edexcel

Mark Scheme (Results)

June 2011

International GCSE
Mathematics (4MA0) Paper 3H

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCSE team on 0844 576 0027, or visit our website at www.edexcel.com.

If you have any subject specific questions about the content of this Mark Scheme that require the help of a subject specialist, you may find our **Ask The Expert** email service helpful.

Ask The Expert can be accessed online at the following link: http://www.edexcel.com/Aboutus/contact-us/

Question Number	Working	Answer	Mark	Notes	
1. (a)	$\dfrac{24.1}{0.6} - 38.44 = 40.166\ldots - 38.44$		2	M1	for 0.6 or $\dfrac{3}{5}$ or 40.166… (4 figures correct rounded or truncated) or $40\dfrac{1}{6}$ or 38.44 or $38\dfrac{11}{25}$
		1.726666667		A1	Accept if first 4 figures correct (rounded or truncated) Also accept 1.726 or $\dfrac{259}{150}$ or $1\dfrac{109}{150}$
(b)		1.73	1	B1	ft from (a) if answer to (a) is a decimal with more than 3 sf
					Total 3 marks

Question Number	Working	Answer	Mark	Notes	(alternative method)
2 .	$(5 - 2) \times 180$ or 3×180 or $(2 \times 5 - 4) \times 90$ or 6×90 or $360 + 180$		4	M1	$360 - (83 + 66 + 53 + 96)$ Condone 1 incorrect ext angle
	540			A1 540 seen scores M1A1	62
	"540" − (97 + 114 + 127 + 84)			M1 dep on first M1	180 − "62"
		118		A1 cao	
					Total 4 marks

International GCSE Mathematics (4MA0) Paper 3H Summer 2011

Question Number		Working	Answer	Mark		Notes
3.	(a)		$w(w-9)$	2	B2	Award B2 also for $(w \pm 0)(w - 9)$ B1 for factors which, when expanded & simplified, give two terms, one of which is correct except B0 for $(w + 3)(w - 3)$ SC B1 for $w(w - 9w)$
	(b)	$3x = -6$ or $3x = 1 - 7$ or $5x - 2x = -6$ oe		3	M2	for correct rearrangement with x terms on one side and numbers on the other AND correct collection of terms on at least one side M1 for $5x - 2x = 1 - 7$ oe ie correct rearrangement with x terms on one side and numbers on the other
			-2		A1	cao dep on M2
	(c)	$y^2 + 3y - 7y - 21$		2	M1	for 3 correct terms out of 4 or for 4 correct terms ignoring signs or for $y^2 - 4y + n$ for any non-zero value of n
			$y^2 - 4y - 21$		A1	cao
						Total 7 marks

International GCSE Mathematics (4MA0) Paper 3H Summer 2011

Question Number	Working	Answer	Mark	Notes
4. (a)	1 − (0.6 + 0.3)		2	M1
		0.1		A1 Also accept $\frac{1}{10}$ or 10%
(b)	30 × 0.6		2	M1
		18		A1 cao Do not accept $\frac{18}{30}$
				Total 4 marks

International GCSE Mathematics (4MA0) Paper 3H Summer 2011

Question Number	Working	Answer	Mark	Notes
5.	$\frac{10}{12}$ and $\frac{9}{12}$ eg $\frac{10-9}{12}$, $\frac{10}{12} - \frac{9}{12}$		2	**B2** B1 for $\frac{10}{12}$ or $\frac{9}{12}$ Also accept $\frac{5\times2}{6\times2}$ or $\frac{3\times3}{4\times3}$ **Alternative method** B1 for both fractions correctly expressed as equivalent fractions with denominators that are common multiples of 6 and 4 eg $\frac{20}{24}$ and $\frac{18}{24}$ or $\frac{5\times4}{6\times4}$ and $\frac{3\times6}{4\times6}$ B1 (dep on first B1) for evaluation as a correct fraction which is equivalent to $\frac{1}{12}$ eg $\frac{2}{24}$ **SC** B1 for multiplying both sides by 12 ie 10 − 9 = 1
				Total 2 marks

