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Edexcel GCSE

Mathematics A 1387

Paper 5525/06

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Mark Scheme (Results)

Edexcel GCSE

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NOTES ON MARKING PRINCIPLES

1 Types of mark

M marks: method marks
A marks: accuracy marks
B marks: unconditional accuracy marks (independent of M marks)

2 Abbreviations

cao – correct answer only
ft – follow through
isw – ignore subsequent working
SC: special case
oe – or equivalent (and appropriate)
dep – dependent
indep - independent

3 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.

4 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. Send the response to review, and discuss each of these situations with your Team Leader.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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.

5 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

6 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.

7 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

8 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

9 Parts of questions

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

Paper 5525/06					
No		Working	Answer	Mark	Notes
1	(a)	$\frac{\sqrt{25.96}}{4.05} = \frac{5.09509...}{4.05}$	1.258048316	2	M1 for 5.09… or 4.05 or 25.96 seen A1 for at least 4 sf rounded or truncated: 1.258(048316…) or 1.26
	(b)		1.26	1	B1 for 1.26 or ft from (a); 1.260 gets B0
2	(a)		p^9	1	B1cao
	(b)		q^5	1	B1cao
	(c)		t^{12}	1	B1cao
	(d)	$6m + 8 + 3m - 15$	$9m - 7$	2	M1 for correct expansion of at least one term A1 for $9m - 7$
3		$168^2 + 157^2 = 28\,224 + 24\,649$ $= 52\,873$ $\sqrt{28224 + 24649}$	229.9 - 230	3	M1 for $168^2 + 157^2$ M1 $\sqrt{168^2 + 157^2}$ or $\sqrt{28224 + 24649}$ or $\sqrt{52873}$ ie not doubling A1 for 229.9-230
4		$\frac{8}{25} \times 1750$ or 0.32×1750 or 8×70	560	3	M1 for $\frac{8}{25}$ oe seen or $\frac{1750}{25}$ oe seen or 0.32 or 70 seen M1 for $\frac{8}{25} \times 1750$ oe A1 for 560

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No		Working	Answer	Mark	Notes
5	(a)	3.1 68.2(31) 3.2 73.7(28) 3.3 79.4(97) 3.4 85.5(44) 3.5 91.8(75) 3.6 98.4(96) 3.7 105.4(13) 3.65 101.9(1725)	3.6	4	B2 for trial $3.1 \le x \le 3.7$ evaluated (B1 for trial $3 < x < 4$ evaluated) B1 for different trial $3.615 \le x \le 3.65$ evaluated B1 for 3.6, (dep on at least one of 2 previous Bs) or anything that rounds to 3.6 Values evaluated can be rounded or truncated, but to at least 1 d.p.
	(b)(i)		$x^2(x+4)=100$	2	B1 for $x^2(x+4)$ seen or $x \times x \times x + 4$ *OR* "3.6"^{3}+4×"3.6"^{2} ≈ 100 (dep on 3.6≤(a)≤3.7); (46.656+4×51.84)
	(ii)		7.6		B1 ft from "3.6" ie "3.6" + 4
6	(a)	$121.6(0) \times \frac{100}{4}$	3040	2	M1 for $121.6(0) \times \frac{100}{4}$ A1 cao
	(b)	1.04 oe seen $2828.8 \div 1.04$	2720	3	B1 for 1.04 oe seen M1 for $2828.8 \div 1.04$ oe A1 for 2720
7	(a)		95 185 220 235 240	1	B1 for all correct
	(b)		Points	2	B1 ft for at least 4 or 5 pts plotted correctly (± 1 sq) at ends of interval dep on sensible table (cf; no more than 1 error)
			curve or line segment		B1ft (dep on previous B1) for pts joined by curve/line segments provided no gradient is negative (SC: B1 if 4 or 5 pts plotted not at ends but consistently within each interval **and** joined)
	(c)		20.5 - 22	1	B1 ft from a cf graph using cf = 120 (.5)

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No		Working	Answer	Mark	Notes
8	(a)		perp bisector	2	B1 appropriate arcs B1 if within guidelines
	(b)		Angle bisector	2	B1 appropriate arcs B1 if within guidelines
9	(a)	12 600 or 1.26×10^4	1.12×10^2	2	M1 for 12 600 or 1.26×10^4 A1 for 1.12×10^2 - 1.123×10^2 oe
	(b)	$d^2=\frac{3h}{2}$	$\frac{2d^2}{3}$	2	M1 for squaring each side A1 for $\frac{2d^2}{3}$ oe
10		$\cos x=\frac{3.9}{4.7}=0.8297\ldots$	33.9	3	M1 for $\cos=\frac{3.9}{4.7}$ (= 0.8297…) M1 (dep) for $\cos^{-1}$ A1 for 33.9 –33.93 SC B2 for 0.592(069…) or 37.6(923…) or 37.7
11		Region $x<3$ Region $y>-2$ Region $y<x$	**R** shaded	4	B4(dep on well defined border) correct region labelled **R**. If not labelled, dep on all inequalities being clearly shaded (B3 corrected region with incorrectly marked boundaries) (B2 2 out of 3 correct regions, consistently shaded or all 3 lines drawn to form a triangle) (B1 any one region correctly shaded either side or any two correct lines drawn)

