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Mark Scheme (Results)

November 2021

Pearson Edexcel GCSE
In Mathematics (1MA1)
Foundation (Calculator) Paper 3F

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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 (eg 3.5 – 4.2) then this is inclusive of the end points (eg 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 eg 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 eg "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 eg [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.

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 awarded for a fully correct statement(s) with no contradiction or ambiguity
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: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1	0.45	B1	cao	
2	2 factors	B1	at least 2 of 1,5,7,35	No incorrect factors
3	10 45	B1	for 10 45	Accept any time notation
4	11	B1	cao	
5	Midpoint marked	B1	within tolerance	
6 (a)	$4ab$	B1		
(b)	$3x + 8$	M1	for method to collect terms eg $3x$ or 8	May be seen in working. Accept if no ambiguity.
		A1	for $3x + 8$	
7	EJ, EK, FJ, FK, GJ, GK	B2	fully correct list with no repeat	Allow letters in either order
		(B1	for at least 4 correct)	
8	2540 shown	M1	for finding the cost of one item eg 2×600 (=1200) or 7×120 (=840) or 2×250 (=500)	
		M1	full process eg "1200" + "840" + "500" (=2540) **or** 2500 − "1200" − "840" − "500" (= ±40)	
		A1	for 2540 or ±40	Ignore written statements as long as the correct figures are shown

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
9	4 **5** 23 **32** **8** 9 7 24 **12** **14** 30 **56**	B3 (B2 (B1	for a fully correct table for at least 7 figures correctly placed) for the given values correctly placed in the table or one correct row or column)	Given values in bold Given values: 5, 32, 8, 12, 14, 56
10	61	P1 A1 A1	for 300 ÷ 4.85 (= 61.8...) for 61.8... **or** 62 61	This mark may be awarded for build-up methods that get to figures that are before or after 300 Embedded answers get −1 mark.
11 (a)	3 hrs 16 mins	P1 A1	196 − 60 − 60 − 60 (=16) oe **or** 196 ÷ 60 (= 3.26.. or 3.27…) **or** states 3 hours in their answer (with an incorrect number of minutes or minutes left blank) 3 hours 16 minutes	
(b)	$\frac{x}{2}$	B1	$\frac{x}{2}$ oe	
12 (a)	50	M1 A1	[2.5] × 20 (=50) for an answer in the range 46 to 54	[2.5] a number in the range 2.3 to 2.7 or identified as the distance from Shelton to Trilby
(b)	60	M1 A1	5 × 1200 (=6000) **or** 1200 ÷ 100 (=12) **or** conversion 5 ÷ 100 (=0.05) cao	

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
13 (a)	40	M1	2 ÷ (2+3) × 100 (=40) or build up to (and shows) 40:60 oe **or** for sight of $\frac{2}{5}$ oe **or** 100 ÷ 5 (=20)	
		A1	cao	
(b)	20 : 80	M1	100 − 20 (=80) or 80 : 20 oe	
		A1	20 : 80 oe	Accept any equivalent ratio; award full marks if an acceptable ratio is given and then incorrectly simplified.
14	80	P1	for $1-\frac{13}{15}\left(=\frac{2}{15}\right)$ **or** $\frac{13}{15}\times 600$ (million) (= 520 (million))	Condone no million or may see 000 000 used* *In this case condone up to two missing 0s for the award of the P marks.
		P1	for $"\frac{2}{15}"\times 600$ (million) (= 80 (million)) **or** 600 − "520" (=80) oe	For P marks accept $\frac{13}{15}$, $\frac{2}{15}$ rounded or truncated to no less than 2dp.
		A1	Accept 80 000 000	
15	Explanation	C1	for explanation **Acceptable examples** They do not add to 360 They add to 100 too least It is missing a 100 angle / It needs 100 more Because the total has to be 360 A whole circle is 360 **Not acceptable examples** They add up to 260 One of the angles is wrong A shape with 4 angles adds up to 360	

