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Edexcel GCSE

Mathematics A 1387

Paper 5523/04

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Mark Scheme

Edexcel GCSE
Mathematics A 1387

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

5523/04				
No.	**Working**	**Ans.**	**Mark**	**Notes**
1(a)	450×28 = 12600p = £126 9.51×15 = £142.65 142.65+126 =	268.65	3	M1 for 450×28 or 0.28 × 450 or the digits 126 seen M1 for 9.51×15 or 951×15 or the digits 14265 seen A1 cao
(b)	$\frac{15}{450}$	$\frac{1}{30}$	2	M1 $\frac{15}{450}$ A1 $\frac{1}{30}$ SC B1 for 0.03(…) or 3.33(…)%
(c)	360×1.175 **or** $360\times\frac{17.5}{100}=63$ 360 + 63	£423	3	M2 for 360×1.175 oe A1 cao OR M1 $360\times\frac{17.5}{100}(=63)$ or attempt at 10%, +5%, +2.5%: eg digits 36 + 18 + 9 M1 (dep) 360 + '63' A1 cao
2 (a)		10 10	1	B1 cao
(b)		6.0 – 7.5 exclusive	1	B1 for 6.0 – 7.5 exclusive
(c)		30	1	B1 cao
(d)		Graph	1	B1 cao Line from (11.10, 20) to (11.50, 0); tolerance ±2mm Accept freehand line if intention is clear
(e)		40	2	M1 20 ÷ 30 or 20 ÷0.5 oe or 0.6 or 0.66…… seen A1 cao SC Award B1 for 20 ÷ 40 in working or 0.5 or 30 given as answer.

5523/04				
No.	**Working**	**Ans.**	**Mark**	**Notes**
3(a)		5	1	B1 cao
(b)	$4y = 11$	2.75	2	M1 Movement of a term eg $4y = 12 - 1$ A1 2.75 or $2\frac{3}{4}$ or $\frac{11}{4}$ oe
(c)		$3cd$	1	B1 cao
(d)		$3p - q$	2	B2 for $3p - q$ (B1 for $3p$ or $\pm q$ or $3p+-q$)
4	$60\times15\times30 = 27000$	27000	2	M1 $60\times15\times30$ A1 cao
5	78+119+105 = 302 360 – 302 =58 180–58	122	3	M1 360– (78+119+105) or 360–302 or 58 seen M1 (indep) 180 – "58" where the "58" must be <90° and not 78° from the diagram. A1 cao
6	Σfreq = 60 360° ÷ 60 = 6° 15×6=90 Cow 12×6=72 Hen 5×6=30 Pig 28×6=168 Sheep	90 72 30 168	4	M1 evidence of method for at least 1 angle (could be implied by 1 correct angle drawn on pie chart, or one other than 90° in the table). A2 All 3 angles drawn (±4° tolerance, any order) (A1 at least 2 angles of three correctly drawn ±4°, or all 3 angles, other than 90°, in the table) B1 (dep on at least 1 angle drawn correctly, and exactly 4 sectors) for labels (names or abbreviations of animals only) NB mark table or pie chart to the benefit of the candidate if inconsistent.
7(a)	4.5 + 2.7225	7.2225	2	M1 for 4.5 or 2.7225 A1 7.2225 cao
(b)		7.2	1	B1 for rounding correctly their 4 or more figure answer in (a) to 1 decimal place; award if 7(a) already to 1dp

5523/04				
No.	**Working**	**Ans.**	**Mark**	**Notes**
8	3kg peaches is £1.68 £2.34 – £1.68 = £0.66 £0.66 ÷ 2 = £0.33	£0.33 or 33p	3	M1 2 × £0.84 or digits 168 seen M1 (dep) digits 234 – digits "168" or digits 66 seen A1 £0.33 or 33p (units consistent with answer) NB 0.33 or 33 without units M2, £0.33p,£.33p M2A1
9(a)	8×5	40km	1	B1 accept answers from 39 to 41
(b)		023° – 027°	1	B1 accept answers from 23° to 27°
(c)		D correct	2	B2 cao (B1 D either 4 cm ±2mm from A or on correct bearing from A, 115° ±2°)
10 (a)	$4y - 2y = 9 - 3$	3	2	M1 Attempts to move both y and number term eg $4y - 2y = 9 - 3$ A1 cao
(b)	$5t - 15 = 8$ $5t = 23$	4.6	2	M1 $5t - 15 = 8$ or $t - 3 = \frac{8}{5}$ A1 4.6, $4\frac{3}{5}$, $\frac{23}{5}$

