



# Mark Scheme (Results)

Summer 2019

Pearson Edexcel International GCSE  
In Mathematics A (4MA1)  
Paper 1F

## **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](http://www.edexcel.com) or [www.btec.co.uk](http://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](http://www.edexcel.com/contactus).

## **Pearson: helping people progress, everywhere**

Pearson aspires to be the world's leading learning company. 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](http://www.pearson.com/uk)

Summer 2019

Publications Code 4MA1\_1F\_1906\_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.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- 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
  - awrt – answer which rounds to
  - eeo – 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 method in the working space with no answer on the answer line then all methods should be marked and the lowest mark awarded.

If there is an answer on the answer line then only the method leading to this answer should be marked.

- **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 to another.

**International GCSE Maths**

Apart from question 9b, 9c (where the mark scheme states otherwise) the correct answer, unless obtained from an incorrect method, should be taken to imply a correct method.

Question		Working	Answer	Mark	Notes
<b>1</b>	(a)		3 or 19 or 51 or 81	1	B1
	(b)		24 or 60	1	B1
	(c)		16 or 81	1	B1
	(d)		3 or 19	1	B1
					<b>Total 4 marks</b>

<b>2</b>	(a)		5	1	B1
	(b)		60	1	B1
	(c)		1000	1	B1
					<b>Total 3 marks</b>

<b>3</b>	(a)		Mweru	1	B1
	(b)		six thousand four hundred and five	1	B1
	(c)		69 000	1	B1
	(d)	5299 × 5.5 = 29 144.5 <b>or</b> 29 500 ÷ 5299 = 5.567... <b>or</b> 29 500 ÷ 5.5 = 5363.63...		2	M1 for a relevant calculation <b>and</b> answer (rounded or truncated to 2 sf or better)
			yes/no with correct figures and reason		A1 correct figures and a reason that refers to (Lake) Malawi (or 29 500) <b>or</b> refers back to $5\frac{1}{2}$ (or 5.5) <b>or</b> refers to (Lake) Albert (or 5299)
					<b>Total 5 marks</b>

<b>4</b>	(a)		unlikely	1	B1
	(b)		× at $\frac{1}{2}$	1	B1
	(c)		× at 0	1	B1
					<b>Total 3 marks</b>

<b>5</b>		$\frac{3}{5} \times (12481 - 8906) (=2145)$ <b>or</b>		4	M2 If not M2 then award M1 for either $12481 - 8906 (=3575)$ <b>or</b>
		$1 - \frac{3}{5} (= \frac{2}{5})$ <b>and</b> $12481 - 8906 (=3575)$			M1 dep
		$3575 - "2145"$ <b>or</b> $\frac{2}{5} \times "3575"$			A1
			1430		
					<b>Total 4 marks</b>

<b>6</b>	(a)		$12ef$	1	B1
	(b)		$3m + 8k$	2	B2 B1 for $3m$ or (+) $8k$
	(c)	$5y = 14 - 3$ <b>or</b> $5y = 11$ <b>or</b> $3 - 14 = -5y$ <b>or</b> $-11 = -5y$		2	M1
			$2\frac{1}{5}$		A1 for $2\frac{1}{5}$ or $\frac{11}{5}$ oe or 2.2
					<b>Total 5 marks</b>

<b>7</b>	(a)		4	1	B1
	(b)	10 - 4		2	M1 or for 10 and 4 selected
			6		A1
	(c)	4, 4, 4, 4, 4, 5, 7, 7, 7, 8, 10		2	M1 allow one error or omission
			5		A1
	(d)		more with reason	1	B1 e.g. mean of extra pairs of shoes is £40; £31 is £3 less than given mean and £49 is £15 more than given mean
					<b>Total 6 marks</b>

