Mark Scheme (Results)

January 2019

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

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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.
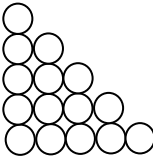
- **Parts of questions**

   Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another

The correct answer, unless clearly, obtained by an incorrect method, should be taken to imply a correct method with the exception of Q20a and Q22

Question	Working	Answer	Mark	Notes
1 (a)		24	1	B1
(b)		9	1	B1
(c)		2 circles and a half circle	1	B1 oe
2 (a)		(7, 5)	1	B1
(b)		C marked in correct position	1	B1
(c)	'D' marked on the grid at (5, −3)	(5, −3)	2	M1 ft (b) A single point at (5, −3) will suffice A1 ft (b)
3 (a)	100 − (13 + 16 + 8 + 5 + 15 + 20)	23	2	M1 A1
(b)		0.16	1	B1
(c)		$\dfrac{13}{100}$	1	B1 or any correct equivalent fraction
(d)	$\dfrac{15}{100} \times 8000$	1200	2	M1 A1

Question	Working	Answer	Mark	Notes
4 (a)		radius	1	B1
(b)		chord	1	B1
(c)		sector	1	B1
(d)		12	1	B1
5 (a)		Marked 2/6 in from left	1	B1
(b)		Marked at 0	1	B1
(c)		unlikely	1	B1
6 (a)	(330 + 330 + 250 + 290 + 350 + 330 + 310 + 370 + 320 + 300) (= 3180) ÷ 10			M1
		318	2	A1
(b)	250 290 300 310 **320 330** 330 330 350 370			M1 write in order
		325	2	A1
(c)		330	1	B1
(d)	370 − 250 or 250 − 370			M1 for identification of 250 and 370
		120	2	A1
7 (a)	Angle *PRQ* drawn 55º or *QR* drawn 6 cm long	Fully correct		M1 Angle *R* ± 2º, *QR* ± 0.2 cm A1
(b)		60º	1	B1 58º to 62º inclusive
(c)		*D* placed correctly	1	B1 *D* 3 cm from A ± 0.2 cm

Question	Working	Answer	Mark	Notes
8 (a)		Correct pattern	1	B1
(b)		21	1	B1
(c)		20	1	B1
(d)	30 + 29		2	M1
		59		A1
9 (a)	1,2,3,4,6,9,12, 18,36			M1 list at least 4 correct factors with no incorrect factors
		e.g.6 & 9	2	A1 or 1 & 18, or 3 & 12, or 4 & 12,or 6 & 12
(b)				M1 A number, greater than 50 with at least two distinct factors from 2, 3 and 5
		e.g. 60	2	A1 Any multiple of 30 greater than 50
10 (a)	$y = 2 \times 3 \times 4 - 8$			M1
		16	2	A1
		16	2	A1
(b)	$y = 2c \times 2 + 3c = 4c + 3c$			M1 for $4c$
		$7c$	2	A1
11	$24 \times w = 432$			M1 or $432 \div 24$
		18	2	A1

Question	Working	Answer	Mark	Notes
12 (a)	$x + 90 + 90 + 40 = 360$	140	2	M1 or $360 - (90 + 90 + 40)$ A1
(b)		140	1	B1
13 (a)		$\dfrac{3}{8}$	1	B1 oe
(b)		$\dfrac{5}{8}$	1	B1 oe
(c)		$\dfrac{1}{8}$	1	B1 oe
14	(Machine A or B =) $14 \times 24 \times 7$ (= 2352) or (Machine C =) $18 \times 24 \times 7$ (= 3024) $2 \times$ '2352' + '3024' (= 7728) '7728' ÷ 120 (= 64.4) Alt: $2 \times 14 + 18$ (= 46) '46' $\times 24 \times 7$ (= 7728) '7728' ÷ 120 (= 64.4)	65 65	4	M1 output of at least 1 machine per week M1 dep M1 dep on M2 A1 cao M1 total output per day M1 dep M1 dep on M2 A1
15 (a)	$106 - 4$ or $101 - 12$	$g = 102$ $h = 89$	2	M1 A1 both correct
(b)	$y + 110 = 130$	(110, 20)	2	M1 or $130 - 110$ A1 both correct

Question	Working	Answer	Mark	Notes
16 (a)	$15\ 400 \times 63.21$	973 434	2	M1 A1
(b)	$\dfrac{240}{15400} \times 100$	1.56	2	M1 A1 1.558441 Accept awrt 1.56
17	$\sqrt{400} = 20$ $\pi \times \ '20'$ oe	62.8	3	M1 M1 dep A1 62.83185 ... Accept awrt 62.8
18	40 min $= \dfrac{40}{60}$ hr $9720 \div 11\dfrac{40}{60}$ Alt: 11 hr 40 mins = 11×60 + 40=700 min $9720 \div 700 \times 60$	833 833	3	M1 M1 (accept 11.66 or 11.67 or better for 11 40/60) A1 833.1428.. Accept awrt 833 M1 M1 A1 833.1428.. Accept awrt 833