Paper: 1MA1/3F					
Question	**Answer**	**Mark**	**Mark scheme**		**Additional guidance**
16	Enlargement centre (1,1) scale factor 4	B2 (B1	Enlargement, centre (1,1) and scale factor 4 two of Enlargement, centre (1,1), scale factor 4 with nothing incorrect)		No extras. Accept *A* as centre. If there is a clear reference to a different transformation award no marks
17 (a)	$y^2 + 5y$	B1	cao		
(b)	$2(2a - 3)$	B1	cao		
(c)	2.9	M1	for a correct first stage eg. expanding the brackets, $2 \times 5x - 2 \times 4$ ($= 10x - 8$) **or** division of both sides by 2, eg $\frac{2(5x-4)}{2} = \frac{21}{2}$		
		M1	for isolating terms in x eg $10x = 21 + 8$		
		A1	oe		
(d)	$20\,e^3f^4$	M1	for any two of 4×5 (=20), e^{2+1} ($=e^3$), f^{1+3} ($=f^4$) in a product or written as individual terms		Do not award if there is contradiction
		A1	cao		
18	10 000	B1	cao		
19	34 cm²	P1	for finding one area eg 8×8 (= 64) or $0.5 \times 3 \times 5$ (=7.5)	for first stage in working with Pythagoras eg sight of $3^2 + 5^2$ or $9 + 25$	
		P1	for a complete process to find the area eg "64" − 4 × "7.5" (=34)	for full use of Pythagoras eg $\sqrt{3^2+5^2}$ or $\sqrt{34}$ or 5.83…	Any figure used must come from a correct process
		A1	for an answer in the range 33.6 to 34		Can be awarded with incorrect units stated
		B1	(indep) for cm²		Can be awarded with an incorrect or absent numerical answer

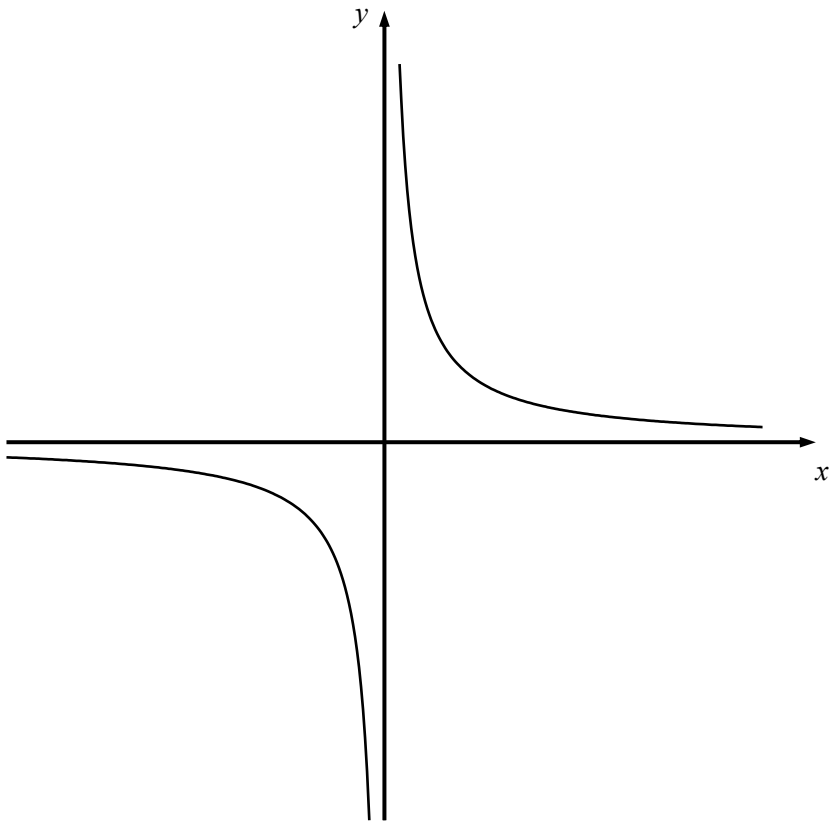
Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
20	1 | 57899 2 | 0224558 3 | 235	B2 (B1 B1	for a fully correct ordered diagram for a fully correct unordered diagram or for an ordered diagram with one error or omission) (indep) for correct key (units not required but must be correct if stated) eg 2|5 represents 25 (cm)	Can be in reverse vertical order (with matching leaves) eg 3,2,1 One number in the wrong position is one error.
21 (a)	(100,18)	B1	cao	
(b)	12.8 to 14.8	M1 A1	for a method to read off eg line of best fit **or** line up from 370 **or** for a point on the grid at (370, *y*) where *y* lies between 12.8 and 14.8 for an answer in the range 12.8 to 14.8	
(c)	Decision and statement	C1	for decision and statement **Acceptable examples** No, as this point can be disregarded from the general trend No, ignore this point No, the correlation is positive No, because even with an outlier you can still have a negative or positive correlation. No, there is still a correlation. No, as you can use the rest of the data to determine a correlation. No, as outlier does not affect the majority No as a line of best fit can still be drawn No, it is an anomaly **Not acceptable examples** Yes, …. Outliers can be ignored [no decision] No, the outlier can be ignored so the correlation is negative No there are other things that can affect the test	

