Mark Scheme (Results)

Summer 2017

Pearson Edexcel International GCSE
In Mathematics A (4MA0) Paper 2FR

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

Summer 2017
Publications Code 4MA0_2FR_1706_MS

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
    - 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.
  Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks.
  If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
  If 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.

International GCSE Maths				
Apart from questions 21 and 24 (where the mark scheme states otherwise) the correct answer, unless clearly obtained from an incorrect method, should be taken to imply a correct method.				
Q	**Working**	**Answer**	**Mark**	**Notes**
1 (a)		24016	1	B1
(b)		88000	1	B1
(c)		$\frac{3}{10}$	1	B1 (three) tenth(s) 0.3
(d)		42 or 49	1	B1 Either 42 or 49 (or both with no other number)
(e)	Eg $\frac{5}{8} \times 48$ or $\frac{1}{8} \times 240$ or $48 \div 8 \times 5$	30	2	M1 For a complete method A1
(f)	Eg $\frac{60}{100} \times 750$ or $\frac{750}{10} \times 6$ or 6×75	450	2	M1 For a complete method A1
				Total 8 marks

2	(a)		Football	1	B1	
	(b)		20	1	B1	
	(c)		Correct bar	1	B1	Bar for boys at 40 for basketball
	(d)		5 : 7	2	M1 A1	25 : 35 Allow 1 : 1.4 or $0.71(428...):1$ or $\frac{5}{7}:1$ SCB1 for $7:5$ or $1.4:1$ or $1:\frac{5}{7}$ or or $1:0.71(428.....)$
						Total 5 marks

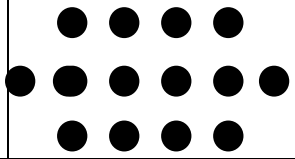
3	(a)		$-20,-15,-10,-5$	1	B1	Numbers all correctly marked
	(b)		$-7,-4,-2,3,5,8$	1	B1	All correctly ordered
	(c)	$72+58$ or $72--58$ or $-58-72$	130	2	M1 A1	For a complete method Allow -130
						Total 4 marks

4	(a)		1	1	B1	1, 1.0, 100%
	(b)		0.3	1	B1	oe
						Total 2 marks

5	(a) (i)		218	1	B1
	(ii)		238	1	B1
	(iii)		2673	1	B1
	(iv)		24	1	B1
	(b)		$7\times(3+8)-2$	1	B1
	(c)		39	1	B1
	(d)		10280	2	M1 Any one of 10000, 64 or 216 A1 10280
					Total 8 marks

6	(a)		8	1	B1
	(b)		6	1	B1
					Total 2 marks

7	(a) (i)		centimetres	1	B1	cm allow any unambiguous spelling
	(ii)		kilograms	1	B1	kg allow any unambiguous spelling
	(iii)		Square metres	1	B1	m^2 allow any unambiguous spelling
	(b)	3×150 or 3×0.15 $2000 - 3 \times 150$ or 1550 or $2 - 3 \times 0.15$ or 1.55	 1550 m*l* Or 1.55 *l*	3	M1 M1 A1	or for 2×1000 or 2000 or $150 \div 1000$ or 0.15 or $450 \div 1000$ or 0.45 SCB1 for 1850 m*l* or 1.85 *l*
						Total 6 marks

8	(a)			1	B1	
	(b)	$3 \times 11 + 2$ or $3 \times 10 + 5$ oe	35	2	M1 A1	for $3n+2$ or 5,8,11,14 …continued for 11 items with at most 1 error or for a correct diagram drawn
						Total 3 marks

9			35	2	M1 7 × 5 oe or 7×6 or 42 A1 35
					Total 2 marks

10	(a)		123° - 127°	1	B1
	(b)	Bearing of 070° from *B* and 7 cm from *B*	Correct angle and length	2	B1 Correct bearing within overlay B1 A point 7cm from *B*. Accept 6.8cm -7.2cm
					Total 3 marks

11	(a)		1830	1	B1
	(b)		3 hrs 45 mins	2	M1 45 mins or 3 hours or evidence of adding on to 10 30 and subtracting 15 mins to get to 1015 oe A1 3 hours 45 minutes
	(c)		9 25 pm	1	B1 9 25 (pm) or 2125
					Total 4 marks