8		angle $DBC$ (or $DBC$ ) = $(180 - 116) \div 2$ (=32)		5	M1 angles may be seen on diagram
		angle $ADB$ = $180 - (90 - "32") - 55$ (=67) <b>or</b> angle $ADB$ = $360 - 116 - "32" - 55 - 90$ (=67)			M1 dep
		$x = 360 - 116 - "67"$ (= 177)			M1 dep
			177 with reasons		A2 for 177 and full reasons base angles in an <u>isosceles</u> triangle are equal <u>angles</u> in a <u>triangle</u> add up to $180^\circ$ <u>angles</u> at a <u>point</u> add up to $360^\circ$  If not A2 then A1 for 177 with 1 correct reason  (SCB1 dep on M1 for a correct reason explicitly linked to their correct method)
					<b>Total 5 marks</b>

9	(a)	eg 0.7, 0.8, 0.5, 0.725		2	M1	for converting all four fractions to a common form e.g. common denominators or decimals or 3 fractions in the correct order or correct reverse order							
		eg $\frac{28}{40}, \frac{32}{40}, \frac{20}{40}, \frac{29}{40}$	$\frac{1}{2}, \frac{7}{10}, \frac{29}{40}, \frac{4}{5}$		A1	Any correct form							
	(b)	eg $\frac{16}{30} + \frac{9}{30}$ <b>or</b>		2	M1	for $\frac{16}{30}$ and $\frac{9}{30}$ <b>or</b> both fractions expressed as equivalent fractions with denominators that are a common multiple of 10 and 15 eg. $\frac{80}{150}$ and $\frac{45}{150}$							
		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td></td><td>8</td><td>15</td></tr> <tr><td>3</td><td style="background-color: #cccccc;"></td><td>45</td></tr> <tr><td>10</td><td>80</td><td>150</td></tr> </table> <b>and</b> $\frac{125}{150}$				8	15	3		45	10	80	150
	8	15											
3		45											
10	80	150											
		eg $\frac{16}{30} + \frac{9}{30} = \frac{25}{30} = \frac{5}{6}$											

See next page for part 9(c)

Question		Working	Answer	Mark	Notes
9	(c)	e.g. $\frac{14}{3}$ <b>and</b> $\frac{10}{9}$			M1 Both fractions expressed as improper fractions
		e.g. $\frac{14}{3} \times \frac{9}{10}$			M1 <b>or</b> for both fractions expressed as equivalent fractions with denominators that are a common multiple of 3 and 9 eg. $\frac{42}{9} \div \frac{10}{9}$ <b>or</b> $\frac{126}{27}, \frac{30}{27}$
		e.g. $\frac{14}{3} \times \frac{9}{10} = \frac{126}{30} = \frac{21}{5} = 4\frac{1}{5}$ <b>or</b> $\frac{14}{3} \times \frac{9}{10} = \frac{126}{30} = 4\frac{6}{30} = 4\frac{1}{5}$ <b>or</b> $\frac{14^7}{3^1} \times \frac{9^3}{10^5} = \frac{21}{5} = 4\frac{1}{5}$ <b>or</b> $\frac{126}{27}, \frac{30}{27} = \frac{126}{30} = \frac{21}{5} = 4\frac{1}{5}$	Shown	3	A1 Dep on M2 for conclusion to $4\frac{1}{5}$ from correct working – either sight of the result of the multiplication e.g. $\frac{126}{30}$ must be seen or correct cancelling prior to the multiplication to $\frac{21}{5}$ NB: use of decimals scores no marks
					<b>Total 3 marks</b>

<b>10</b>		$3.5 + 5.75 + 6.5 + 6.25 + 8 (=30)$ <b>or</b> $3.5 \times 8 (=28)$ <b>or</b> $5.75 \times 8 (=46)$ <b>or</b> $6.5 \times 8 (=52)$ <b>or</b> $6.25 \times 8 (=50)$ <b>or</b> $8 \times 8 (=64)$		4	M1 (allow one error in sum to 30)
		$"30" \div 5 (=6)$ <b>or</b> $"30" \times 8 (=240)$ <b>or</b> $"28" + "46" + "52" + "50" + "64" (=240)$			M1 Dep on M1 and if adding values, must be 5 values with intention to add
		$"6" \times 8$ <b>or</b> $"240" \div 5$			M1 dep
			48		A1
					<b>Total 4 marks</b>

