then simplified incorrectly, sometimes by adding, sometimes by multiplication and sometimes simply by incorrect subtraction. A number of students tried to square the vector **b** instead of multiplying it by 2 giving $\begin{pmatrix}4\\5\end{pmatrix}-\begin{pmatrix}9\\4\end{pmatrix}$. Quite a few students saw this as a fraction question, 4/5 −6/4, and proceeded with a common denominator etc. A number of students wrote out $\begin{pmatrix}4\\5\end{pmatrix}-2\begin{pmatrix}3\\2\end{pmatrix}$ but they were unable to complete this method.

Summary

Based on their performance on this paper, students should:

- show working for all questions including any calculations done using a calculator
- read each question carefully to ensure that their final answer matches the question asked
- ensure that they know the difference between area and perimeter
- use the correct percentage of decimal or equivalent instead of a fraction, for example, 0.3 or 30% should not be used in place of $\frac{1}{3}$
- remember to draw a straight line through points generated and then plotted in order to draw the graph of an equation of the form $y = mx + c$
- practise showing inequalities on a number line, drawing loci to identify a region, finding lengths or angles using trigonometry and writing down error intervals

Question 30

This question was answered poorly with relatively few students showing an understanding of vector arithmetic. Some students scored the first method mark for $5 - 2 \times 3$ or $2 - 2 \times -1$. When $\begin{pmatrix} 5 \\ 2 \end{pmatrix} - \begin{pmatrix} 6 \\ -2 \end{pmatrix}$ was seen it was often not simplified correctly with errors usually occurring in the y component. Students that scored the second mark for simplifying to $\begin{pmatrix} -1 \\ 4 \end{pmatrix}$ were rarely able to achieve the final mark for drawing the vector. Some students attempted to find the vector $\mathbf{a} - 2\mathbf{b}$ by drawing but most could not manage even the first step. At all stages of the question the drawing of vectors was extremely poor and very few students drew any kind of correct vector.

Summary

Based on their performance on this paper, students should:

- practise working with time, converting from minutes to hours and vice versa
- learn how to read and interpret scales on graphs, particularly those where 1 small square is not 1 or 0.1
- ensure that they know how to use their calculator
- practise finding missing angles with isosceles triangles in various orientations
- understand the difference between simple interest and compound interest
- practise working with algebra in formulating expressions or formulae and in substituting into formulae
- practise using and drawing column vectors

Question 26

Students attempted to answer this question in a wide variety of ways, some were able to gain a mark for the correct substitution or for obtaining the new vectors of $\begin{pmatrix}6\\8\end{pmatrix}$ and $\begin{pmatrix}15\\-6\end{pmatrix}$ but working with negative numbers caused a lot of problems when trying to combine these vectors. Far too many students used addition rather than subtraction. Other students scored a mark by finding one value in the final vector correctly.

Question 30

Part (a)(i) was surprisingly well answered. A common error was for the numbers to be reversed in the vector. But in contrast part (ii) was not well answered. While many candidates were able to show a substituted expression, they often failed to multiply both the 2 and the 3 of vector a by 2 before doing the subtraction. Some candidates forgot to account for the sign and added the vectors instead.
Many of the candidates failed to attempt part (b). Most of those who did make an attempt did not know (or failed to recognise) that 2**d** would be parallel to **d**, just drawing a random diagonal line. Some of the candidates drew a correct vector but not from point *P*. Copying the vector without doubling it was another common error.

Summary

Based on their performance on this paper, candidates should:

- take care when reading figures from questions, and transcribing their own work
- ensure that when giving explanations that responses are focused on the demand of the question
- write their figures legibly, avoiding any possible confusion when writing 1s and 7s, when writing 4s and 9s, and even when writing 0s and 6s.
- show their methods clearly
- ensure they know how to scale numbers, and use scaling on axes of graphs
- practice algebraic manipulation, particularly in relation to finding the subject of a formula
- understand better how to change between units, including compound units.
- practice using ratio in real life contexts

Question 26

This question involved addition of scalar multiples of column vectors. Many learners were able to interpret the demand of the question correctly and find the required result. In some instances errors in evaluation of a correct method meant that only one mark was awarded. Common incorrect approaches included combining the values within the vectors or obtaining a single value for the answer. It appeared that some learners were not familiar with vector notation and interpreted the information given as fractions. Lots of learners scored a mark for

a correct value in the final vector – this was most often the 20 as many learners struggled to work with the negative number. Some learners tried to "simplify" their vector as if it was a fraction.

Summary

Based on the performance on this paper, learners / centres should work on:

- improving numeracy skills, including multiplication and division skills when working with integers and decimals,
- arithmetic involving negative numbers,
- arithmetic with fractions including when to find a common denominator and how to find a fraction of an amount,
- working with time in contextual questions,
- unit conversions for length and working with scales given as a ratio,
- the interpretation of problems involving ratio,
- working with inverse number machines,
- completing tables of values for, and drawing, quadratic graphs,
- giving complete geometrical reasons when working with triangles and with parallel lines,
- using angle notation such as BAC to describe angles in a diagram,
- working with the sum of interior angles and the sum of exterior angles of polygons in problem solving,
- finding the equation of a given line,
- encouraging students to set out their working using logical steps,
- encouraging students to read the question carefully so that they understand what they are required to do and what format the answer should be stated in,
- interpretation of questions involving context and multistep processes.