5523/04				
No.	**Working**	**Ans.**	**Mark**	**Notes**
11(a)	$\frac{451-376}{376}\times 100$	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% Alternative: M2 $\frac{451}{376}\times 100-100$ A1 19.9 – 19.95% SC: B1 for 119.9 – 119.95 or $\frac{451-376}{451}\times 100$ oe NB: ignore 0s for the purpose of awarding the method marks.
(b)	3.2÷8×3=1.2	4.4	2	M1 digits 32 with either ÷8 or ×3 or 4 seen or 1.2 seen or digits 96 seen A1 cao
12(a)	$\frac{5\times 12}{2}$	30	2	M1 $\frac{5\times 12}{2}$ A1 cao
(b)	Area *ABCD* = 17^2 = 289 Area *PQRS* = 289 – 4× "30" $(5+12)^2$ =289 289 – 4 ×'30'	169	3	M1 for Area *ABCD* = 17^2 or 289 seen M1 (dep) for Area *PQRS* = "289" – 4× "30" A1 cao **OR** M1 5^2 + 12^2 M1(dep) $\sqrt{25+144}$ or 13 or 13^2 A1 cao SC B2 for 169^2 or 28561 as answer

5523/04				
No.	**Working**	**Ans.**	**Mark**	**Notes**
13		$9n$, $3\times6n$, $(3n)^2$	3	B1 each correct value (–B1 each tick over 3, to a minimum of B0).
14	$2000\times1.05^2 = 2000\times1.1025$ **or** $2000\times1.05 = 2100$ $2100\times1.05 = 2205$	£2205	3	M2 2000×1.05^2 (M1 2000×1.05^n, $n \neq 2$) A1 cao Or M1 $\frac{5}{100}$ × 2000 (oe) or 100 or 200 or 2100 or 2200 seen M1 (dep) $\frac{5}{100}$ × (2000 + "100") A1 cao SC B2 for £2315.25 seen (3 yrs)
15(a)		Reason	1	B1 eg "mode is 7" "the mode is the one of which there is the most" "because its got the lowest frequency"
(b)	$4\times4=16$ $5\times7=35$ $6\times10=60$ $7\times12=84$ $8\times5=40$ $9\times2=18$ Mean = $\frac{\Sigma fx}{\Sigma f}$ = "$\frac{253}{40}$"	6.325	3	M1 Σfx (at least 3, implied by answers) or 253 seen M1 (dep) $\frac{\Sigma fx}{\Sigma f}$ A1 6.325, 6.33, 6.3, 6.32

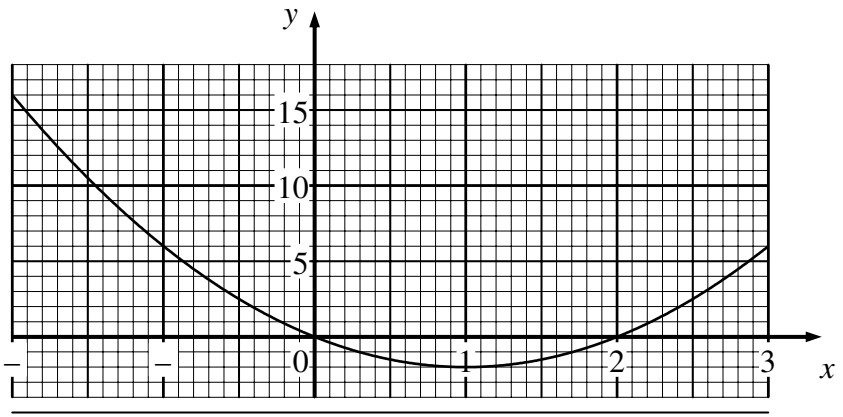
5523/04				
No.	**Working**	**Ans.**	**Mark**	**Notes**
(c) (d)		7 Beccy, as a bigger sample	1 1	B1 cao NB 6.5 leading to 7 gets B0 B1 for Beccy and reason
16	$5.6^2 + 10.5^2$ $\sqrt{31.36 + 110.25} = \sqrt{141.61}$	11.9	3	M1 $5.6^2 + 10.5^2$ M1 (dep) $\sqrt{31.36 + 110.25}$ A1 cao
17	$\frac{1}{2}\pi \times 10^2$	157 cm^2	3	M1 for sight of $\frac{1}{2}\pi \times 10^2$ or $\pi \times 10^2$ A1 157 – 157.1 B1 (indep) cm^2
18	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 correct steps to find 720 as a product of its prime factors or sight of factors 2, 3, 5 on a factor tree oe A1 cao accept $2^4 \times 3^2 \times 5$
19	$27 = \frac{4(x + 10)}{2}$ $27 = 2x + 20$	3.5	3	M1 $27 = \frac{4(x + 10)}{2}$ M1 Expansion to $4x+40$ or ×2 to give $54=4(x+10)$ A1 for 3.5, accept $\frac{14}{4}$ or $\frac{7}{2}$ SC: B1 for $x=11$

