Cambridge Assessment International Education

Cambridge Lower Secondary Checkpoint

MATHEMATICS **0862/02**

Paper 2 **April 2023**

MARK SCHEME

Maximum Mark: 50

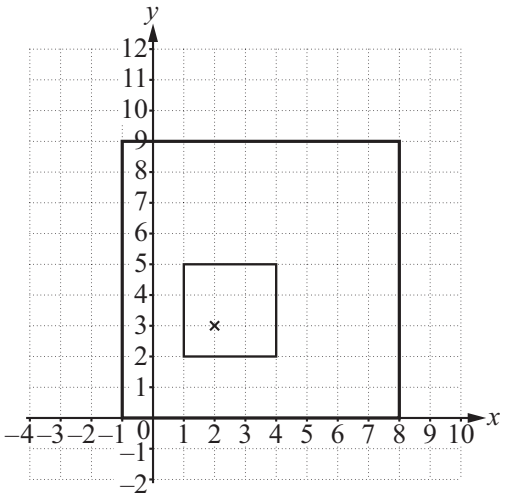
Published

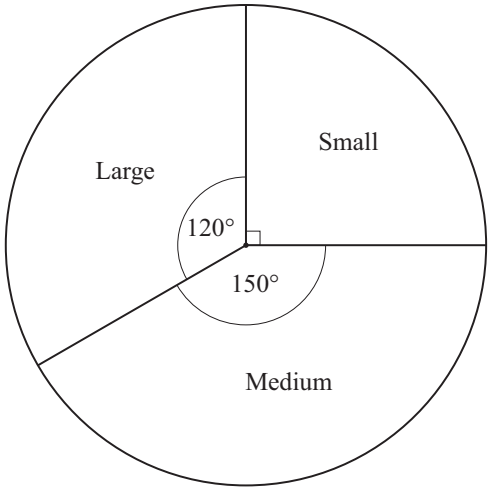
This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Markers were instructed to award marks. It does not indicate the details of the discussions that took place at a Markers' meeting before marking began, which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

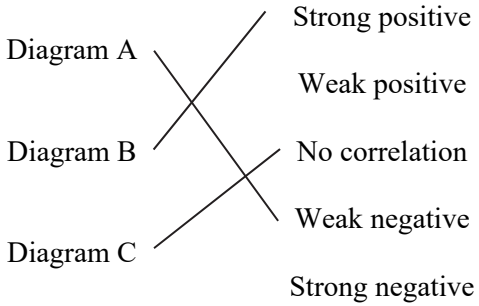
Mark schemes should be read in conjunction with the question paper and the End of Series Report. Cambridge will not enter into discussions about these mark schemes.

Mark scheme annotations and abbreviations

M1	method mark
A1	accuracy mark
B1	independent mark
FT	follow through after error
dep	dependent
oe	or equivalent
cao	correct answer only
isw	ignore subsequent working
soi	seen or implied

Question	Answer	Marks	Part marks	Guidance
1	x^2 (cm^2)	**1**		Do **not** accept $x \times x$
2	238 (cm^2) **or** 237.6 to 237.9 (cm^2)	**2**	Award 1 mark for $\pi \times 8.7^2$	Accept 75.69π **or** 75.7π for 2 marks. Accept values for π between 3.14 and $\frac{22}{7}$
3	1 : 5	**1**		Accept any clear indication.
4	8^2 and $\frac{19}{6}$ (are rational numbers) $\sqrt{19}$ and π (are irrational numbers)	**1**		Both sentences correct for the mark. The two rational values and the two irrational values can be written in either order.
5	Coordinates of square at (–1, 0), (–1, 9), (8, 0), (8, 9). 	**2**	Award 1 mark for **two** vertices of image correctly positioned **or** if image has the correct size and shape but is wrongly positioned on the grid.	0 marks if the image does not fit on the grid.

