

MARK SCHEME for the October/November 2007 question paper

0580 and 0581 MATHEMATICS

0580/02 and 0581/02 Paper 2 (Extended), maximum raw mark 70

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2007 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

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ABBREVIATIONS

BOD	Benefit of the doubt is to be given to the candidate
CAO	Correct answer only
eeo	Each error or omission
MR	Misread- not to be used unless agreed by the P.E.
NR	Answer space is completely blank
o.e.	or equivalent
W1, 2 and 3	These marks temporarily replace both SC and B marks
www	Without wrong working
ft or \checkmark	Work has been followed through after an error
dep	Dependent on the previous mark

MARKING INSTRUCTIONS

- M** marks are given for a correct method. **W** marks are given for a correct statement or step. **A** marks are given for an accurate answer following a correct method.
- Marks should be written in the mark box. **Completely blank** answer spaces should be marked **NR**. Any other (incorrect) attempt should be awarded zero.
- Errors should be indicated in some way that explains the loss of marks. You may use any of the marking tools that are appropriate including the highlighter.
- When a complete part of a question has been deleted it should be marked provided that it has not been replaced.**

ANSWERS

- In most questions the correct answer will score full marks and it will not be necessary to look into the working.
- If two answers to a question are given in the answer space and both are acceptable, mark the best answer. If one of the answers is incorrect then give zero. e.g. 3/5 or 6/10 would score if 3/5 was the required answer whereas 3/5 or 2/3 would not score.
- If no answer appears in the answer space, or if the answer is illegible, consider the final working. Award marks if the working is clear and unambiguous.
- If working and answer appear in the answer space, ignore the working.
- Reversed answers or answers in the wrong place can only score if there is extremely strong supporting evidence.
- If four or more significant figures are given in an answer, correct the answer to 3 figures and apply the scheme.**
- If a two figure answer is given in the answer space and the correct answer can be seen in the working then award full marks.**
- Unless specified in the question, answers may be given as fractions, decimals or in standard form. Ignore superfluous zeros provided that the degree of accuracy is not affected.
- Where the answer in the answer space is incorrect because of a clear transcription error of a correct answer then marks may be awarded.
- Unless a particular method has been specified in the question, full marks may be awarded for any correct method. However, if a calculation is required then no marks will be awarded for a scale drawing.

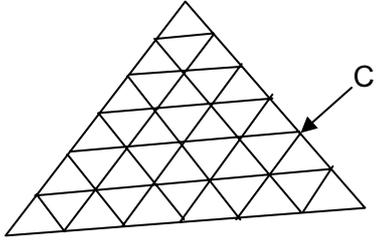
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* indicates that it is necessary to look in the working following a wrong answer

1	(a) 4.25957(744...) or 4.25958 (b) 4.3	1 1√	Must have at least 6 figures correct Correct answer or ft from (a)
2	5×10^4 or 50000	2*	M1 $3.6 \times 10^{13} / 7.2 \times 10^8$ or M1 $8.33... \times 10^{-3} \times 6 \times 10^6$
3	(a) 4 cao (b) 0	1 1	Allow zero or none or no symmetry
4	x^2 , $\cos x^\circ$, x^{-1}	2*	W1 reverse order Numerical values not allowed in answer space
5	2	2*	M1 25c/35 or 125c/ 175 or 25c = 50 or 125c = 250 or 875c = 1750 oe
6	(a) $\frac{0.003 \times 3000}{(10 + 20)^2}$ cao (b) 0.01 or 1/100	1 1	No extra zeros allowed. Accept standard form SC1 for answer 0 if 0 is used for 0.003 in (a)
7	$x = 2$ $y = -6$ cao	3*	M1 consistent x and + for x or consistent x and - for y A1A1
8	(a) 0.701 cao (b) (-)190	1 2*	Allow 0.70, of course, if 0.701 seen in working M1 14020 – 20000 x 0.6915 or reversed
9	$p = 2$ $q = -12$	3*	M1 $x^2 + 2px + p^2$ (+q) or $(x + 2)^2 - 4 - 8$ A1 A1 If no marks scored give SC1 for $p = 2$ in answer
10	170 provided that $\frac{22}{7}$ is not used	3*	M1 $\frac{1}{2} \times \pi \times (12 \text{ or } 6)^2$ M1 $\frac{1}{2} \times \pi \times 12^2 - \frac{1}{2} \times \pi \times 6^2$ SC2 54π or SC1 $\pi \times 12^2 - \pi \times 6^2$ seen allow 452... - 113.....
11	100	3*	M1 $M = kr^3$ A1 $k = 0.8$ M1 $kM = r^3$ A1 $k = 1.25$
12	(a) \emptyset (b) ξ (c) A	1 1 1	No brackets allowed. Not ϵ or e No brackets allowed
13	28.2 28.6 exact values only	3*	M1 two of 6.05, 6.15, 8.05 or 8.15 seen A1 28.2 <u>or</u> 28.6 in either answer space SC2 both correct reversed

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14	(a) 13.5 (b) -1 and 4 cao	2* 2*	M1 $2x = 27$ or $\frac{x}{3} = 4.5$ or $x - \frac{27}{2} = 0$ M1 $(x-4)(x+1)$ or $\frac{3 \pm \sqrt{(3^2 - 4 \times 1 \times -4)}}{2}$ or $\frac{3 \pm \sqrt{(25/4)}}{2}$
15	 (b) $\frac{1}{2}a + \frac{1}{3}b$ oe (c) $-\frac{1}{2}a + \frac{2}{3}b$ oe	1 1,1	Any clear indication Fractions need not be cancelled Mark coefficients of a and b independently
16	(a) (b) 1.12	2* 2*	M1 connecting volumes A1 cube root of volumes or M1 cubing A1 connecting volumes M1 8^2 or Area sf = 64
17	$\sqrt{((6/T)^2 - 1)}$ or $\sqrt{(36/T^2 - 1)}$ oe	4*	W1 each of the first 3 completed correct operations ignore $\pm \dots$
18	(a) $-\frac{4}{5}$ or $\frac{4}{-5}$ cao (b) $y = -\frac{4}{5}x (+0)$ oe forms (c) $y = -\frac{4}{5}x + 3.4$ oe	1 1√ 2	Note that a fraction is required $y = (a)x$ allow decimal or unsimplified fraction W1 $y = (a)x + c$ or $y = (b)x + c$ W1 3.4 Allow 17/5 oe
19	(a) 3.365 to 3.375 (b) 0.26 to 0.27 (c) 55, 56 or 57	1 2* 1	Inclusive M1 3.52 and 3.25 to 3.26 seen (even on diagram)
20	(a) 65 All answers cao (b) 25 unless $\sqrt{\quad}$ applied (c) 103 (d) 206	1 1√ 1√ 1√	If answer space is blank check diagram $90 - (a)$ $168 - (a)$ $2(c)$
21	(a) $3x^2$ (b) -6	1,1 2*	W1 for 3 and ind W1 for x^2 must be single term M1 1/64 SC1 2^{-6} in answer space
22	(a) $\begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$ cao (b) I	4* 1	W2 for 4 correct or W1 for 2 or 3 correct of $\begin{pmatrix} 3 & 4 \\ 2 & 3 \end{pmatrix}$ in A^2 W1 $\begin{pmatrix} 2 & 4 \\ 2 & 2 \end{pmatrix}$ in 2A allow $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
	TOTAL	70	