

# **Cambridge Assessment International Education**

Cambridge International General Certificate of Secondary Education

MATHEMATICS (US) 0444/23

Paper 2 (Extended)

October/November 2018

MARK SCHEME
Maximum Mark: 70

#### **Published**

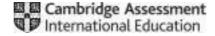
This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began,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

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

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This document consists of 5 printed pages.



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# Cambridge IGCSE – Mark Scheme PUBLISHED

# **Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

#### **GENERIC MARKING PRINCIPLE 1:**

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

#### GENERIC MARKING PRINCIPLE 2:

Marks awarded are always whole marks (not half marks, or other fractions).

#### **GENERIC MARKING PRINCIPLE 3:**

#### Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit
  is given for valid answers which go beyond the scope of the syllabus and mark scheme,
  referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these
  features are specifically assessed by the question as indicated by the mark scheme. The
  meaning, however, should be unambiguous.

### **GENERIC MARKING PRINCIPLE 4:**

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

#### **GENERIC MARKING PRINCIPLE 5:**

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

#### **GENERIC MARKING PRINCIPLE 6:**

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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# **Abbreviations**

cao correct answer only

dep dependent

FT follow through after error isw ignore subsequent working

oe or equivalent SC Special Case

nfww not from wrong working

soi seen or implied

Question	Answer	Marks	Partial Marks
1	63	1	
2	y(1-2y)	1	
3	5	1	
4	-4	1	
5	25	1	
6(a)	5 000 207	1	
6(b)	$8.13 \times 10^{-3}$	1	
7	-3p-4q final answer	2	<b>B1</b> for $-3p + kq$ or $kp - 4q$ final answer
8(a)	0.076	1	
8(b)	10 000	1	
9	$\frac{3}{8}$ oe	2	Accept equivalent fractions  M1 for $\frac{1}{4} \times \frac{3}{2}$ or $\frac{3}{12} \div \frac{8}{12}$ oe
10	13	2	<b>M1</b> for $3w = 32 + 7$ or $w - \frac{7}{3} = \frac{32}{3}$
11	$\frac{A-\pi r^2}{\pi r}$ or $\frac{A}{\pi r}-r$	2	M1 for $A - \pi r^2 = \pi r l$ or $\pi r^2 - A = -\pi r l$ or $\frac{A}{\pi r} = l + r$
12	$6\sqrt{3}$	2	<b>B1</b> for $9\sqrt{3}$ or $3\sqrt{3}$ or $2\sqrt{27}$
13	60, 300	2	B1 for each If zero scored SC1 for two answers that add to 360
14	[Amplitude=] 5 [Period=] 90	2	B1 for each

Question	Answer	Marks	Partial Marks
15	600	3	M2 for $\frac{108 \times 1000 \times 20}{60 \times 60}$ oe or M1 for $\frac{108 \times 1000}{60 \times 60}$ oe or for speed × time
16(a)	$\frac{1}{w}$ or $w^{-1}$	1	
16(b)	$27w^9$ final answer	2	<b>B1</b> for $kw^9$ or $27w^k$
17	10	3	M1 for $y = k\sqrt{x}$ M1 for $y = their \ k \times \sqrt{25}$ OR M2 for $\frac{y}{6} = \sqrt{\frac{25}{9}}$
18	$\frac{1}{x(x+1)}$ oe final answer	3	<b>B1</b> for common denominator $x(x+1)$ oe isw <b>B1</b> for $x+1-x$ seen isw
19	$[p =] 12$ $[q =] \frac{12}{5}$ oe	3	<b>B1</b> for $[p =] 12$ <b>B2</b> for $[q =] \frac{12}{5}$ or <b>M1</b> for $\frac{72}{360} \times \pi \times 2 \times 6$ oe
20	[a =] 1 [b =] 5	4	M2 for $(x-1)^2 = 5$ or M1 for $(x-1)^2$ A1 for $a = 1$ or $b = 5$ OR if $\frac{p+\sqrt{q}}{r}$ or $\frac{p-\sqrt{q}}{r}$ used B3 for $\frac{2\pm\sqrt{20}}{2}$ or B1 for $q = (-2)^2 - 4(1)(-4)$ or better and B1 for $p = -(-2)$ and $r = 2(1)$ or better
21	$x \geqslant 0$	4	<b>B1</b> for $x \ge 0$
	$x + y \le 8$ oe		<b>B1</b> for $x + y \le 8$ oe
	$x + 2y \geqslant 8$ oe		B2 for $x + 2y \ge 8$ oe or B1 for gradient $= -\frac{1}{2}$ or for $x + 2y = k$

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Question	Answer	Marks	Partial Marks
22	$\frac{x-1}{x}$ or $1-\frac{1}{x}$ final answer	4	<b>B2</b> for $(2x+1)(x-1)$ or <b>B1</b> for $2x(x-1) + [1](x-1)$ or $x(2x+1) - [1](2x+1)$ or $(2x+a)(x+b)$ where $ab = -1$ or $a+2b = -1$ <b>B1</b> for $x(2x+1)$
23	30	4	M3 for $\tan = \frac{10}{\sqrt{(10\sqrt{2})^2 + (10)^2}}$ oe or M2 for $\sqrt{(10\sqrt{2})^2 + (10)^2}$ oe or B1 for recognising angle $PAC$ is required
24(a)	9	1	
24(b)	$\frac{5}{3}$ oe	2	<b>M1</b> for $2 = 3(u - 1)$ or for $\frac{2}{3} = u - 1$
24(c)	1/16	2	<b>M1</b> for $x^{\frac{1}{4}} = \frac{1}{2}$
25(a)	(x+y)(p-1) final answer	2	M1 for $p(x+y)$ –[1](x+y) or $x(p-1) + y(p-1)$
25(b)	2(t+7m)(t-7m) final answer	3	M2 for $(2t+14m)(t-7m)$ or $(t+7m)(2t-14m)$ or correct answer seen or M1 for $2(t^2-49m^2)$ or $(t+7m)(t-7m)$ or $2(t+7)(t-7)$
26(a)	$\mathbf{c} + \frac{2}{3}\mathbf{a}$	2	M1 for correct unsimplified form or correct route
26(b)(i)	$\frac{2}{5}\mathbf{a} + \frac{3}{5}\mathbf{c}$	2	M1 for correct unsimplified form or correct route
26(b)(ii)	3:2 oe	2	<b>B1</b> for $\overrightarrow{OX} = \frac{3}{5} \overrightarrow{OP}$ oe