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Edexcel GCSE

Mathematics B 1388

Paper 5538/ 19

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Mark Scheme

Edexcel GCSE

Mathematics B 1388

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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.

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No	Working	Answer	Mark	Notes
1	$\frac{451-376}{376}\times 100$	19.9%	3	M1 $\frac{451-376}{376}$ $(=\frac{75}{376}=0.199...)$ M1 dep $\frac{'451-376'}{376}\times 100$ A1 19.9–19.95% NB: Ignore zeros for the purpose of awarding method marks. SC:B1 for $\frac{451-376}{451}\times 100$ oe or $119.9-119.95$
2	<table><tr><td>x</td><td>x^3-5x</td></tr><tr><td>4</td><td>44</td></tr><tr><td>4.1</td><td>48.4(2)</td></tr><tr><td>4.2</td><td>53.0(8)</td></tr><tr><td>4.3</td><td>58.0(0)</td></tr><tr><td>4.4</td><td>63.1(8)</td></tr><tr><td>4.5</td><td>68.6(2)</td></tr><tr><td>4.6</td><td>74.3(3)</td></tr><tr><td>5</td><td>100</td></tr><tr><td>4.35</td><td>60.5(6)</td></tr></table>	4.3	4	B2 for trial between 4.3 and 4.4 inclusive (B1 for trial between 4 and 5 inclusive) B1 for different trial between 4.3 and 4.4 B1 (dep on at least one previous B1) for 4.3 NB Trials should be evaluated to at least 1 dp truncated or rounded
3	$\frac{1}{2}\pi\times 10^2$	157 cm^2	3	M1 $\frac{1}{2}\pi\times 10^2$ or $\pi\times 10^2$ A1 157 – 157.1 B1(indep) cm^2

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No	**Working**	**Answer**	**Mark**	**Notes**
4(a)		Reason	1	B1 for correct explanation eg, The mode is 7, the mode is the most frequent, 9 is not the most common, 9 has the lowest frequency
(b)		7	1	B1 cao
(c)		Beccy, as a bigger sample	1	B1 for Beccy and reason e.g Beccy takes a bigger sample
5	(100%–25%)×Normal Price=£12.75 Normal Price = £12.75÷0.75	£17	3	M1 (100%–25%)×Normal Price = £12.75 or 0.75 or 75% seen M1 12.75÷0.75 oe A1 cao M1 for $12.75 \div 3 (= 4.25)$ M1 dep for 12.75 + "4.25" or "4.25"$\times 4$ A1 cao
6	2 × 360 , 2×2×180, 2×2×2×90, 2×2×2×2×45,	2×2×2×2×3×3×5	2	M1 at least two steps to find 720 as a product of its prime factors or sight of factors 2, 3, 5 on a factor three oe A1 cao accept $2^4 \times 3^2 \times 5$
7(a)	130÷2	65 Reason	2	B1 cao B1 angle at centre is twice the angle at the circumference
(b)	$RQP = 55$ $RSP = 180 - RQP$	125	2	M1 Full method for *RSP* A1 cao SC: 1 mark for assumptions that lead to eg $P\hat{Q}O = 27\frac{1}{2}$ and $Q\hat{R}S = 90^\circ$

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No	**Working**	**Answer**	**Mark**	**Notes**
8	$\frac{0.533692341}{1.466307658}$	0.363970(234…)	2	M1 for 0.5336… or 1.4663… A1 for 0.3639……or better
9 (a)	$f = \frac{k}{d}$ $256 = \frac{k}{50}$ $k = 12800$ $f = \frac{'12800'}{80}$ **OR** $50 \times 256 = f \times 80$	160	3	M1 $f = \frac{k}{d}$ M1 for $256 = \frac{k}{50}$ oe (also implies first M1) A1 cao OR M1 $50 \times 256 = f \times 80$ M1 $f = \frac{'12800'}{80}$ A1 cao
(b)	$f = \frac{'12800}{80}$ $d = \frac{'12800'}{125}$	102.4	2	M1 for $d = \frac{'12800'}{125}$ or $\frac{50 \times 256}{125}$ A1 cao

