Cambridge Assessment International Education

Cambridge IGCSE™

MATHEMATICS **0580/42**

Paper 4 (Extended) **May/June 2020**

MARK SCHEME

Maximum Mark: 130

Published

Students did not sit exam papers in the June 2020 series due to the Covid-19 global pandemic.

This mark scheme is published to support teachers and students and should be read together with the question paper. It shows the requirements of the exam. The answer column of the mark scheme shows the proposed basis on which Examiners would award marks for this exam. Where appropriate, this column also provides the most likely acceptable alternative responses expected from students. Examiners usually review the mark scheme after they have seen student responses and update the mark scheme if appropriate. In the June series, Examiners were unable to consider the acceptability of alternative responses, as there were no student responses to consider.

Mark schemes should usually be read together with the Principal Examiner Report for Teachers. However, because students did not sit exam papers, there is no Principal Examiner Report for Teachers for the June 2020 series.

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

Cambridge International is publishing the mark schemes for the June 2020 series for most Cambridge IGCSE™ and Cambridge International A & AS Level components, and some Cambridge O Level components.

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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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Maths-Specific Marking Principles	
1	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.
2	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.
3	Allow alternative conventions for notation if used consistently throughout the paper, e.g. commas being used as decimal points.
4	Unless otherwise indicated, marks once gained cannot subsequently be lost, e.g. wrong working following a correct form of answer is ignored (isw).
5	Where a candidate has misread a number in the question and used that value consistently throughout, provided that number does not alter the difficulty or the method required, award all marks earned and deduct just 1 mark for the misread.
6	Recovery within working is allowed, e.g. a notation error in the working where the following line of working makes the candidate's intent clear.

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Abbreviations

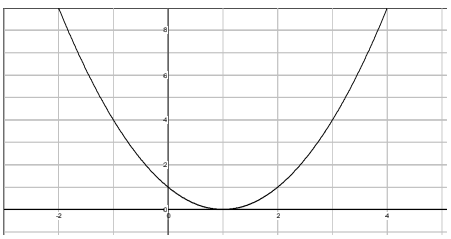
cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
nfww not from wrong working
soi seen or implied

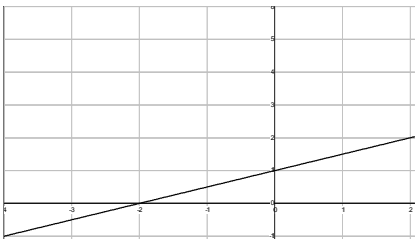
Question	Answer	Marks	Partial Marks
1(a)(i)	14, 10	**2**	**M1** for 24 ÷ (7 + 5)
1(a)(ii)	$\frac{3}{350}$	**2**	**B1** for correct fraction not in lowest terms
1(a)(iii)	120	**1**	
1(b)(i)	10.2[0]	**2**	**M1** for $\frac{15}{100}\times 12$ oe or better
1(b)(ii)	45	**2**	**M1** for $\frac{38.25}{1-\frac{15}{100}}$ oe
1(c)(i)	85	**2**	**M1** for $\frac{500\times 1.7\times 10}{100}$ oe
1(c)(ii)	203 or 202.5 to 202.6	**2**	**M1** for $200\times\left(1+\frac{0.0035}{100}\right)^{365}$
1(c)(iii)	1.9	**3**	**M2** for $\sqrt[6]{\frac{559.78}{500}}$ or **M1** for $500\left(1+\frac{r}{100}\right)^{6}=559.78$
2(a)(i)	$\binom{6}{17}$	**2**	**B1** for each
2(a)(ii)	6.4[0] or 6.403...	**2**	**M1** for $4^2 + 5^2$
2(b)	(1, 2)	**1**	
2(c)	(0, –2)	**1**	