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
22	12.85 or 12.86 or 13.5(0)	P1	for 9 + 2 + 1 (=12)	Award this mark for sight of 4500, 1000 or 500
		P1	for working out how many lots of 175g are needed eg 6000 ÷ "12"× 2 ÷ 175 (=5.71..)	Process may lead to 5 or 6 instead of 5.71
		P1	for a complete process eg "5.71…" × 2.25 (=12.857..)	"5.71…" (ft) or a figure rounded or truncated eg "6"
		A1	for 12.85 or 12.86 or 13.5(0)	
23 (a)	450 000	B1	cao	
(b)	7×10^{-3}	B1	cao	
(c)	4.73×10^{3}	M1	for 4730 oe **or** for 4.73×10^{n} where $n \neq 3$	
		A1	cao	

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
24	260	P1	conversion to common units of capacity eg 2.2 × 4.54 (= 9.988) **or** 8 ÷ 4.54 (= 1.76...) **OR** **for company A** 2400 ÷ 4.54 (= 528.63...) **OR** 2400 ÷ 8 (= 300) **OR** a rate per minute 8 ÷ [time for Company A] (= 4.8…) oe	[time for Company A] could be 1 min 40 sec or 1.66… or 1.6 or 1.40 etc as long as it is clear it relates to 1 min 40 sec Results of calculations may be truncated or rounded.
		P1	for a complete process to find the time for one water rate in minutes. eg in litres Company A 2400 ÷ "4.8.." (= 500) or "300" × [1 min 40 sec] (= 500) **or** Company B 2400 ÷ "9.988" (= 240.28...) **OR** eg in gallons Company A "528.63.." ÷ ("1.76. .." ÷ [1 min 40 sec]) (= 500) **or** Company B "528.63…" ÷ 2.2 (= 240.28…)	
		P1	for complete processes to find the times for both company A and company B in minutes. Company A eg in litres 2400 ÷ "4.8…" (= 500) or "300" × [1 min 40 sec] (= 500) or in gallons "528.63.." ÷ ("1.76. .." ÷ [1 min 40 sec]) (= 500) **AND** Company B eg in litres 2400 ÷ "9.988" (= 240.28...) or in gallons "528.63…" ÷ 2.2 (= 240.28…)	
		A1	for an answer in the range 259 to 260	If the answer is given within the range but then rounded incorrectly award full marks.

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
25	12	P1	for a process to find the fifth term eg 3a + 5a (=8a)	
		P1	for setting up the equation eg $a + 2a + 3a + 5a + [8a] = 228$	[8a] allow use of what is clearly indicated as the missing term
		A1	cao	$\frac{228}{19}$ or $\frac{228}{1+2+3+5+8}$ scores P1 P1 $\frac{228}{1+2+3+5+[8]}$ scores P0 P1
26 (a)	0.5, 0.3	P1	for $1 - 0.05 - 0.15$ (=0.8)	Award this mark for any two probabilities that sum to 0.8
		A1	oe	
(b)	120	M1	$18 \div 0.15$ oe **or** $6 + 18 + a + b$ where $a + b = 96$	
		A1	cao	
27	18.3	P1	for finding the area of the triangle eg $0.5 \times 8 \times 8$ (=32)	Accept rounded or truncated figures
		P1	for finding the area of the circle $\pi \times 8 \times 8$ (= 201.06..)	
		P1	for finding the area of the sector eg $¼ \times \pi \times 8^2$ **or** "201.06.." ÷ 4 (= 50.26...)	
		A1	for an answer in the range 18.2 to 18.3	If the answer is given within the range but then rounded incorrectly award full marks.
28	Sketch	M1	correct shape in one of the required quadrants **or** correct graph where the lines touch the axes	
		A1	fully correct shape	Lines do not need to extend to the ends of the axes if the intention is clear