5523/04				
No.	**Working**	**Ans.**	**Mark**	**Notes**
20(a)	$\frac{1240+1270+1330}{3}$	1280	2	M1 $\frac{1240+1270+1330}{3} = \frac{3840}{3}$; accept 1240 + 1270 + 1330 ÷ 3 oe A1 cao
(b)	$\frac{1300+1330+x}{3}=1350$ or (1350 × 3) – (1300 + 1330) = 4050–2630	1420	2	M1 $\frac{1300+1330+x}{3}=1350$ Or (1350 × 3) –(1300 + 1330) or 4050–2630 A1 cao
21(a)		6, –2, 0	2	B2 all 3 correct (B1 one or two correct)
(b)		Graph	2	B1 for 5 or 6 points plotted either correct or ft from their table. B1 Joined with a smooth curve For either B mark ft on (a) if at least B1 awarded
(c)	y = 2.5 drawn	–0.5, 2.5	2	B1 –0.4 to –0.6 or ft graph ±0.1 B1 2.4 to 2.6 or ft ft graph ±0.1 SC If B0 then B1 y = 2.5 drawn at least $-1 \le x \le 2$; tolerance within y=2 and y=3 NB Accept coordinates that define the values.
22	(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 or £12.75 × $\frac{4}{3}$ oe A1 cao Alternative: M1 25% is £4.25 or £12.75 ÷3 (=£4.25) M1 (dep) £12.75 + "£4.25" oe A1 cao

5523/04				
No.	**Working**	**Ans.**	**Mark**	**Notes**
23	$\frac{2\times 2.2\times 10^{12}\times 1.5\times 10^{12}}{2.2\times 10^{12}-1.5\times 10^{12}}$ $=\frac{6.6\times 10^{24}}{7\times 10^{11}}$	9.43×10^{12}	3	M1 6.6×10^{24} or 7×10^{11} or 0.7×10^{12} or as ordinary numbers or calculator notation M1 $\frac{6.6\times 10^{24}}{7\times 10^{11}}$ or as ordinary number or calc notation A1 9.42×10^{12} to 9.43×10^{12} SC B1 for $9.4\ldots\times 10^{n}$ where $n\neq 12$ and an integer
24	$6x + 2y = 16$ $4x + 2y = 9$ $2x = 7$, $x = 3.5$ $3\times 3.5 + y = 8$, $y = -2.5$	$x = 3.5$, $y = -2.5$	3	M1 full method to eliminate x or y, allow one accuracy error M1 (dep) for substitution of one variable in one of the equations, or by appropriate method after starting again A1 both cao
25	$\tan x = \frac{4.5}{12} = 0.375$ $x = \tan^{-1} 0.375$	20.6	3	M1 $\tan and \frac{4.5}{12}$ M1 $\tan^{-1}\left(\frac{4.5}{12}\right)$ A1 20.55 – 20.6 RAD: 0.3587 GRAD: 22.84 for M2
26	$130\div 2$	65 Reason	2	B1 cao B1 'angle at centre is twice the angle at the circumference' Allow "origin & O & middle" and "edge & perimeter"

Additional notes for Paper 4: confidential to examiners. Not for publication.

Graph: Q21b



Notes: pie chart Q6.

Due to an unfortunate error in printing the paper, the 90° angle has drifted from the actual centre of the circle.
To compensate, the tolerance n the angles has therefore been extended to ±4°. This is shown on the overlay.

Call up the overlay. Ignore the centre squares, but position the overlay on the ends of the given lines using the blue T shapes by moving the top square with the mouse.
Once positioned, you will now find that you can rotate the bottom square, and the overlay correctly rotates around the given circle.
If candidates draw the sectors in the correct order marking is straight-forward.
If candidates draw the sectors in the wrong order, rotate the overlay to mark:
PIG the lines should both fall within the 4° tolerance lines on the overlay, even if this means they have the benefit of a wider tolerance
HEN rotate until a T shape falls on the intersection between the circumference and one of the sector lines; make sure the other T shape remains on the circumference. The other sector line should then fall within the 4° tolerance lines. Any difficulty in placing the overlay, give the benefit to the candidate and/or check with the angle measurer.

SHEEP rotate until a T shape falls on the intersection between the circumference and one of the sector lines; make sure the other T shape remains on the circumference. The other sector line should then fall within the 4° tolerance lines. Any difficulty in placing the overlay, give the benefit to the candidate and/or check with the angle measurer.

Question 15(a)

B1: 9 is not the most common number
because its got the lowest frequency
because 9 is not the number that has the most frequency
the mode has the highest number in the frequency
because the amount of houses with 9 rooms is less than all the others
9 does not occur the most

B0: 9 has only 2 rooms
9 is not the maximum
because 12 is the mode
because the mode is the highest number in the frequency

Question 15(d)

B1: Because she takes the bigger sample
Because she has got more rooms
Becky has 80 houses but Ali only has 40
Becky has a bigger frequency