12		CB, CD, CF TB, TD, TF	2	M1 A1	For at least 3 correct combinations or for all correct with repeats All correct and no repeats
					Total 2 marks

13	(−2,−5) (−1,−3) (0,−1) (1, 1) (2, 3) (3, 5)	Correct line between $x = -2$ and $x = 3$	3	B3	For a correct line between $x = -2$ and $x = 3$
				B2	For a correct line through at least 3 of (−2,−5) (−1,−3) (0,−1) (1, 1) (2, 3) (3, 5) **or** For all of (−2,−5) (−1,−3) (0,−1) (1, 1) (2, 3) (3, 5) plotted but not joined.
				B1	For at least 2 correct points stated (may be in a table) **or** For a line drawn with a positive gradient through (0,−1) or For a line with the correct gradient. **NB** a line joining (0,−1) to (2, 0) scores B0
					Total 3 marks

14 (a)			2	B2	All entries correct or
				B1	5 correct entries

	1	**2**	**3**	**4**	**5**	**6**
1	*0*	*1*	*2*	**3**	**4**	**5**
2	*1*	*0*	**1**	**2**	**3**	**4**
3	**2**	**1**	*0*	**1**	*2*	**3**

(b) (i)		$\frac{1}{18}$	1	B1ft	From complete table Accept 0.055(555...) rounded or truncated to at least 3 dp
(ii)		$\frac{6}{18}$	1	B1ft	oe From complete table Eg $\frac{1}{3}$ Accept 0.33(333...) rounded to at least 2 dp
					Total 4 marks

15 (a)		$9gh$	1	B1	
(b)		$8a - 5m$	2	B2	B1 for $8a$ or $-5m$
(c)		$12 - 28c$	1	B1	
(d)		$y(y + 8)$	1	B1	
					Total 5 marks

16	$10 \times 4.2 \times 7.5$ or 315 (cm^3) oe		4	M1	For volume of cuboid
	Eg $0.5 \times 7 \times x \times 5$ or $17.5x$ oe			M1	indep For volume of triangular prism
	$10 \times 4.2 \times 7.5 = 0.5 \times 7 \times x \times 5$ or $17.5x = 315$ oe or $\frac{10 \times 4.2 \times 7.5}{0.5 \times 7 \times 5}$ or $\frac{"315"}{"17.5"}$ oe			M1	Dep on M2 For a correct equation involving volume of cuboid and volume of prism or For a correct expression for x
		18		A1	18 SCB2 for For volume of cuboid = 315 and final answer = 9
					Total 4 marks

17	(a)	Eg $\frac{30}{12}\times 110$ or 2.5×110 or $\frac{30}{12}$ or 2.5 or $\frac{110}{12}\times 30$ or 9.16(666...) × 30 or $\frac{110}{12}$ or 9.16(666...) oe	275	2	M1 A1	Accept 9.16(666...) rounded or truncated to at least 3 SF
	(b)	Eg $\frac{375}{100}\times 12$ or 3.75×12 or $375 \div \frac{100}{12}$ or $375 \div 8.33(333...)$ or $\frac{12}{100}\times 375$ or 0.12×375	45	2	M1 A1	For a complete method Accept 8.33(333...) rounded to at least 3 SF
						Total 4 marks

18	(a) (i)		5, 15	1	B1	
	(ii)		5, 7, 9, 10, 11, 13, 15	1	B1	
	(b)		4, 6, 8, 10, 12, 14	2	B2	B2 for all correct and none incorrect. If not B2 then B1 for 4 or more correct and no more than 1 incorrect.
						Total 4 marks

19		14.37028405	2	M1 A1	102.66 or 1.843(9...) or 7.143(9..) Accept 14.37(028.....) rounded or truncated to at least 4SF
					Total 2 marks