Qu 28 Example



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

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: ±5º
Measurements of length: ±5 mm

PAPER: 1MA1_3F			
Question		**Modification**	**Mark scheme notes**
5		Wording added 'Look at the diagram for Question 5 in the Diagram Booklet.' Wording 'AB is a straight line' removed and replaced with 'It shows a straight line *AB*.' The line made exactly 12 cm. Labels moved above the line. Braille: Wording 'with a cross (×)' removed, a spare diagram provided with 2 round bumpons and drawing film.	Standard mark scheme but note the change in line length.
6	(a)	Change *a* to *m*, *b* to *n*.	Standard mark scheme but note the change in letters.
6	(b)	Change *x* to *y*.	Standard mark scheme but note the change in letters.
7		Wording added 'In bag **A**, the three cards have the letters *E*, *F* and *G* written on them.' Wording added 'In bag **B**, the two cards have the letters *J* and *K* written on them.' Braille: diagram removed.	Standard mark scheme

<table>
<tr><th colspan="3">PAPER: 1MA1_3F</th></tr>
<tr><th colspan="2">Question</th><th>Modification</th><th>Mark scheme notes</th></tr>
<tr><td>8</td><td></td><td>Wording added ‘Look at the table for Question 8 in the Diagram Booklet. It shows information about prices.’ ;
Table enlarged.
Braille: Change table to information:
“These details are shown below:
• Each plane ticket costs 600 dollars
• Each night in a hotel costs 120 dollars
• Each theme park ticket costs 250 dollars”</td><td>Standard mark scheme</td></tr>
<tr><td>9</td><td></td><td>Wording added ‘Look at the two-way table for Question 9 in the Diagram Booklet.’
Wording added ‘in the Diagram Booklet.’
Table enlarged.
Wording added ‘There are twelve spaces to fill.’
Braille: Wording added ‘There are seven spaces to fill.’
Diagram amended as shown:
<table>
<tr><td></td><td>Plastic</td><td>Not plastic</td><td>Total</td></tr>
<tr><td>Red</td><td>(ii)</td><td>8</td><td>12</td></tr>
<tr><td>Blue</td><td>5</td><td>(iii)</td><td>14</td></tr>
<tr><td>Black</td><td>(vii)</td><td>(vi)</td><td>(iv)</td></tr>
<tr><td>Total</td><td>(i)</td><td>(v)</td><td>56</td></tr>
</table>
In the table, add (i), (ii), (iii), (iv), (v), (vi) & (vii) in the blank spaces.
For Braille add “Ans: (i) __ (ii) __ (iii) __ (iv) __ (v) __ (vi) __ (vii) __</td><td>Standard mark scheme for MLP.
For Braille:
B3 for a fully correct table, or values given: (i) 32 (ii) 4 (iii) 9 (iv) 30 (v) 24 (vi) 7 (vii) 23
B2 for at least 3 figures correctly given)
B1 for the value of 32 given for (i) or one correct row or column
B2</td></tr>
</table>