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No	**Working**	**Answer**	**Mark**	**Notes**
10(a)		0.2 0.58, 0.22 0.2	2	B1 0.2 on jazz on 1st set B1 0.58, 0.22 0.2 (ft) repeated 3 times
(b)	$0.8 \times 0.2 \times 2 + 0.2 \times 0.2$ or $1 - 0.8 \times 0.8$	0.36	3	M1 $(0.58 + 0.22) \times$ '0.2' M1 $(0.58 + 0.22) \times$ '0.2' $\times 2 +$ '0.2' $\times$ '0.2' A1 0. 36 cao NB: without replacement can gain method marks only OR M2 $1-(0.58+0.22)^2$ A1 0.36 cao OR M2 for 5 combinations added (M1 for any 2,3,4 combinations added)
11	$3.5 \times 100 \times 100 \times 100$	3 500 000	2	M1 for $100 \times 100 \times 100$ oe seen A1 cao
12	$\frac{2.9x \sin 18}{\sin 122}$	1.06	3	M1 for $180 - 18 - 40 (= 122)$ M1 for $\frac{x}{\sin 18} = \frac{2.9}{\sin'122'}$ oe A1 for 1.056 – 1.06

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No	**Working**	**Answer**	**Mark**	**Notes**
13(a)	$3x(2x-7)+x(3x+4)=85$ $6x^2-21x+3x^2+4x=85$	AG	3	M1 for $3x(2x-7)+x(3x+4)$ oe M1 for $6x^2-21x+3x^2+4x$ oe (at least 3 out of 4 terms correct) OR M1 $x(5x-3)+2x(2x-7)$ M1 $5x^2-3x+4x^2-14x$ oe (at least 3 out of 4 terms correct) OR M1 $3x(5x-3)-2x(3x+4)$ oe M1 $15x^2-9x-6x-8x$ oe (at least 3 out of 4 terms correct) A1 fully correct working leading to correct equation
(b)	$x=\dfrac{-(-17)\pm\sqrt{(-17)^2-4\times9\times(-85)}}{2\times9}$ $x=\dfrac{17\pm\sqrt{3349}}{18}$	4.16, – 2.27	3	M1 correct substitution up to signs M1 $x=\dfrac{17\pm\sqrt{3349}}{18}$ A1 4.15 to 4.16, –2.27 to –2.271
14	$\dfrac{2}{\sqrt{5}}\times\dfrac{\sqrt{5}}{\sqrt{5}}$	$\dfrac{2\sqrt{5}}{5}$	2	M1 for $\dfrac{2}{\sqrt{5}}\times\dfrac{\sqrt{5}}{\sqrt{5}}$ or $\dfrac{2}{\sqrt{5}}\times\dfrac{\sqrt{n}}{\sqrt{n}}$ where $\sqrt{5n}$ is rational A1 for $\dfrac{2\sqrt{5}}{5}$ oe with rational denominator
15	$(p-t)y=2pt$ $py-ty=2pt$ $py=ty+2pt$ $py=t(y+2p)$	$t=\dfrac{py}{y+2p}$	4	M1 $(p-t)y=2pt$ M1 $py-ty=2pt$ M1 $py=ty+2pt$ or collect terms in t on one side and remaining terms on other side [at least 2 terms in it] A1 cao

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No	**Working**	**Answer**	**Mark**	**Notes**
16	$DC^2 = 5^2 + 8^2$; $DC = \sqrt{89}$ $DB^2 = 5^2 + 10^2$; $DB = \sqrt{125}$ $BC^2 = 8^2 + 10^2$; $BC = \sqrt{164}$ $\cos CDB = \dfrac{89 + 125 - 164}{2 \times \sqrt{89} \times \sqrt{125}}$ $= 0.23702$	76.3	6	M1 ($DC^2 =) 5^2 + 8^2$ or $DC = \sqrt{89} = 9.4(3\ldots)$ M1 ($DB^2 =) 5^2 + 10^2$ or $DB = \sqrt{125} = 11.1(8\ldots)$ M1 ($BC^2 =) 8^2 + 10^2$ or $BC = \sqrt{164} = 12.8(1\ldots)$ M2 $\cos CDB = \dfrac{'89' + '125' - '164'}{2 \times \sqrt{'89'} \times \sqrt{'125'}}$ M1 $\sqrt{''164''^2} = \sqrt{''89''^2} + \sqrt{'125'^2} - 2 \times \sqrt{'89'} \times \sqrt{'125'} \times \cos CDB$ A1 76.2–76.3
17(a)	$(x-4)^2 - 16 + 23$	$p = 4$, $q = 7$	3	M1 for sight of $(x-4)^2$ or for $x^2 - 2px + p^2 (+q)$ A1 $p = 4$, A1 $q = 7$ Or substitution of two different values of x and attempts to solve for p and q
(b)		(4, 7)	1	B1 ft on (a)
(c)	Reflection in the y axis		1	B1 cao