Paper 5525/06					
No		Working	Answer	Mark	Notes
12		$\left(\frac{1}{2}\times\pi\times30^2+60\times45\right)\times90$ (1/2 × 2827.43+2700)×90 (1413.7..+2700)×90 4113.7.. × 90 = 370234.5…	370 000	5	**Cross-section approach:** M1 for $(\frac{1}{2}\times)\pi\times30^2$ (=2827.4 or 1413.7) or 60×45 (=2700) M1 for "$(\frac{1}{2}\times)\pi\times30^2$" $+60\times45$ (complete method) M1 for "*any* area" × 90 or 4110–4115 A1 for 370 000 to 370300 B1 correct units **Volume approach:** M1 for $(\frac{1}{2}\times)\pi\times30^2$ or 60×45 M1 for "$(\frac{1}{2}\times)\pi\times30^2$"×90 (=127234 or 254468) or 60 × 45 × 90 (=243000) M1 for addition of two volumes A1 for 370 000 to 370300 (370 235) B1 correct units
13	(i) (ii) (iii)		E A I	3	B1 for E cao B1 for A cao B1 for I cao
14		60 × 40 × 2 4800 "4800"$=\pi\times4^2\times h$ $\frac{\text{"4800"}}{\text{"50.265..."}}$	95.5	5	M1 60 × 40 × 2 A1 for 4800 M1 **f**or $\pi\times4^2$ or 50.265… M1 for "4800" ÷ "π x 4^2**"** A1 95.49 - 95.5
15		$\frac{x}{450}\times70$ 7, 18.8, 15.2, 28.9	7, 19, 15, 29	3	M1 valid method A2 all correct (A1 2 or 3 correct) SC unrounded: M1 A1 A0

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No		Working	Answer	Mark	Notes
16	(a)	$d = kt^2$ $20 = k \times 2^2$	$d = 5t^2$	3	M1 for $d = kt^2$ (accept any $k \neq 0, 1$) M1(dep) for $20 = k \times 2^2$ A1 for $d = 5t^2$
	(b)		45	1	B1 for 45 cao
	(c)	$605 = 5t^2$ $\sqrt{\frac{605}{5}}$	11	3	M1 for $605 = "5" t^2$ ("5" $\neq 1$) M1 for $\sqrt{\frac{605}{"5"}}$ A1 for 11 cao
17		eg $0.91^8 = 0.4702\ldots$	8	3	B1 for 0.91 seen oe M1 for 0.91^2 (0.8281) or higher power evaluated A1 for 8 – 8.01
18	(a)	$2x + 2y = 10$		1	B1 for $2x + 2y = 10$ oe
	(b)	$x^2 + y^2 = 16$ $x^2 + (5 - x)^2 = 16$		3	B1 for $x^2 + y^2 = 4^2$ oe M1 for rearranging first equation and substituting into second A1 for sight of $25 - 10x + x^2$ and correct simplification to the given equation
	(c)	$x = \frac{10 \pm \sqrt{(-10)^2 - 4 \times 2 \times 9}}{2 \times 2}$ $\frac{10 \pm \sqrt{28}}{4}$	3.82; 1.18	3	M1 for correct substitution into quadratic formula (allow sign errors) A1 for correct simplification A1 for 3.82 – 3.823, 1.177 – 1.18

Paper 5525/06					
No		Working	Answer	Mark	Notes
19		$qx = p(x+c)$ $qx = px + pc$ $qx - px = pc$ $x(q-p) = pc$	$\frac{pc}{q-p}$	4	M1 for $qx = p(x+c)$ oe M1 for $qx = px + pc$ oe M1 for $x(q-p) = pc$ oe process A1 for $\frac{pc}{q-p}$ oe
20	(a)	eg $\frac{4.2^2 + 5.3^2 - 7.6^2}{2 \times 4.2 \times 5.3}$ $\frac{-12.03}{44.52}$ or $-0.2702\ldots$	105.7	3	M1 for correct substitution into cosine rule to find any angle M1(dep) for correct order of evaluation of their cosine rule to get to $\cos X = \frac{p}{q}$ where p and q are numbers A1 105.67 – 105.7
	(b)	eg $\frac{1}{2} \times 4.2 \times 5.3 \times \sin"105.67°"$	10.7	3	M2 for substitution of lengths of 2 sides and their included angle into $\frac{1}{2}ab\sin C$ (M1 if it is their angle but not the included one) A1 for 10.7 – 10.72
21	(a)(i)	$\frac{4.75}{5.35}$	0.887850467	3	B3 LB = 0.8878-0.888 and UB = 0.9238 - 0.924 (B2 one of LB or UB correct) (B1 sight of one of 4.75, 5.35, 4.85, 5.25) SC: B2 correct answers in wrong order
	(ii)	$\frac{4.85}{5.25}$	0.923809523		
	(b)		0.9 Bounds agree to 1 dp	2	B1 dep on two correct bounds for gradient B1 dep on two correct bounds for gradient

Paper 5525/06				
No	**Working**	**Answer**	**Mark**	**Notes**
22	0.62 × 0.38 or 0.2356 × 2 oe	0.4712	4	B1 for 0.38 seen M1 for 0.62 × (1-0.62) or 0.2356 M1(dep) for × 2 oe A1 for 0.47, 0.471, 0.4712 oe
23	$\frac{49152}{12000}$ or 4.096 $\sqrt[3]{4.096}$ or 1.6 "1.6"^{2} or 2.56	3800	4	M1 for $\frac{49152}{12000}$ or 4.096 oe M1 for $\sqrt[3]{4.096}$ or 1.6 oe M1 for "1.6"^{2} or 2.56 oe A1 for 3800 cao