Question	Working	Answer	Mark	Notes
19 (a)	$472 \div 20$	23.6	2	M1 A1
(b)	$10.8 \times 100 \ (= 1080)$ $'1080' \div 60$ Alt: $60 \div 100 = 0.6$ $10.8 \div '0.6'$	18 18	 3	M1 working in cms M1 dep A1 (accept 1 : 18 or 18 : 1) M1 working in metres M1 dep A1 (accept 1 : 18 or 18 : 1)
20 (a)	$5x - x = 8 + 2$	2.5	3	M2 collecting x terms on one side **and** all numbers on the other side (accept $4x = 10$) (M1 for collecting x terms on one side **or** all numbers on one side e.g. $6x = 8 + 2$ or $4x = 8 - 2$) A1 oe dep on at least M1 Accept $x = 10/4$ or $5/2$
(b)		$t(3 - 5y)$	1	B1
(c)		k^6	1	B1
(d)	$\dfrac{h}{2} < 5 + 8$ or $2 \times \dfrac{h}{2} - 2 \times 8 < 2 \times 5$	$h < 26$	2	M1 for a correct first step (accept use of =) A1 cao

Question	Working	Answer	Mark	Notes
21	$9^2 - 6^2$ (=45) $\sqrt{(9^2 - 6^2)}$ (=$\sqrt{45}$)	6.71	3	M1 or $9^2 = h^2 + 6^2$ or for a complete method to find an unknown angle, x (correct to 1 d.p) in the triangle e.g. $\cos^{-1}(6/9)$ (= 48.2°) or $\sin^{-1}(6/9)$ (= 41.8°) M1 for a complete method, using x, to find h e.g $6 \times \tan 48.2°$ A1 or awrt 6.71
22	$\dfrac{9}{4}$ $\dfrac{9}{4} \times \dfrac{5}{6} = \dfrac{45}{24}$ $\frac{45}{24} = 1\frac{21}{24}$ or $\frac{45}{24}$ cancelled down to $\frac{15}{8}$ Alt: $\dfrac{9}{4}$ cancelling 9 and 6 to get $\frac{3}{4}$ x $\frac{5}{2}$ = $\frac{15}{8}$		3	M1 converting $2\frac{1}{4}$ into an improper fraction (e.g. $\frac{9}{4}$) M1 A1 dep M2 M1 converting $2\frac{1}{4}$ into an improper fraction (e.g. $\frac{9}{4}$) M1 A1 (dep M2)

Question	Working	Answer	Mark	Notes
23	6×12 (=72) or $0.5 \times 7 \times 4$ (=14) or 6×5 (=30) or 7×6 (=42) $0.5 \times \{6+10\} \times 7$ (=56) '30' + '42' +'14' or '72' +'14' or '30' + '56' '86' × 25 Alt: 6×12×25 (=1800) or 0.5×7×4×25 (=350) or 6×5×25 (=750) or 7×6×25 (=1050) or 0.5×{6+10}×7 (=1400) '1800'+ '350' or '750' + '1400' or '750' + '1050' + '350'	 2150 2150	4	M1 for any correct calculation of a component of the cross-section (i.e. leading to 72 or 14 or 30 or 56 or 42) M1 dep correct cross-section components added to get total cross section (=86) M1 (dep on previous M1) A1 cao M1 for any correct calculation seen of one volume block (i.e. leading to 1800 or 350 or 750 or 1050 or 1400) (M2 for any two correct volume calculations seen) M1 (dep on previous M2) correct volume components selected to be added A1

Question	Working	Answer	Mark	Notes
24	120×50 (= 6000) $120 \times \frac{3}{4} \times 80$ (=7200) or $120 \times \frac{1}{4} \times 40$ (=1200) ('7200' + '1200' − '6000') ÷ '6000' × 100 or ({'7200' + '1200'}÷ '6000' − 1) × 100 Alt: 120×50 (= 6000) $120 \times \frac{3}{4} \times (80 - 50)$ (=2700) or $120 \times \frac{1}{4} \times (40 - 50)$ (= − 300) ('2700' + ' − 300') ÷ '6000' × 100	40 40	 4	M1 cost price M1 part profits M1 dep on M2 A1 M1 cost price M1 profit or loss M1 dep on M2 A1
25 (a)		1,3,5,7,8,9,10	1	B1
(b)		3, 9	1	B1
(c)		e.g. 1,2,4,5	2	B2 any set of 4 elements , one of which is 5 and the other three are from {1, 2, 3, 4, 6} (no repeats) If not B2 then B1 for either any set of 4 elements, from {1, 2, 3, 4, 6}(no repeats) or 5 and the other three are from {6, 7, 8, 9, 10} (no repeats)