Question Number	Working	Answer	Mark	Notes	
6. **(a)**		Rotation	3	B1 Accept 'rotate', 'rotated' etc	These marks are independent but award no marks if the answer is not a single transformation
		90° clockwise		B1 Also accept quarter turn clockwise, −90° or 270°	
		(0, 0)		B1 Also accept origin, *O*	
(b)	vertices (4,4), (4,2), (5,2)	**R** correct	2	B2 Condone omission of label B1 for 2 correct vertices	
				Total 5 marks	

Question Number	Working	Answer	Mark	Notes
7.	3+5+7 or 15		3	M1 15 may be denominator of fraction or coefficient in an equation such as 15*x* = 90
	90 ÷ (3+5+7) or 90 ÷ "15" or 6 or $\frac{7}{15}$ oe			M1 dep
		42		A1 Also award for 18 : 30 : 42
				Total 3 marks

International GCSE Mathematics (4MA0) Paper 3H Summer 2011

Question Number	Working		Answer	Mark	Notes	
8. (i)			3, 5, 7, 11	2	B1 cao	
(ii)			2, 3, 5, 7, 9, 11		B1 cao (B0 if 3 or 5 or 7 or 11 repeated)	Brackets not necessary
						Total 2 marks

Question Number	Working		Answer	Mark	Notes	
9.	eg $\dfrac{5}{100}\times 8000 = 400$ $\dfrac{5}{100}\times(8000+"400")$ $= 420$ $\dfrac{5}{100}\times(8000+"400"+"420")$ $= 441$ $8000+"400"+"420"+"441"$	OR 8000×1.05^3		3	M1 for eg $\dfrac{5}{100}\times 8000$ or 400 M1 for completing method Accept (1 + 0.05) as equivalent to 1.05 throughout.	OR M2 for 8000×1.05^3 (M1 for 8000×1.05 or 8400 or 8000×1.05^2 or 8000×1.05^4)
					SC If no other marks gained, award M1 for 8000×1.15 oe or 9200	
			9261		A1 Cao	
						Total 3 marks

International GCSE Mathematics (4MA0) Paper 3H Summer 2011

Question Number	Working	Answer	Mark	Notes
10.		$C = \dfrac{3d+7}{2}$ oe	3	B3 B2 for $\dfrac{3d+7}{2}$ oe B2 for $C = 3d+7 \div 2$ oe B1 for $3d+7 \div 2$ B1 for C = linear expression in d
				Total 3 marks

Question Number	Working	Answer	Mark	Notes	
11. **(a)**	$1 \times 8 + 3 \times 14 + 5 \times 26 + 7 \times 17 + 9 \times 10 + 11 \times 5$ or $8 + 42 + 130 + 119 + 90 + 55$		3	M1	for finding at least four products $f \times x$ consistently within intervals (inc end points) and summing them
				M1	(dep) for use of halfway values
		444		A1	Cao
(b)		8 22 48 65 75 80	1	B1	Cao
(c)		Points correct	2	B1	$\pm$ ½ sq ft from sensible table
		Curve or line segments		B1	ft from points if 4 or 5 correct or if points are plotted consistently within each interval at the correct heights Accept curve which is not joined to the origin
(d)	5.2 indicated on cf graph		2	M1	for 5.2 indicated on cf graph
		approx 36-40 from correct graph		A1	If M1 scored, ft from cf graph If M1 not scored, ft only from correct curve & if answer is correct ($\pm$ ½ sq tolerance), award M1 A1
					Total 8 marks

