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Mark Scheme (Results)

January 2014

Pearson Edexcel International GCSE Mathematics A 4MA0/4HR

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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.
- 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
  - awrt – anything which rounds to

- **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.

Apart from Questions 4, 5, 19 and 22, where the mark scheme states otherwise, the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.

Question	Working	Answer	Mark	Notes
1. (a)		3^5	1	B1 cao
(b)	$\frac{7^{14}}{7^6}$ or $\frac{7^9}{7^{(1)}}$ or $7^5 \times 7^3$	7^8	2	M1 A1
				Total 3 marks

2.	4 + 6 + 4 + 7 + 8 + 6 +7 + 7 (= 49) or 9 × 6 (=54) $\frac{"49+a"}{9} = 6$ oe or "54" – "49"	5	3	M1 M1 for 4 + 6 + 4 + 7 + 8 + a + 6 +7 + 7 = 49 + a M1 dep A1
				Total 3 marks

3. (a)		28	1	B1
(b)	36 + 28 or 36 + "28" or 180 – 116	64	2	M1 ft their answer from (a) "116" from 180 – (36 + 28) A1
				Total 3 marks

4. (a)	$\frac{3\times4}{15}+\frac{5\times2}{15}$ or $\frac{12}{15}+\frac{10}{15}$	$\frac{22}{15}$	2	M1 Any pair of correct fractions with a denominator a multiple of 15 A1 Dependent on M1
(b)	$\frac{9}{4}\div\frac{7}{2}$ $\frac{9}{4}\times\frac{2}{7}$ oe	$\frac{18}{28}$	3	M1 Correct improper fractions (may be implied by second M1) M1 A1 Award A1 for 9/14 if cancelling seen to have taken place.
(b)	Alternative: $\frac{9}{4}\div\frac{7}{2}$ $\frac{9}{4}\div\frac{14}{4}$	$\frac{9}{14}$ oe	3	M1 Correct improper fractions (may be implied by second M1) M1 Denominators must be the same. A1 Must lead directly from 2nd M1
				Total 5marks

5.	Circular arc, centre *B*, to intersect both lines *AB* and *BC* Equal length arcs, from intersections on each line, meeting to give a point on the bisector.	correct bisector	2	M1 A1 dep on M1 Full construction shown.
				Total 2 marks

6. (a)		10	1	B1	Accept $\frac{1}{6}$ hour if units stated.
(b)	1 ÷ 0.25 oe	4	2	M1 A1	Accept 1 ÷ 15
(c)	Line at 1.5 km from 0930 to 0940 Line from 1.5 km at 0940 to 0 km at 1010	correct line correct line	2	B1 B1	Accept line from 1.5 km at 09 30 to 0 km at 10 00
					Total 5 marks

7. (a)	Q: (0, −1), (2, 0), (2, −1)	Triangle in correct position	1	B1	Accept without label.
(b)		Enlargement (Scale factor) 3 (Centre) (– 3, 2)	3	B1 B1 B1	Award no marks for multiple transformations. condone missing brackets around (– 3,2) Do not accept vector notation for (– 3,2)
					Total 4 marks

8. (a)		6, 0, −4	2	B2	Award B1 for any one correct.
(b)	(−1, 6), (2, 0), (4, −4)	correct line	2	M1ft A1	Plot any two points, from table with no ft errors, (dependent on B1). Straight line joining (−1, 6) to (4, −4) or better.
(c)			2	M1 A1	Draw lines $x = -1$ and $y = 2$ Correct region identified (R need not be labelled). Accept shaded or unshaded.
					Total 6 marks

9. (a)	14 ÷ 4 oe	3.5	2	M1 A1	
(b)	4 (cms) = 100 000 (cms) or 4 : 100 000 or 100 000 ÷ 4 or 1 (km) = 0.00004 (km) or 1 : 0.00004 or "3.5" x 10^5 ÷ 14	1 : 25 000	2	M1 A1 cao	
					Total 4 marks

10. (a)	228 – 180 (=48) or 360 – 228 (= 132) then 180 – 132	048	2	M1 A1	Can be marked on diagram. i.e Full method leading to correct answer. Accept 48
(b)		110	1	B1	
(c)	228 – 118 (= 110) (180 – "110") ÷ 2 (= 35) "48" + "35"	083	2	 M1ft A1	 bearing from (a) + 35 accept 83
					Total 5 marks

11. (a)	$1.21 \times 10^9 + 7.48 \times 10^7 + 5.2 \times 10^6$	1.29×10^9	2	M1 A1 cao	Intention to add 3 correct numbers or digits 1 290 ... Must be in standard form.
(b)	$(1.21 \times 10^9) \div (3.29 \times 10^6)$	368	2	M1 A1	 awrt 368 (367.781153..)
					Total 4 marks

12. (a)	(2 x 5) + (8 x 15) + (16 x 25) + (10 x 35) + (4 x 45) 1060		3	M2 freq x all correct midpoint values stated or evaluated {do not have to see intention to add}. if not M2 then M1 for freq x consistent point in each interval (f x x = 860 or 1260 start & end points). or M1 for 1 error in list of 10, 120, 400, 350, 180 or M1 for 4 correct products stated. A1 Accept 26.5 if M2 scored.
(b)	1 square = 5 (potatoes) or 1 small square = 0.2 (potatoes) or correct fd calculated (10 ÷ 50) (=0.2) or marked on vertical axis with no errors 8		2	M1 A1
(c)	(fd=) 12 ÷ (450 – 300) (= 0.08)	correct block	2	M1 A1 Area block from 300 to 450 grams at height 4 small squares
				Total 7 marks