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Question	Answer	Marks	Partial Marks
2(d)	$\frac{1}{2}\mathbf{c} + \frac{1}{3}\mathbf{d}$	**3**	**B2** for correct unsimplified answer or **M1** for $\overrightarrow{CT} = -\mathbf{c} + \frac{2}{3}\mathbf{d}$ oe or $\overrightarrow{TC} = \mathbf{c} - \frac{2}{3}\mathbf{d}$ oe or for correct route
3(a)	41.4	**4**	**M1** for 10, 30, 42.5, 47.5, 55, 70 **M1** for Σfx where x lies in or on the boundary of each interval. **M1 dep** for $\frac{\Sigma fx}{200}$ dep on second M1
3(b)(i)	112, 170	**1**	
3(b)(ii)	Correct diagram	**3**	**B1** for correct horizontal plot **B1FT** for correct vertical plots **B1 FT** dep on at least B1 earned for reasonable increasing curve or polygon through their 6 points If 0 scored **SC1FT** for 5 out of 6 points plotted correctly
3(b)(iii)(a)	48	**1**	
3(b)(iii)(b)	160	**2**	**M1** for 40 seen
3(c)	$\frac{87}{3980}$ oe	**2**	**M1** for $\frac{30}{200}\times\frac{29}{199}$ oe
3(d)	Correct histogram	**3**	**B1** for each column If 0 scored **SC1** for correct frequency densities soi 1.25, 12, 1
4(a)	65.4 or 65.36 to 65.37	**3**	**M1** for $150^2 + 120^2 - 2 \times 150 \times 120 \cos 25$ **A1** for 4270 or 4272 to 4273
4(b)	125 or 124.7 to 124.8	**4**	**B1** for [angle S =] 80 **M2** for $\frac{150\sin 55}{\sin \textit{their}80}$ or **M1** for $\frac{\sin \textit{their}80}{150} = \frac{\sin 55}{RS}$ oe
4(c)	10 400 or 10 410 to 10 440 nfww	**3**	**M1** for $\frac{1}{2}\times 120\times 150\sin 25$ oe **M1** for $\frac{1}{2}\times 150\times \textit{their}$ **(b)**$\sin 45$ oe

Question	Answer	Marks	Partial Marks
5(a)	[0]38 or [0]37.9 or [0]37.87...	**2**	**M1** for tan = $\frac{350}{450}$ oe If 0 scored, **SC1** for answer [0]52 or [0]52.1 or [0]52.12 to [0]52.13
5(b)	624 or 623.8 to 623.9	**6**	**M2** for 450 – 400 sin 50 or **M1** for sin 50 = $\frac{...}{400}$ **M2** for 350 + 400 cos 50 or **M1** for cos 50 = $\frac{...}{400}$ **M1** for (*their* (450 – 400 sin 50))^2 + (*their* (350 + 400 cos 50))^2
5(c)	10 min 8 s	**4**	**B3** for 10.1 or 10.13… or **M2** for (400 + 350 + 450 + *their DA*) ÷ 3 [÷ 60] oe or **M1** for any distance ÷ 3 **M1** for rounding *their* minutes into minutes and seconds to nearest second if clearly seen
6(a)	256	**1**	
6(b)	8	**2**	**M1** for 3(x^2 + 1) + 2 or for 3(2) + 2
6(c)	$9x^2 + 12x + 5$	**3**	**M1** for (3x + 2)^2 + 1 **B1** for [(3x + 2)^2 =] $9x^2 + 6x + 6x + 4$ oe
6(d)	16	**2**	**M1** for 3x + 2 = 7^2 + 1 or better
6(e)	$\frac{x-2}{3}$ oe final answer	**2**	**M1** for x = 3y + 2 or for y – 2 = 3x or for $\frac{y}{3} = x + \frac{2}{3}$
6(f)	$\frac{4x^2 + 2x + 1}{3x + 2}$ final answer	**3**	**B1** for x^2 + 1 + x (3x + 2) or better seen **M1** for common denominator 3x + 2
6(g)	16	**1**	
7(a)	0.1	1	
7(b)(i)	0.2 oe 0.6, 0.3, 0.1 oe	**2**	**B1** for 0.2 **B1** for 0.6, 0.3, 0.1
7(b)(ii)	0.48 oe	**2**	**FT** *their* 0.6 from tree diagram **M1** for 0.8 × *their* 0.6

