Mark Scheme (Results)

January 2019

Pearson Edexcel International GCSE
Mathematics A (4MA1) Foundation Tier
Paper 2F

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information, please visit our website at www.edexcel.com.

Our website subject pages hold useful resources, support material and live feeds from our subject advisors giving you access to a portal of information. If you have any subject specific questions about this specification that require the help of a subject specialist, you may find our Ask The Expert email service helpful.

www.edexcel.com/contactus

Pearson: helping people progress, everywhere

Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

January 2019
Publications Code 4MA1_2F_1901_MS
All the material in this publication is copyright
© Pearson Education Ltd 2019

General Marking Guidance

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

Types of mark

- M marks: method marks
- A marks: accuracy marks
- B marks: unconditional accuracy marks (independent of M marks)

Abbreviations

- cao – correct answer only
- ft – follow through
- isw – ignore subsequent working
- SC - special case
- oe – or equivalent (and appropriate)
- dep – dependent
- indep – independent
- eeoo – each error or omission

- **No working**
  If no working is shown then correct answers normally score full marks
  If no working is shown then incorrect (even though nearly correct) answers score no marks.
- **With working**
  If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
  If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.
  If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review.
  If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.
  If there is no answer on the answer line then check the working for an obvious answer.
- **Ignoring subsequent work**
  It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.
  It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.

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

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

Question	Working	Answer	Mark	Notes
1 (a)		0.23	1	B1
(b)		70	1	B1
(c)		0.2	1	B1
(d)		6 triangles shaded	1	B1
(e)		79	1	B1
2 ai		Likely	1	B1
aii		Impossible	1	B1
(b)		× at $\frac{3}{10}$	1	B1
3	150 ÷ 6 (=25) or 6 × 25 = 150 or 1.03 ÷ 6 (=0.17…)			M1
	"25" × 1.03 or "0.17…" × 150			M1 dep
		25.75	3	A1
4 (a)		5*m*	1	B1
(b)		35*p*	1	B1
(c)		5	1	B1
(d)		15	1	B1

Question	Working	Answer	Mark	Notes
5		correct graph	4	B1 for key or suitable labels to identify London and Cairo **or** temperature axis scaled (linear scale, allow 1 error for this mark) and labelled B1 for diagram showing data for at least 3 months for both cities (may not be accurate) (eg. dual bar chart, composite bar chart, time series) B1 for correct heights for at least 4 bars or at least 4 correct plots (ft from a scale with only 1 error) B1 fully correct diagram

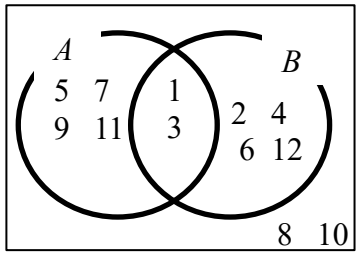
Question		Working	Answer	Mark	Notes
6			1H, 1T, 2H, 2T, 3H, 3T, 4H, 4T, 5H, 5T, 6H, 6T	2	B2 for all 12 combinations and no extras or repeats If not B2 then B1 for at least 4 correct combinations (ignoring repeats)
7			Triangle at (3, 0) (3, −3) (5, −3)	2	M1 for line $y = 1$ drawn or correct reflection in any line parallel to the x-axis A1 SCB1 for correct reflection in $x = 1$
8	(a)		$3\frac{4}{5}$	1	B1
	(b)	84 – 10 – 45 (=29)	$\frac{29}{84}$	M1 2	A1 SCB1 for $\frac{55}{84}$
	(c)	0.75, 0.916…, 0.625, 0.45	$\frac{9}{20}, \frac{5}{8}, \frac{3}{4}, \frac{11}{12}$	M1 2	for conversion to common form A1 SC :if M0 award B1 for any 3 fractions in the correct order or for all fractions in correct reverse order
	(d)	$\frac{23}{24} - \frac{9}{24}$ oe	shown	M1 2	for two fractions with a common denominator with at least one numerator correct A1 for $\frac{14}{24}$ oe and then $\frac{7}{12}$