PAPER: 1MA1_3F			
Question		**Modification**	**Mark scheme notes**
12		Wording added 'Look at the diagram for Question 12 in the Diagram Booklet.' Wording 'The diagram shows…' removed and replaced with 'It shows two places, Shelton and Trilby, on a map.' The diagram enlarged × 2 so the distance between Shelton and Trilby will be 5 cm exactly. The scale changed to 1 centimetre represents 10 kilometres. Wording added 'It has the scale: 1 cm represents 10 kilometres.' Trilby moved to the right of Shelton so that the candidate can measure horizontally. Crosses changed to solid dots. The town names moved above the dots. Scale moved above the diagram. The outside frame made wider.	Standard mark scheme but the M mark in part (a) is now: M1 [5]* × 10 (=50) *accept [5] in the range 4.5 to 5.5 (=45 to 55) For the A mark accept an answer in the range 45 to 55
16		Wording added 'Look at the diagram for Question 16 in the Diagram Booklet.' Wording 'Here is…' removed and replaced with 'It shows two right-angled triangles on a grid. The triangles are labelled *BAC* and *DAE*.' Wording added 'Point *A* for each of the triangles is in the same position on the grid.' Wording added 'Angle *BAC* and angle *DAE* are right angles.' Diagram enlarged. Open headed arrows. Shading removed. The grid cut at $x = -1$ and $y = -1$. Axes labels moved to the right of the horizontal axis and above the vertical axis. The wording '…that maps triangle *ABC* onto triangle *ADE*' removed and replaced by '…that maps triangle *BAC* onto triangle *DAE*.'	Standard mark scheme
17	(b)	Change *a* to *m*.	Standard mark scheme but note the change in letter
17	(d)	Change *e* to *p*. Change *f* to *q*.	Standard mark scheme but note the change in letters

PAPER: 1MA1_3F			
Question		**Modification**	**Mark scheme notes**
19		Wording added 'Look at the diagram for Question 19 in the Diagram Booklet.' Wording 'This diagram shows…' removed and replaced with 'It shows two squares, *ABCD* and *EFGH*.' The larger square labelled *ABCD* and the shaded square labelled *EFGH*. Wording added 'The square *EFGH* is shaded. *EFGH* is inside *ABCD*.' Wording added: '*AE* = *BF* = *CG* = *DH* = 3 cm; *EB* = *FC* = *GD* = *HA* = 5 cm ; All the marked angles are right angles.' Diagram enlarged. Right angles made more obvious. Shading changed.	Standard mark scheme
20		Wording added 'Look at the diagram for Question 20 in the Diagram Booklet. It shows an incomplete stem and leaf diagram.' Wording 'Here…' removed and replaced with 'Below..'; Wording added 'in the Diagram Booklet.' Diagram enlarged. Key moved above the diagram. Extra horizontal line added. Braille: Remove "Here are" and change to "The list below shows…" Change "Draw…" to "On your paper, make…" ; No diagram in Braille.	Standard mark scheme
21		Wording added 'Look at the diagram for Question 21 in the Diagram Booklet. It is a scatter graph which shows…' Diagram enlarged. Open headed arrows. Right axis has been labelled. Axes labels moved to the left of the horizontal axis and above the vertical axis. Crosses changed to solid dots. Small squares removed. Braile: There will be a spare diagram and Wikki Stix	Standard mark scheme but in part (b) use a range of 11 to 13
25		Change *a* to *n*.	Standard mark scheme but note the change in letter.
26		Wording added 'Look at the table for Question 26 in the Diagram Booklet.' Wording added 'The table in the Diagram Booklet…'; Table enlarged and turned vertical. In part (a) Wording added 'in the Diagram Booklet.'; Wording added 'There are two spaces to fill.' Braille: In the table letters (i) & (ii) placed in the blank spaces with an answer line: 'Ans: (i) __ (ii) __'	Standard mark scheme

PAPER: 1MA1_3F			
Question		**Modification**	**Mark scheme notes**
27		Wording added ‘Look at the diagram for Question 27 in the Diagram Booklet.’ Wording ‘The diagram shows…’ removed and replaced with ‘It shows…’ Wording added ‘$OP = OR = 8$ cm.’ Wording added ‘The marked angle is a right angle.’ Diagram enlarged. Right angle made more obvious. Shading changed.	Standard mark scheme
28		Wording added ‘Look at the diagram for Question 28 in the Diagram Booklet. It shows a set of axes.’ Wording added ‘on the axes in the Diagram Booklet.’ Diagram enlarged. Open headed arrows. Axes labels moved to the right of the horizontal axis and above the vertical axis. Braille: there will be a spare diagram, Wikki Stix and drawing film.	Standard mark scheme

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