Question Number	Working	Answer	Mark	Notes
12. **(a)**	$\dfrac{BC}{5.2} = \dfrac{9}{6}$ oe		2	M1 for correct, relevant proportionality statement with 3 values substituted
		7.8		A1 cao
(b)	$\dfrac{CE}{7.2} = \dfrac{6}{9}$ oe or $\dfrac{CE}{6} = \dfrac{7.2}{9}$ oe or $\dfrac{CE}{7.2} = \dfrac{5.2}{"7.8"}$ oe or $\dfrac{CE}{5.2} = \dfrac{7.2}{"7.8"}$ oe		2	M1 for correct, relevant proportionality statement with 3 values substituted
		4.8		A1 cao
				Total 4 marks

International GCSE Mathematics (4MA0) Paper 3H Summer 2011

Question Number	Working	Answer	Mark	Notes	
13.	$\dfrac{20(2x-1)}{4} + \dfrac{20(x-1)}{5} = 2 \times 20$ or $5(2x-1) + 4(x-1) = 40$ or $\dfrac{5(2x-1) + 4(x-1)}{20} = 2$ or $\dfrac{5(2x-1)}{20} + \dfrac{4(x-1)}{20} = 2$		4	M1	for clear intention to multiply both sides by 20 or a multiple of 20 or to express LHS as a single fraction with a denominator of 20 or a multiple of 20 or to express LHS as the sum of two fractions with denominators of 20 or a multiple of 20 May be implied by first B1
	$10x - 5 + 4x - 4 = 40$ or $\dfrac{10x - 5 + 4x - 4}{20} = 2$ or $\dfrac{10x - 5}{20} + \dfrac{4x - 4}{20} = 2$			B1	expanding brackets (dep on M1)
	$14x = 49$ or $14x - 9 = 40$ or $10x + 4x - 9 = 40$ or $14x - 49 = 0$			B1	dep on both preceding marks ie for a correct rearrangement of a correct equation
		3.5		A1	dep on all preceding marks
					Total 4 marks

Question Number	Working	Answer	Mark	Notes	
14.	1.75 seen		2	M1	
		8		A1	
					Total 2 marks

International GCSE Mathematics (4MA0) Paper 3H Summer 2011

Question Number	Working	Answer	Mark		Notes
15. **(a)**	Splits shape into rectangle & semicircle		4	M1	May be implied by working
	$\dfrac{\pi \times 2.7^2}{2}$ or value rounding to 11.4 or 11.5			M1	$\pi \to 11.451105...$ $3.14 \to 11.4453$ $3.142 \to 11.45259$ Also award for equivalent multiple of π eg 3.645π, $\dfrac{729\pi}{200}$
	2 × 2.7 × 7.1 or 38.34			M1	Also accept 38.3
		49.8		A1	for 49.8 or for answer rounding to 49.78 or 49.79
(b)	$P - 2L = \pi r + 2r$ oe		3	M1	for rearranging with both r terms on one side
	$P - 2L = (\pi + 2)r$ oe			M1	for factorising a correct expression (does not depend on a correct rearrangement)
		$\dfrac{P - 2L}{\pi + 2}$ oe		A1	
					Total 7 marks

International GCSE Mathematics (4MA0) Paper 3H Summer 2011

Question Number	Working	Answer	Mark	Notes
16. (a)(i)		114	2	B1 cao
(ii)	eg angle at the centre = 2 × angle at circumference			B1 Three key points must be mentioned 1. Angle at centre/middle/*O*/origin 2. Twice, double, 2× or half/$\frac{1}{2}$ as appropriate 3. angle at circumference/edge/perimeter (NOT e.g. angle *D*, angle *ADB*, angle at top, angle at outside)
(b)		74	1	B1 cao
				Total 3 marks