13. (a)	(Gradient =) $\frac{12-4}{0-10}$ or $\frac{8}{-10}$ oe	$y = -0.8x + 12$ oe	3	M1 B2 $5y + 4x = 60$ oe If not B2 then B1 for $y = -0.8x +$ "c" where c = numerical value ≠ 12 or letter or $5y + 4x =$ "c" where c = numerical value ≠ 12 or letter or $-0.8x + 12$ or $5y + 4x$

(b)	$-11 = \frac{"\ 8\ "}{-10} \times 5 + c$	$y = -0.8x - 7$ oe	2	M1ft A1	Correct substitution into (a) also "$5y + 4x$" = c or identify y intercept = -7 $5y + 4x = -35$
					Total 5 marks
14. (a) (i)		112	1	B1	Allow on diagram.
(a) (ii)	Opposite angles of a cyclic quadrilateral (add up to 180)		1	B1	Accept abbreviations if meaning is clear. Withhold mark for incorrect statements.
(b) (i)		136	1	B1	Allow on diagram.
(b) (ii)	Angle at the centre/ middle is twice / (2 times)/ double angle at circumference/ edge/ perimeter		1	B1	Three separate points made. Adjust comments if starting with angle at circumference.
(c)		68	1	B1	Allow on diagram.
					Total 5 marks

15. (i)		$12x^2 - 2$	2	B2	If not B2 then B1 for $12x^2$ or -2
(ii)	"$12x^2 - 2$" = 1 $x^2 = 3/12$ oe		4	M1ft M1ft	only ft $ax^2 \pm b = 1$ ft x^2 = constant
		0.5 , 4.5 and – 0.5 , 5.5		B2	Award B1 for both x values correct or 1 pair of x and y values correct.
					Total 6 marks

16. (a)	$v = k\sqrt{x}$ oe $8 = k\sqrt{25}$ oe	$v = 1.6\ \sqrt{x}$ oe	3	M1 M1 A1	Allow $v = k\sqrt{x}$ if $k = 1.6$ is found in (a) or (b).
(b)	(v =) "1.6" $\sqrt{56.25}$	12	2	M1ft A1 cao	Do not ft if $k = 1$
					Total 5 marks

17. (a)		0.6, 0.6, 0.4, 0.6	1	B1	For probabilities shown correctly on tree diagram.
(b)	$0.6 \times 0.6 \times 0.4$	0.144oe	2	M1 A1	Accept 18/125
(c)	$0.3 + (0.7 \times 0.3) + (0.7 \times 0.7 \times 0.3)$	0.657	3	M2 A1	Accept 1 – 0.7 x 0.7 x 0.7 If not M2 then M1 for 0.7×0.3 or $0.7 \times 0.7 \times 0.3$ or 0.21 or 0.147
					Total 6 marks

18. (a) (i) (a) (ii) (a) (iii)		**p** + **q** oe 2**p** + 2**q** oe 2**p** + **q** oe	1 1 1	B1 B1 B1	
(b)	$\sqrt{\left(\sqrt{3}\right)^2 + 1^2}$	2	2	M1 A1cao	
					Total 5 marks

19.	1.05 selected 0.175 selected $\sqrt{\frac{1.05}{0.175}}$ oe	2.45	4	B1 B1 M1 A1	Allow $\sqrt{6}$ or "x"^{2} = 6 or 6 (from 1.05 ÷ 0.175) (2.44948) awrt 2.45 dependent on M1
					Total 4 marks

20.	$\frac{4(x+1)-3(x-1)}{(x+1)(x-1)}$ $\frac{4x+4-3x+3}{(x+1)(x-1)}$	$\frac{x+7}{x^2-1}$	3	M1 For expressing both fractions correctly with a common denominator. Allow as two separate fractions. M1 For removing brackets correctly in a correct single fraction. Allow $x^2 - 1$ in denominator. A1 Allow $\frac{x+7}{(x+1)(x-1)}$
				Total 3 marks
21.	$130 = \pi \times 4.5 \times l$ $l = \frac{130}{4.5\pi}$ or $l = 9.1956$ sin (AVO) = 4.5/"9.20" (= 0.489..)	58.6	4	M1 M1 For exact expression or answer which rounds to 9.2 M1 For a correct expression for sin AVO or cos AVB cos (AVB) = ("9.2"^{2} + "9.2"^{2} – 9)/ 2 x "9.2" x "9.2" (=0.521...) A1 awrt 58.6
				Total 4 marks

22.	$x^2 + (3 - 2x)^2 = 26$ $x^2 + 9 - 6x - 6x + 4x^2 = 26$ $5x^2 - 12x - 17$ (= 0) $(5x - 17)(x + 1)$ (= 0) or $\frac{--12 \pm \sqrt{(-12)^2 - 4 \times 5 \times -17}}{2 \times 5}$ condone no brackets around – 12	$x = 3.4, y = -3.8$ $x = -1\ y = 5$		M2 M1 for $9 - 6x - 6x + 4x^2$ A1 Correct 3 part quadratic M1 Factorising correctly or correct use of quadratic formula A1 Both correct x values or 1 correct pairing, dependent on previous M1 A1 4 fully correct values (pairing need not be explicit), dependent on previous M1
				Total 6 marks

				Total 100 marks

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