Question		Working	Answer	Mark	Notes
9		55 × 28 × (33 – 3) oe (=46 200) or 55 × 28 × 33 (=50820) "46 200" ÷ 1000 ÷ 4 "50820" ÷ 1000 ÷ 4 "46 200" ÷ (4 × 1000) "50820" ÷ (4 × 1000)	11	4	M1 correct method to find the volume of water in fish tank or volume of fish tank M2 For ÷ 1000 ÷ 4 (or ÷ by 4000) or for an answer of 11.55 (M1 for division of volume by one of these or for 4 × 1000 (= 4000)) A1 cao
10	(a)	150 : 75	2 : 1	2	M1 for any ratio equivalent to 150 : 75 eg 6 : 3 **or** 1 : 2 A1 Accept 1 : 0.5 oe
	(b)	75 ÷ 40 × 8 oe **or** 40 ÷ 8 (=5) **and** 75 ÷ "5"	15	2	M1 A1
	(c)		eg don't know with reason	1	B1 E.g. Can't be sure as pie chart shows proportions and not actual numbers, We don't know how many each degree represents, etc

Question		Working	Answer	Mark	Notes	
11	(a)	$5m = 24 - 7$ **or** $m + \frac{7}{5} = \frac{24}{5}$			M1	
			3.4 oe	2	A1	for 3.4 oe e.g. $\frac{17}{5}$
	(b)	$2k = t - e$			M1	
			$t = 2k + e$	2	A1	NB: $2k + e$ only on answer line scores M1 unless $t = 2k + e$ in working and then M1A1
	(c)		p^5	1	B1	
	(d)		1	1	B1	
	(e)		$27x^6y^{15}$	2	B2	If not B2 then B1 for any two correct terms in a product
12	(a)	$2 \times \pi \times 9$ **or** $\pi \times 18$			M1	
			56.5	2	A1	for answer in range 56.5 – 56.6
	(b)	$\sqrt{169}$ (=13)			M1	
		5 × "13" oe			M1	
			65	3	A1	

Question	Working	Answer	Mark	Notes
13	Angle BCD = 180 – 68 (=112) or angle *BAD* (or *BDA*) = (180 – 48) ÷ 2 (=66) angle *BDC* = 360 – 243 – "66" (=51) **or** angle *ADC* = 360 – 243 (=117) e.g. 68 – "51" (=17) **or** 180 – (180 – 68) – "51" **or** 360 – "117" – "66" – (180 – 68) – 48	17 with reasons	5	M1 Could be seen on diagram M1 Could be seen on diagram M1 for a complete method B1 dep on M1 for any one correct appropriate reason A1 for correct answer with full reasons E.g. Base angles of an isosceles triangle are equal Angles in a triangle sum to 180° Angles at a point add up to 360° / full turn Angles on a straight line sum to 180° **or** exterior angle equals the sum of interior opposite angles Angles in a quadrilateral add up to 360°
14	300 × 0.08 oe (=24) **or** 300 × 9.5 (=2850) **or** 100(%) – 8(%) (=92(%)) **or** 1 – 0.08 (=0.92) 300 – "24" (=276) **or** for 0.08 × "2850" (=228) **or** "0.92" × 300 (=276) "276" × 9.5 **or** "2850" – "228" oe	2622	4	M1 M1 M2 for 0.92 ×"2850" M1 A1

Question		Working	Answer	Mark	Notes
15			perpendicular bisector drawn	2	M1 Two pairs of relevant arcs drawn **or** line within guidelines without arcs A1 perpendicular bisector drawn within guidelines and with two pairs of relevant arcs present (overlay needed)
16	(a)		11 – 15	1	B1
	(b)	$3 \times 5 + 8 \times 10 + 13 \times 16 + 18 \times 9$ **or** $15 + 80 + 208 + 162$ **or** 465			M2 $f \times n$ for at least 3 products with correct mid-interval values **and** intention to add If not M2 then award M1 for n used consistently for at least 3 products within interval **and** intention to add **or** at least 3 products with correct mid-interval values with no intention to add
		$(3 \times 5 + 8 \times 10 + 13 \times 16 + 18 \times 9) \div 40$ **or** $(15 + 80 + 208 + 162) \div 40$ **or** $465 \div 40$			M1 dep on M1 NB: accept their 40 if addition shown
			11.625	4	A1 Accept 11.6 or 11.63 or 12 if correct working seen ($465 \div 40$ oe)