<b>11</b>	(a)		triangle with vertices (6, 4) (6, 1) (4, 1)	2	B2 if not B2 then award B1 for a rotation of $180^\circ$ about a different centre
	(b)		Reflection in $x = -1$	2	B1 Reflection B1 $x = -1$ NB. No marks if more than one transformation is stated or suggested with column vector, coordinate, SF, angle etc
					<b>Total 4 marks</b>

<b>12</b>	(a)		49.876(41697...)	2	B2 If not B2 then award B1 for 41.6(6...) <b>or</b> $\frac{125}{3}$ <b>or</b> $\frac{7.5}{0.18}$ <b>or</b> 8.2(0...)
	(b)		50	1	B1 ft from (a) provided 2 or more sig figs
					<b>Total 3 marks</b>

<b>13</b>		360 ÷ 24  $(n - 2)180 = (180 - 24)n$		2	M1 A fully correct method to find the number of sides of the polygon or correct use of formula with use of 24
			15		A1
					<b>Total 2 marks</b>

14	(a)	1, 2, 4, 5, 8, 10, 20, 40 and 1, 2, 4, 8, 16, 32, 64 <b>OR</b> $2 \times 2 \times 2 \times 5$ and $2 \times 2 \times 2 \times 2 \times 2 \times 2$		2	M1 for start to list factors – must be at least 4 for each of 40 and 64 <b>or</b> prime factorisation of both numbers with at least 2 stages correct eg $40 = 2 \times 20 = 2 \times 4 \times 5$ could be numbers on tree or in table
			8		A1
	(b)	$(8 = ) 2 \times 2 \times 2$ <b>or</b> $2^3$ <b>or</b> $2^{3+n}$		2	M1 For clearly writing 8 as a product of prime factors or as $2^3$
			$2^{n+3} \times 3 \times 5^m$		A1
					<b>Total 4 marks</b>

15	(a)	eg 15 km/h or $\frac{25}{6}$ m/sec or 0.25 km/min or $\frac{15}{4}$ oe eg 12 km/h or $\frac{10}{3}$ m/sec or 0.2 km/min or $\frac{9}{3}$ oe	'before' with reason	1	B1 e.g. before as gradient is steeper <b>or</b> before as speed before is 15 km/h speed after is 12 km/h <b>or</b> before as she goes over 11 (allow 11-12) km in $\frac{3}{4}$ hour but only goes 9 km in $\frac{3}{4}$ hour after oe NB: any figures given must be accurate if they haven't used 'steeper' oe
	(b)		line from (12:00, 24) to (12:45, 24) to (14:15, 0)	2	B2 If not B2 then B1 for a line from (12:00, 24) to (12:45, 24) <b>or</b> for a line from (t, 24) to (t + 1.5, 0) <b>or</b> for a time of 1.5 hours (oe) seen
	(c)	1h 45m + 1h 30m <b>or</b> 1 + 0.75 + 1.5 <b>or</b> 3h 15m or 3.25h or 195 m oe			M1 ft from their graph for total time when cycling
		(24 × 2) ÷ 3.25 oe eg (48 ÷ 195) × 60			M1 ft dep on M1 for full method
			14.8	3	A1 awrt 14.8
<b>Total 6 marks</b>					

16	(a)	$2 \times 7 + 3 \times -4$ <b>or</b> $14 + -12$ <b>or</b> $14 - 12$		2	M1
			2		A1
	(b)		$e^4$	1	B1
	(c)		$y^{16}$	1	B1
	(d)	$x^2 + 9x - 2x - 18$		2	M1 for 3 correct terms or 4 correct terms ignoring signs or $x^2 + 7x + c$ or .... $+ 7x - 18$
			$x^2 + 7x - 18$		A1
	(e)		$4cp^2(4c^3 + 5p)$	2	B2 if not B2 then award B1 for any correct factorisation with at least 2 factors outside the bracket eg $4cp(4c^3p + 5p^2)$ , $cp^2(16pc^3 + 20p)$ , $2p(8c^4 + 10cp^2)$ etc <b>or</b> the correct common factor <b>and</b> a 2 term expression with just one error
					<b>Total 8 marks</b>