Question Number	Working	Answer	Mark	Notes
17. (i)	$\frac{1}{7}\times\frac{2}{6}$ and no other terms		2	M1
		$\frac{2}{42}$ or $\frac{1}{21}$ oe		A1 Also accept 0.05, 0.04, 0.047, 0.048 etc Sample space method – award 2 marks for a correct answer; otherwise no marks
(ii)	$\frac{1}{7}\times\frac{1}{6}$ or $\frac{2}{7}\times\frac{3}{6}$		3	M1 · SC M1 for $\frac{1}{7}\times\frac{1}{7}$ or $\frac{2}{7}\times\frac{3}{7}$
	$\frac{1}{7}\times\frac{1}{6}$ + $\frac{2}{7}\times\frac{3}{6}$			M1 · M1 for $\frac{1}{7}\times\frac{1}{7}$ + $\frac{2}{7}\times\frac{3}{7}$
		$\frac{7}{42}$ or $\frac{1}{6}$ oe		A1 Also accept 0.16̇, 0.16, 0.17, 0.166, 0.167 etc but not 0.2 Sample space method – award 3 marks for a correct answer; otherwise no marks
				Total 5 marks

International GCSE Mathematics (4MA0) Paper 3H Summer 2011

Question Number	Working	Answer	Mark	Notes	
18.	$(BC =) \ 47 \sin 32°$		5	M1	or for $(CD =)\dfrac{47 \sin 32°}{\sin 129°}$
	24.906… at least 3 sf (may be implied by correct *BD*)			A1	or for *CD* = 32.048… at least 2 sf (may be implied by correct *BD*)
	$\tan 51° = \dfrac{"24.906…"}{BD}$ or $\tan 39° = \dfrac{BD}{"24.906…"}$			M1	or for $\cos 51° = \dfrac{BD}{"32.048…"}$
	$(BD =)\dfrac{"24.906…"}{\tan 51°}$ or $"24.906…" \tan 39°$			M1	or for $(BD =)"32.048…" \cos 51°$
		20.2		A1	for answer rounding to 20.2 (20.1686…)
					Total 5 marks

International GCSE Mathematics (4MA0) Paper 3H Summer 2011

Question Number	Working	Answer	Mark	Notes
19. (a)	$P = kQ^3$		3	M1 for $P = kQ^3$ but not for $P = Q^3$
	$1350 = k \times 3375$			M1 for $1350 = k \times 3375$ Also award for $1350 = k \times 15^3$
		$P = 0.4Q^3$ oe		A1 $P = 0.4Q^3$ oe Award 3 marks if answer is $P = kQ^3$ oe but k is evaluated as 0.4 in part (a) or part (b)
(b)		3200	1	B1 ft from "0.4" $\times$ 8000 except for $k = 1$, if at least M1 scored in (a) (at least 1 d.p. accuracy in follow through)
				Total 4 marks

International GCSE Mathematics (4MA0) Paper 3H Summer 2011

Question Number	Working	Answer	Mark	Notes	
20.	$a^2 \times 10^{2n}$		3	M1	
		$\dfrac{a^2}{10} \times 10^{2n+1}$		A1 for $\dfrac{a^2}{10}$ oe A1 for $\times 10^{2n+1}$ oe	Award M1 A1 A1 for $\dfrac{a^2}{10} \times 10^{2n+1}$ even if M1 not awarded. Award M1 A1 A0 if $\dfrac{a^2}{10}$ oe seen. Award M1 A0 A1 if $\times 10^{2n+1}$ oe seen.
					Total 3 marks

Question Number	Working	Answer	Mark		Notes
21. (a)	Use of areas to obtain a correct expression for A, which must be correctly punctuated. For example $(A =) 80 - 2 \times \frac{1}{2} x(10 - x) - 2 \times \frac{1}{2} x(8 - x)$ or $10 \times 8 - \frac{1}{2} x(10 - x) - \frac{1}{2} x(10 - x) - \frac{1}{2} x(8 - x) - \frac{1}{2} x(8 - x)$ or $80 - x(10 - x) - x(8 - x)$ or $80 - 2\left(\dfrac{10x - x^2}{2}\right) - 2\left(\dfrac{8x - x^2}{2}\right)$		3	B2	B1 for expression for area of triangle or pair of congruent triangles, for example $\frac{1}{2} x(10 - x)$ or $\frac{1}{2} x(8 - x)$ or $x(10 - x)$ or $x(8 - x)$ Condone omission of brackets for award of B1
	Correct simplification of a correct expression for A to obtain an expression which is equivalent to $2x^2 - 18x + 80$ For example $(A =)\ 80 - 10x + x^2 - 8x + x^2$ or $80 - (10x - x^2) - (8x - x^2)$ or $80 - (5x - \frac{1}{2} x^2) - (5x - \frac{1}{2} x^2) - (4x - \frac{1}{2} x^2) - (4x - \frac{1}{2} x^2)$			B1	dep on B2
(b)(i)		$4x - 18$	5	B2	B1 for 2 of 3 terms differentiated correctly
(ii)	" $4x - 18$ " $= 0$			M1	
		4.5 oe		A1	cao
(iii)		eg positive coefficient of x^2 or U shape or $\dfrac{\mathrm{d}^2 A}{\mathrm{d}x^2} = 4$ which > 0		B1	
					Total 8 marks