Question	Working	Answer	Mark	Notes
17	90 ÷ (2 + 13) (= 6) **or** $\frac{12+x}{90+x}=\frac{1}{3}$ "6" × 2 (=12) **or**"6" × 13 (=78) **or** $3(12 + x) = 90 + x$ ("78" ÷ 2) – "12" **or** $2x = 54$ **or "**78" × 3/2 –"78" – "12"oe	27	4	M1 M2 for $\frac{2}{15}\times 90(=12)$ **or** $\frac{13}{15}\times 90(=78)$ M1 M1 dep on a correct method for "78" and "12" A1
18		Fully correct Venn diagram	4	B4 fully correct Venn diagram with labels *A* and *B* (If not B4 then B3 for 3 correct regions, B2 for 2 correct regions B1 for 1 correct region)

Question	Working	Answer	Mark	Notes
19	123 – 67 (=56) **or** $2x = 123 - 67$ **or** $2x + y = 67$ **or** $4x + y = 123$ oe (x = length of tile, y = width of tile)			M1
	e.g. "56" ÷ 2 (=28)			M1 for method to find length or width
	67 – 56 (=11) **or** 67 – 2×"28" (=11) **or** 123 – 4×"28" (=11)			M1 for method to find other dimension
	(67 – 2×"11") × (123 – 2×"11") **(**45 × 101) **or** 123 × 67 – 12 × "28" ×" 11" (8241 – 3696)			M1 dep on M2
		4545	5	A1

<table>
<tr><th>Question</th><th>Working</th><th>Answer</th><th>Mark</th><th colspan="3">Notes</th></tr>
<tr><td>20 (a)</td><td>2 × 2 × 2 × 2 × 2 × 3 or 2 × 2 × 2 × 3 × 5
e.g.
<table><tr><td>2</td><td>96</td><td>120</td></tr><tr><td>2</td><td>48</td><td>60</td></tr><tr><td>2</td><td>24</td><td>30</td></tr><tr><td>3</td><td>12</td><td>15</td></tr><tr><td></td><td>4</td><td>5</td></tr></table>
<table><tr><td>6</td><td>96</td><td>120</td></tr><tr><td>4</td><td>16</td><td>20</td></tr><tr><td></td><td>4</td><td>5</td></tr></table></td><td>24</td><td>2</td><td>M1</td><td colspan="2">for one number written as product of prime factors number may be at the end of factor trees or on ‘ladder diagrams
or
Use of table method (allow 1 error), 2 examples shown but could have 2, 3, 4, 6, 12, 24 along the side
or
at least 2 factors for each (excluding 1, 96, 120)</td></tr>
<tr><td></td><td></td><td></td><td></td><td>A1</td><td colspan="2">or $2^3 \times 3$</td></tr>
<tr><td>(b)</td><td></td><td></td><td></td><td>M1</td><td colspan="2">for $2^m \times 3^n \times 5^p \times 7^q \times 11^r$ with at least two of $m = 4$, $n = 1$, $p = 2$, $q = 2$, $r = 1$ (or omission of one with others fully correct)
or prime numbers may be seen in a Venn diagram – if so must be correctly placed</td></tr>
<tr><td></td><td></td><td>646 800</td><td>2</td><td>A1</td><td colspan="2">or $2^4 \times 3 \times 5^2 \times 7^2 \times 11$ oe</td></tr>
<tr><td>21</td><td>8500 × 0.023 (=195.5) or
8500 × 1.023 (=8695.5)
((8500 + “195.5”) × 1.023) × 1.023</td><td>9100</td><td>3</td><td>M1