20	(a)	$x^2 - 3x + 7x - 21$	$x^2 + 4x - 21$	2	M1 A1	For 3 correct terms or for 4 correct terms ignoring signs or for $x^2 + 4x + c$ for any non-zero value of c or for ... + $4x$ – 21 cao
	(b)	$5p - 3p = 9$ or $2p = 9$ or $-9 = 3p - 5p$ or $-9 = -2p$	4.5	2	M1 A1	 oe eg $\frac{9}{2}$ or $4\frac{1}{2}$
	(c)		y^{11}	1	B1	
	(d)		h^8	1	B1	
						Total 6 marks

21	Eg $9x = 22.5$ or $18y = 27$ or $-18y = -27$ or $5x - (13 - 4x) = 9.5$ or $4x + 5x - 9.5 = 13$ or $5\left(\frac{13-2y}{4}\right) - 2y = 9.5$ or $4\left(\frac{9.5+2y}{5}\right) + 2y = 13$		3	M1	For a complete method to eliminate one variable (condone one arithmetic error)
	Eg $5 \times$ "2.5" $- 2y = 9.5$ or $5x - 2 \times$ "1.5" $= 9.5$			M1	Dep on M1 For substituting the other variable or starting again to eliminate the other variable
		$x = 2.5$, $y = 1.5$		A1	dep on M1 NB: candidates showing no correct working score 0 marks.
					Total 3 marks

22	(a)		$30 < d \leq 40$	1	B1	Accept $30 - 40$
	(b)	$5\times5 + 15\times12 + 25\times17 + 35\times20 + 45\times6$ **or** $25 + 180 + 425 + 700 + 270$ **or** 1600		4	M2	$f \times d$ for at least 4 products with correct mid- interval values **and** intention to add. If not M2 then award M1 for d used consistently for at least 4 products within interval (including end points) **and** intention to add **or** for at least 4 correct products with correct mid-interval values with no intention to add
		$\frac{25+180+425+700+270}{5+12+17+20+6}$ or $\left(=\frac{1600}{60}\right)$			M1	dep on M1 (ft their products) NB: accept their 60 if addition of frequencies is shown
			26.7		A1	Accept 26.6 – 26.7 inclusive Accept 27 if M3 awarded Do not accept fractions or mixed numbers, eg $\frac{80}{3}$ or $26\frac{2}{3}$
						Total 5 marks

23	(a)	$4x \geq 27 - 13$ or $4x \geq 14$ or $-4x \leq 13 - 27$ or $-4x \leq -14$	$x \geq 3.5$	2	M1 A1	Accept an equation in place of an inequality or Accept wrong inequality sign or Accept 3.5 oe given as answer oe Must be the final answer
	(b)		Correct line drawn	1	B1	For a closed circle at −1with line that goes at least as far as 3 or For a closed circle at −1 with an arrow on a line pointing to the right
	(c)		−2, −1, 0, 1, 2	2	B2	B1 for list with one error or omission: e.g. −2, −1, 0, 1, 2, 3; −1, 0, 1, 2; −2, −1, 1, 2; −3, −2, −1, 0, 1, 2 SCB1 for −3, −2, −1, 0, 1
						Total 5 marks

24	$\frac{16}{5}$ and $\frac{8}{3}$		3	M1	For at least one correct improper fraction
	$\frac{16}{5} \times \frac{3}{8}$ **or** $\frac{48}{15} \div \frac{40}{15}$			M1	Dep For first fraction unchanged, changing ÷ to × and inverting the 2nd fraction **or** Converting each fraction with a common denominator of 15 (or multiple of 15) with ÷ sign
		A fully correct method shown		A1	$\frac{48}{40}$ from correct working
					Total 3 marks

25	$(x^2 =)\ 18^2 - 13^2$ or 324 – 169 or 155		3	M1	Squaring and subtracting
	$(x =)\ \sqrt{18^2 - 13^2}$ or $\sqrt{"155"}$			M1dep	For square rooting
		12.4		A1	Accept 12.4 – 12.46 inclusive
	Alternative Methods - Using Trigonometry Eg $\sin^{-1}(\frac{13}{18})$ **and** 18cos"46.2(382...)" oe or $\cos^{-1}(\frac{13}{18})$ **and** 18sin"43.7(617...)"oe			M2 A1	For a complete method Accept 12.4 – 12.46 inclusive
					Total 3 marks

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