International GCSE Mathematics (4MA0) Paper 3H Summer 2011

Question Number	Working	Answer	Mark	Notes	
22.	$x^2 + (2x-3)^2 = 2$		6	M1	for correct substitution
	$x^2 + 4x^2 - 6x - 6x + 9 = 2$ or $x^2 + 4x^2 - 12x + 9 = 2$			B1	(indep) for correct expansion of $(2x-3)^2$ even if unsimplified
	$5x^2 - 12x + 7 (= 0)$			B1	for correct simplification Condone omission of '= 0'
	$(5x-7)(x-1)(=0)$ or $\dfrac{12 \pm \sqrt{4}}{10}$ or $\dfrac{12}{10} \pm \dfrac{\sqrt{4}}{10}$ or $\dfrac{6}{5} \pm \dfrac{1}{5}$			B1	for correct factorisation or for correct substitution into quadratic formula and correct evaluation of '$b^2 - 4ac$' or for using square completion correctly as far as indicated
	$x = 1$ or $x = 1\dfrac{2}{5}$			A1	for both values of x dep on all preceding marks
		$x = 1,\ y = -1$ $x = 1\dfrac{2}{5},\ y = -\dfrac{1}{5}$		A1	for complete, correct solutions (need not be paired) dep on all preceding marks No marks for $x = 1,\ y = -1$ with no working
					Total 6 marks

Question Number	Working	Answer	Mark	Notes
23.	$\dfrac{2\pi r^2 + 2\pi rh}{4\pi r^2} = 2$		5	M1 Also award for $\dfrac{\pi r^2 + 2\pi rh}{4\pi r^2} = 2$
	$2\pi r^2 + 2\pi rh = 2 \times 4\pi r^2$ oe			M1 for $2\pi r^2 + 2\pi rh = 2 \times 4\pi r^2$ oe or $\dfrac{2\pi r(r+h)}{4\pi r^2} = 2$ If first M1 awarded for $\dfrac{\pi r^2 + 2\pi rh}{4\pi r^2} = 2$ award this second M1 also for $\pi r^2 + 2\pi rh = 2 \times 4\pi r^2$ oe
	$h = 3r$ oe			A1 If first M1 awarded for $\dfrac{\pi r^2 + 2\pi rh}{4\pi r^2} = 2$ and second M1 for $\pi r^2 + 2\pi rh = 2 \times 4\pi r^2$ oe Award this A1 also for $h = 3.5r$ oe
	$\dfrac{\pi r^2 \times "3r"}{\frac{4}{3}\pi r^3}$ oe			M1 dep on first two M1s h must be of the form kr
		$\dfrac{9}{4}$ oe		A1
				Total 5 marks

International GCSE Mathematics (4MA0) Paper 3H Summer 2011

Further copies of this publication are available from
International Regional Offices at www.edexcel.com/international

For more information on Edexcel qualifications, please visit
www.edexcel.com

Alternatively, you can contact Customer Services at
www.edexcel.com/ask or on + 44 1204 770 696

Ofqual

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

CCEA
Rewarding Learning