



# Mark Scheme (Results)

January 2012

International GCSE Mathematics  
(4MA0) Paper 3H

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Question	Working	Answer	Mark	Notes
1. (a)	$7/32 \times 100$ oe	21.9	2	M1 A1 (21.875) accept awrt to 21.9
(b)	4/100 x 32 (=1.28) or 4/100 x 32000000 (=1280000) 32 + "1.28" or 32000000 + "1280000"	33	3	M1 M2 for 32 x 1.04 oe or 32000000 x 1.04 oe M1 (dep) A1 (33.28) accept 33.3, 33000000, 33300000, 33280000
				<b>Total 5 marks</b>
2.	$2/5 \times 30$	12	2	M1 A1 12 out of 30 = M1A1 $12/30 = M1A0$
				<b>Total 2 marks</b>
3.	$\pi \times 7.5^2 \times 26$	4590	3	M2 M1 for $\pi \times 15^2 \times 26$ or 18369 $\rightarrow$ 18386 inc A1 (4594.579....) accept answers 4592 $\rightarrow$ 4597 inc
				<b>Total 3 marks</b>
4.	Arcs of length 6cm from A <u>and</u> B Arc of length 10 cm from A <u>or</u> B Arc of length 6 cm from correct top vertex Correct rhombus within overlay tolerance		4	M1 M1 M1 A1 Dependent on M3 sc B1 for correct rhombus with no construction lines.
				<b>Total 4 marks</b>
5. (a)		a(5 - 3a)	2	B2 B1 for factors which when expanded & simplified give 2 terms for which one is correct.
(b) (i)		$8 - 6w$	1	B1
(ii)		$y^3 + 10y^2$	2	B2 B1 for $y^3$ or $10y^2$
(c)	$7.168 / 0.64$	11.2	2	B2 B1 for 7.168 or 0.64
				<b>Total 7 marks</b>

6. (a) (i)		Does not study Maths No student studies (both) German <b>and</b> Maths Students who study German do not study Maths etc	1	B1	Accept general answers (e.g. no student belongs in both sets).
(ii)		(Preety) does not study French (Preety) is not a member of (set) F	1	B1	Accept she /he in place of Preety or omission of name. Penalise extra incorrect statements (e.g. Preety studies Maths and German but not French)
(b)		1,2,3,4	2	B2	B1 for any 3 correct with no repetitions or additions.
					<b>Total 4 marks</b>

7. (a)		9 to 11	1	B1	
(b) (i)	$(1 \times 3) + (4 \times 6) + (7 \times 10) + (10 \times 15) + (13 \times 5) + (16 \times 1)$ $(=328)$  $"328" \div ("3+6+10+15+5+1")$			M2	All products, $t \times f$ using $\frac{1}{2}$ way points correctly, and intention to add. Award M1 if all products, $t \times f$ using their $\frac{1}{2}$ way points consistently, from 6 to 8 interval onwards and intention to add.
		8.2	4	M1 A1	(dep on one at least M1) Accept 8 with working. 8 without working = M0A0
(ii)		Mid-points used as actual data is unknown	1	B1	Mention of mid-points <u>or</u> exact (actual) data is unknown.
					<b>Total 6 marks</b>

8. (a)		$x/60$ oe	1	B1	Must be a fraction or 0.016 rec $x$
(b) (i)	$2("x/60") = (x+20)/80$ $16(0) x = 6(0)(x + 20)$ or $80 x = 30(x + 20)$ or $2x/3 = (x + 20)/4$		3	M2 ( must be an equation) A1 dep	M1 for either $2("x/60")$ or $(x+20)/80$ Correct removal of denominators. Correct removal of denominators. Simplifying denominators.
(ii)	$8x = 3x + 60$ or $5x = 60$ or $60 \div 5$	12	2	M1 A1	Dependent on M1. Can be marked if seen in b(i)
					<b>Total 6 marks</b>

9. (a)	Use of sine or $\frac{\sin x}{3.4} = \frac{\sin 90}{5.8}$ $\sin "x" = 3.4 / 5.8 (=0.586..)$		35.9	3	M1 Sine must be selected for use.  M1 A1 (35.888...) Use isw on awrt 35.9
(b) (i)			5.85	1	B1 accept 5.849 rec
(ii)			5.75	1	B1
					<b>Total 5 marks</b>

10.	6/100 x 7500 (=450) {Ist Year} or 1.06 x 7500 (=7950) “450” + “477” + “505.62”		1432.62	3	M1 M2 for $1.06^3 \times 7500 (=8932.62)$ M1 Calculating 6% of previous capital for another 2 years. A1 M1A0 for 1350 or 8850
					<b>Total 3 marks</b>

11.	$3y + 6x - 3 = x + 5y$ $5x - 3 = 2y$ oe		$(5x - 3)/2$	3	M1 Multiplying out brackets. M1 dep Correctly collecting like terms, (3 terms needed here). A1 oe
					<b>Total 3 marks</b>

12. (a)	6/9 x 12 oe		8	2	M1 e.g $12 \div 1.5$ A1
(b)	9/6 (or 12/“8”) x 5		7.5	2	M1 A1 cao
(c)	$1.5^2 \times 32 (=72)$ oe “72” – 32		40	3	M1 M1 for $1.5^2$ or $(2/3)^2$ M1 dep A1
					<b>Total 7 marks</b>