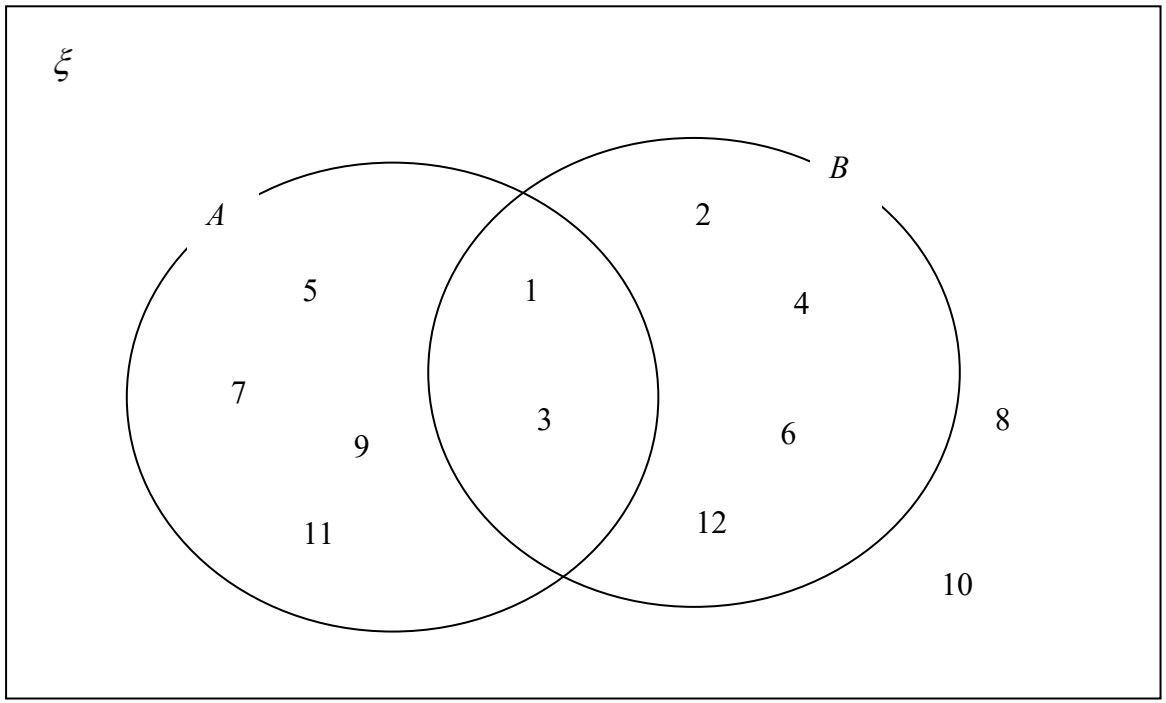
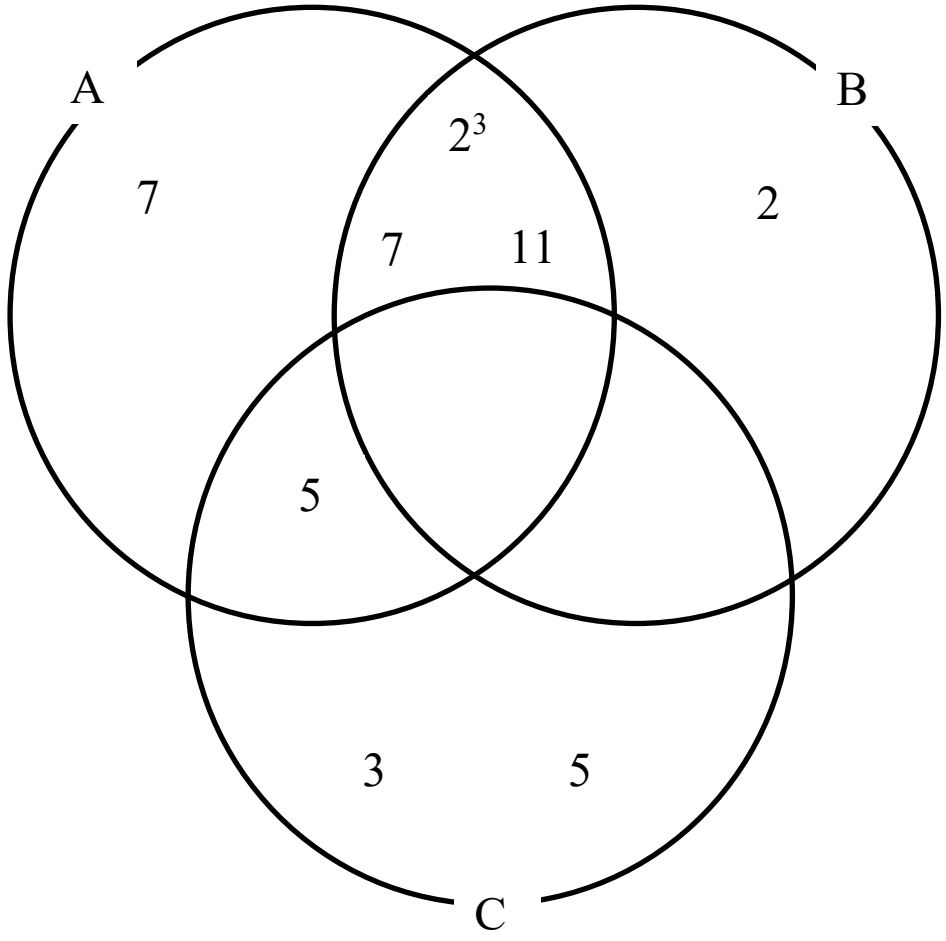
M1
A1</td><td>M2 for 8500×1.023^3
(M1 for 8500×1.023^n)
complete method
for 9100 – 9100.1 (answer of 600(.1) gains M2)</td></tr>
</table>