Question	Answer	Marks	Partial Marks
7(b)(iii)	0.28 oe	**3**	**M2** for $0.2 + 0.8 \times 0.1$ oe or **M1** for 0.2 or 0.8×0.1 or $0.8 \times (0.6 + 0.3)$
7(c)	0.32 oe	**3**	**M2** for $0.8 \times 0.2 + 0.2 \times 0.8$ oe **M1** for one of these products
8(a)(i)	36	**2**	**M1** for $\left(\frac{8}{12}\right)^2$ or $\left(\frac{12}{8}\right)^2$ oe
8(a)(ii)	30	**3**	**M2** for $320 \div 16 \times \frac{12}{8}$ oe or **M1** for $320 \div 16$
8(b)	3.375 cao	**3**	**M2** for $\frac{\frac{4}{3}\pi \times 4.5^3}{\pi \times 6^2}$ or better or **M1** for $\pi \times 6^2 \times h = \frac{4}{3} \times \pi \times 4.5^3$
8(c)	3.63 or 3.627 to 3.628	**3**	**M2** for $\frac{20^3}{40 \times \frac{4}{3}\pi}$ or **M1** for $40 \times \frac{4}{3} \times \pi \times r^3 = 20^3$
8(d)	$\frac{3x}{2}$ or $1.5x$ or $1\frac{1}{2}x$	**3**	**B2** for $4R^2 = 9x^2$ oe or better or **M1** for $4\pi R^2 = 2\pi x^2 + \pi \times 2x \times \frac{7x}{2}$
9(a)(i)	$(x+4)^2 - 25$	**2**	**B1** for $(x+k)^2 - 9 - (their\,k)^2$ or $(x+4)^2 - h$ or $k = 4$
9(a)(ii)	$x + 4 = [\pm]\ 5$	**M1**	**FT** *their* **(a)(i)**
	–9 and 1	**A1**	
9(b)	$[b =]\ 7$ $[c =] -3$	**3**	**B1** for $[b =]\ 7$ **M1** for $b^2 - 4c = 61$
9(c)(i)(a)	Correct sketch 	**2**	**B2** for correct quadratic curve with min touching x-axis or **B1** for parabola vertex downwards

Question	Answer	Marks	Partial Marks
9(c)(i)(b)	Correct sketch 	**2**	**B2** for correct straight line intersecting curve on y-axis or **B1** for straight line with positive gradient and positive y-intercept
9(c)(ii)	2.8[0] or 2.795...	**7**	**B3** for $x^2 - \frac{5}{2}x = 0$ oe or **M1** for $(x-1)^2 = \frac{1}{2}x + 1$ **B1** for $[(x-1)^2 =] \; x^2 - x - x + 1$ AND **B2** for (0, 1) and $\left(\frac{5}{2}, \frac{9}{4}\right)$ oe or **B1** $[x =] \; 0$ and $\frac{5}{2}$ oe AND **M1** for (difference in x)^2 + (difference in y)^2
10(a)(i)	5	**2**	**M1** for $(-1)^4 - 4(-1)^3$
10(a)(ii)	(0, 0) and (3, –27)	**6**	**B2** for $4x^3 - 12x^2$ [= 0] or **B1** for $4x^3$ or $12x^2$ AND **M1** for derivative = 0 or *their* derivative = 0 **M1** for $4x^2(x - 3)$[= 0] **B1** for $[x =] \; 0$ and [$x =] \; 3$ or $[y =] \; 0$ and $[y =] \; -27$ or for one correct coordinate pair
10(b)	$[p =] \; 11$ $[q =] \; 5$	**2**	**B1** for each or **M1** for $\frac{dy}{dx} = px^{p-1} + 2qx^{q-1}$