13. (a) (i) (ii)		$41^\circ$ Angles in same segment (are equal)	2	B1 B1	Accept “from same chord”, “on same arc”.
(b) (i) (ii)		$75^\circ$ Angle at centre/middle is not 2 x angle at circumference / edge / perimeter / arc or Angle PQT ≠ QPT or PRS ≠ RSQ (oe) or $34 \neq 41$	2	B1 B1	Accept $75 \neq 2 \times 41$ or $75 \neq 2 \times 34$ or using idea of isosceles triangles but must mention angles.
					<b>Total 4 marks</b>

14. (a)	$y = 36 - x$	(Area =) $x (36 - x)$	3	M2 M1 for $x + y = 36$ oe or $2y = 72 - 2x$ A1 Must see x times $(36 - x)$ dep on M2
(b)		$(dA/dx) = 36 - 2x$	2	B1 B1 B1 for 36 B1 for $-2x$
(c)	$"36 - 2x" = 0$ $x = 18$	(Area =) 324	3	M1 allow ft only on $a + bx$ ( $a, b \neq 0$ ) A1ft A1ft
				<b>Total 8 marks</b>

15. (a)	$F = "k"/d^2$ $12 = k/2^2$ $k = 48$	$F = 48/d^2$	3	M1 k= letter not number. M1
(b)	$(F = ) "48"/5^2$	1.92 oe	1	B1 ft $k \neq 1$ accept 48/25 as an answer.
(c)	$3 = "48"/d^2$ $d^2 = "48"/3$		4 2	k $\neq 1$ M1 Rearrangement to make $d^2$ or $d$ the subject A1 ignore $\pm$
				<b>Total 6 marks</b>

16. (a)	$10 \times 3$ or $15 \times 2$ or $12 \times 7.5/3$		30	M1 or any correct fd in correct position and no errors, or 1 sq = 2 (runners) indicated. A1
(b)	Missing blocks = 6cm, 10cm, 2cm		2	B2 3 correct blocks B1 1 or 2 correct blocks
(c)	$0.6 \times 20 + 0.8 \times "30"$ or $3 \times "4" + 8 \times "3"$ or $450 \times 0.08$		36	M1 (partitioning blocks) (time x fd's) {must see clear evidence that fd values used}. 450 small squares. A1 cao
				<b>Total 6 marks</b>

17.	$x = 0.1777\dots$ and $10x = 1.777\dots$ $9x = 1.6$	16/90 oe		See at least 3 sevens or recurring symbol. Condone omission of $x$ . M1 Accept $10x = 1.777\dots$ and $100x = 17.77\dots$ A1 Must be integers in numerator and denominator but not 8 & 45 N.B for $0.1777 = 1/10 + 0.0777\dots$ (0.777 needs to be shown to be $7/90$ to gain first M1)
				<b>Total 2 marks</b>

<b>18.</b>	AOC = $70^\circ$ “ $70^\circ$ ”/360 x $\pi$ x $9^2$ (=49.48..) 0.5 x $9^2$ x sin “ $70^\circ$ ” = (38.057..) 49.48.. or 38.057... “49.48..” – “38.057..”		11.4	6	B1 Could be marked on diagram. M1ft Area of sector. M1ft Area of triangle. Follow through angles must be the same. A1 Either area correct to 3 sf M1 dep on both previous M1's A1 (11.42253...) awrt 11.4	<b>Total 6 marks</b>
<b>19.</b>	$(\sqrt{3} + 3\sqrt{3})/\sqrt{2}$ $4\sqrt{3}/\sqrt{2}$ $2\sqrt{6}$ or $(\sqrt{48}/\sqrt{2})$		24	3	M1 Must see $\sqrt{27}$ reduce to $3\sqrt{3}$ alternative $\frac{\sqrt{6} + \sqrt{54}}{2}$ (or better)  M1 dep on 1st M1 A1cao dep on M2 Accept $\sqrt{24}$ if M2 awarded.	<b>Total 3 marks</b>
<b>20.</b>	$\frac{4(2-x) + 3x}{x(2-x)}$ oe  $\frac{8 - 4x + 3x}{x(2-x)}$			3	M1  M1 A1 Accept $\frac{8-x}{2x-x^2}$ Single fraction needed as final answer.	<b>Total 3 marks</b>

21. (a)	0.5x[(x + 5) + (x + 8)] = 42 (trapezium formula) or $x(x + 5) + 0.5x \times 3 = 42$ (partitioning) $x(2x + 13) = 84$ or $x^2 + 5x + 1.5x = 42$		2	M1  M1 dep on 1 <sup>st</sup> M1 then needs to develop on to quadratic given.
(b)	(2x + 21)(x - 4) (= 0) oe  $x = 4$  (P=) "4" +"9" +"12" + $\sqrt{(3^2 + "4")^2}$		30	B2 B1 for either factor correct or $(2x \pm 21)(x \pm 4)$ or M1 for $x = \frac{-13 \pm \sqrt{13^2 - 4 \times 21 \times -84}}{4}$ (condone 1 sign error) then M1 for $x = \frac{-13 \pm \sqrt{169 + 672}}{4}$  A1 dep on M1 or B2  M1 i.e $x + (x + 5) + (x + 8) + \sqrt{(3^2 + x^2)}$ in numeric form. A1cao (Last two marks independent) N.B. Working for solving quadratic could be seen in (a) if not contradicted in (b).
				<b>Total 7 marks</b>

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