Question		Working	Answer	Mark	Notes	
22	(a)	$0.65 = \frac{3.5}{V}$			M1	
		$V = \frac{3.5}{0.65}$			M1	
			5.38	3	A1	for answer in range 5.38 – 5.385 SCB1 for a "correct" equation involving V with digits 65 and 35 where units have been converted eg $V = \frac{3500}{0.65}$
	(b)	630 × 1000 (=630 000) 60 × 60 (=3600) eg 630 ÷ 60 (=10.5) 630 000 ÷ 60 (=10 500) 1000 ÷ 60 (=16.66...) 1000 ÷ (60 × 60) (=0.277...) 1 ÷ (60 × 60) (= 0.000277...)			M1	for converting 630 km to m **or** 1 hour to seconds **or** for correct operation(s) using at least 2 of the numbers 630, 1000, 60, 60
		$\frac{630 \times 1000}{60 \times 60}$ oe or 630 ÷ 3.6			M1	Fully correct method
			175	3	A1	

Question	Working	Answer	Mark	Notes	
23	e.g. $4x + 5y = 4$ $4x - 2y = 18$ with the operation of subtraction $4x + 5y = 4$ $10x - 5y = 45$ With the operation of adding $y = 2x - 9$ and $4x + 5(2x - 9) = 4$			M1	for correct method to eliminate one variable – multiplying one or both equations so the coefficient of x or y is the same in both with the intention to add or subtract to eliminate one variable(condone one arithmetic error) or isolating x or y in one equation and substituting into the other equation
				M1	(dep) for substitution of found variable into one equation or correct method to eliminate second variable
		$x = 3.5$ oe, $y = -2$	3	A1	dep on M1

Question	Working	Answer	Mark	Notes
24	$3 \div 2$ (=1.5) or eg $\frac{4-1}{2(-0)}$ or $c = 1$			M1 for correct method to find gradient or the correct value of c. For gradient, may see a correct calculation, 3/2 with evidence on diagram oe or $1.5x$ (+ c) For value of c, allow $c = 1$, y = 1, (L =) $mx + 1$ oe
	$y =$ "1.5"$x + c$ **or** $y = mx + 1$ or eg $y - 4 = m(x - 2)$			M1 for use of $y = mx + c$ with either m or c or for (L =) $1.5x + 1$ (NB: m ≠ 0)
		$y = 1.5x + 1$ oe	3	A1 oe eg $y - 4 = \frac{3}{2}(x - 2)$

18



20b