<b>17</b>		$48 \div 2 (=24)$		4	M1		
		"24" $\div 3 = 8$			M1 dep	M2 for "24" $\times \frac{5}{3}$	
		"8" $\times 5$			M1 dep		
			40		A1		
		<b>Alternative scheme</b>					
		(5) : 3 : 6 oe		4	M1		
		$48 \div 6 (=8)$ oe			M1 dep	M2 for $48 \times \frac{5}{6}$	
		"8" $\times 5$ oe			M1 dep		
			40		A1		
					<b>Total 4 marks</b>		

<b>18</b>	a		9, 3, (-1), -3, (-3), -1, (3)	2	B2	If not B2 then award B1 for at least 2 correct values
	b			2	M1	dep on B1 ft from (a) for at least 5 points plotted correctly
			correct graph		A1	for the correct graph (clear intention to go through all the points and which must be curved at the bottom)
					<b>Total 4 marks</b>	

<b>19</b>		$2x + 0.18 + 2x + 3x + 0.26 + x = 1$ <b>or</b> $1 - (0.18 + 0.26) (= 0.56)$			M1
		$x = (1 - 0.18 - 0.26) \div (2 + 2 + 3 + 1) (=0.07)$			M1
		$(0.18 + 4 \times "0.07") \times 200$ <b>or</b> $0.46 \times 200$ <b>or</b> $36 + 42 + 14$ oe			M1 dep on M2 <b>and</b> probabilities between 0 and 1 <b>or</b> for $\frac{92}{200}$ , oe with 92 seen
			92	4	A1
					<b>Total 4 marks</b>

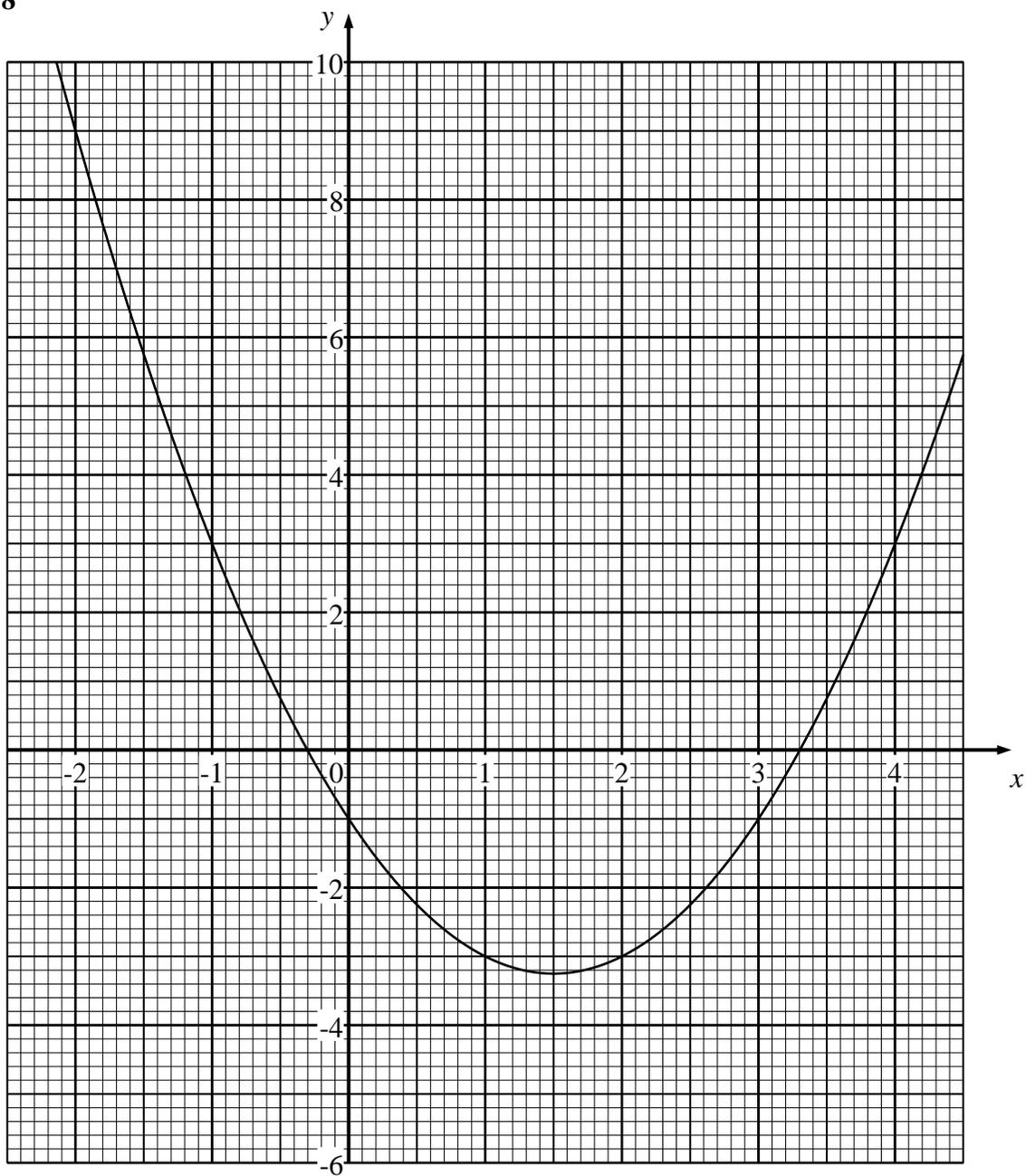
<b>20</b>		$12 \times 8 \times 5 (= 480)$		3	M1
		"480" $\times 0.7$			M1 dep
			336		A1
					<b>Total 3 marks</b>

<b>21</b>	(a)		5 700 000	1	B1
	(b)		$4 \times 10^{-3}$	1	B1
	(c)		5 000 000 <b>or</b> $5 \times 10^6$ oe	2	B2 If not B2 then award B1 for 320000 or $3.2 \times 10^5$ oe <b>or</b> $5 \times 10^n$ oe where $n \neq 6$
<b>Total 4 marks</b>					

<b>22</b>		$0.08 \times 170\,000 (=13600)$ <b>or</b> $0.92 \times 170\,000 (=156400)$			M1 oe eg $170\,000 \div 12.5$	M2 for $170\,000 \times 0.92^3$
		e.g. $0.92 \times (0.92 \times "156400")$			M1 (dep)for a complete method	
			132377	3	A1 or 132376.96	
					(SCB2 for $170\,000 \times 0.92^4 (=121786.810)$ ) (SCB1 for $170\,000 \times 0.24 (=40\,800)$ ) <b>or</b> $170\,000 \times 0.76 (=129\,200)$ <b>or</b> $170\,000 \times 1.08 (=183\,600)$ <b>or</b> $170\,000 \times 1.08^3 (=214151)$ <b>or</b> an answer of 129 200 <b>or</b> an answer of 214 151 – 214151.1(0))	
<b>Total 3 marks</b>						

23		$0.5 \times 6 \times 6 (=18)$		5	M1 For area of triangle, or may use $\frac{1}{2} \times 6 \times 6\sqrt{2} \sin 45$ or $\frac{1}{2} \times 6\sqrt{2} \times 3\sqrt{2}$ oe
		$(d^2 =) 6^2 + 6^2 (=72)$ or $\frac{AC}{(\sin 90)} = \frac{6}{\sin 45}$			M1
		$\sqrt{6^2 + 6^2} (= \sqrt{72} = 6\sqrt{2} = 8.4(85\dots)$ or 8.5) <b>or</b> ( $AC = \frac{6(\sin 90)}{\sin 45} = 6\sqrt{2} = 8.4(85\dots)$ or 8.5) oe			M1
		$0.5 \times \pi \times \left(\frac{"8.48.."}{2}\right)^2 (= 9\pi$ or 28....)			M1
			46.3		A1 for 46.2 – 46.3
					<b>Total 5 marks</b>

Q18



Pearson Education Limited. Registered company number 872828  
with its registered office at 80 Strand, London, WC2R 0RL, United Kingdom