Question	Answer	Marks	Part marks	Guidance
6	Correct pie chart with • angle for Medium = 150[°] • angle for Large = 120[°] • sectors correctly labelled as Medium and Large, e.g.  	**3**	Award 2 marks for sight of 150[°] **or** 120[°] **or** for a sector of 150[°] **or** 120[°] drawn. **or** Award 1 mark for $\frac{360}{6+10+8} \times k$ where $k = 1, 6, 8$ or 10 **or** for $\frac{10}{24}$ oe **or** 42% **or** 0.42 **or** $\frac{8}{24}$ oe **or** 33% **or** 0.33 or better **or** for accurately drawing a sector with *their* calculated **angle** size. **or** $\frac{10}{6} \times 90$ oe **or** $\frac{8}{6} \times 90$ oe	Accept tolerance of ±2°. For 2 marks, accept $\frac{150}{360}$ **or** $\frac{120}{360}$ The size of the angles do not need to be marked on the pie chart or shown at all if diagram is in tolerance. Implied by 15[°]. Accept more accurate decimals and percentages, e.g. 41.6%, 0.417, $0.\dot{3}$ *Their* angle must be clearly shown.
7	*a* **and** *d*	**1**		Both answers correct for the mark. Accept any clear indication.

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Part marks</th><th>Guidance</th></tr>
<tr><td>8</td><td> 
</td><td>1</td><td></td><td>All three lines correct for the mark.</td></tr>
<tr><td>9</td><td>Correct demonstration that the two probabilities are equal, e.g.

Correctly completed sample space diagram or listing all the outcomes for each event

and

Finding each probability is $\frac{6}{16}$ oe or
noting that there are 6 outcomes for each.</td><td>3</td><td>Award 2 marks for a correctly completed table or listing all the outcomes for each event.
or
Award 1 mark for

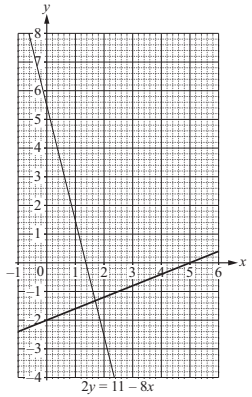
a table with at least 10 correct entries
or
for listing all the outcomes for either of the two events
or
for $\frac{6}{16}$ oe seen.</td><td><table><tr><th>+</th><th>1</th><th>3</th><th>5</th><th>6</th></tr><tr><th>2</th><td>(3)</td><td>5</td><td>7</td><td>8</td></tr><tr><th>3</th><td>4</td><td>6</td><td>(8)</td><td>9</td></tr><tr><th>4</th><td>5</td><td>7</td><td>9</td><td>(10)</td></tr><tr><th>6</th><td>7</td><td>9</td><td>11</td><td>12</td></tr></table>
Score even: 4, 6, 8, 8, 10, 12
Total greater than eight: 9, 9, 9, 10, 11, 12

oe, e.g. $\frac{3}{8}$, 0.375
Note saying that there are the same number of even numbers as there are numbers greater than 8 is insufficient, the 6 is required.
An incorrect statement following correct working invalidates the final mark, e.g. there are 6 outcomes for each so the probability is $\frac{6}{36}$ for each.</td></tr>
</table>

Question	Answer	Marks	Part marks	Guidance
10(a)	B **and** C	**1**		Both answers correct for the mark. Accept any clear indication.
10(b)	900(°)	**1**		
11(a)	1450 ($\leq x <$) 1550	**1**		Both answers correct for the mark.
11(b)	9.875 (s)	**1**		Accept recurring 9s demonstrated by, e.g. '9.87499...' or $9.874\dot{9}$ or 9.8749^{r} or $9.874\bar{9}$ but not a terminating decimal or '9.8749…' (there must be more than one 9 before the dots.)

Question	Answer	Marks	Part marks	Guidance
12(a)	A suitable reason, e.g. • It may not be [as] accurate [as method B]. • It is hard to measure your own pulse [accurately] using your fingers.	**1**		Accept equivalents, e.g. • He may not be able to find his pulse. • He may miscount. Do **not** accept these statements alone: • You can't count BPM using fingers. • Heart rate is not consistent. • You can't find your pulse after running.
12(b)	A correct reason, e.g. • People using a gym may not be representative of everybody his age. • People using a gym are likely to be fitter [or have different heart rates] than other people. • He is not sampling people who do not exercise. • The people at the gym may not be his age.	**1**		Accept equivalents, e.g. • Gym members are healthier. • They are likely to have a lower heart rate [as they are fitter]. (Assume 'they' refers to the 40 gym members.) Do **not** accept these statements alone: • 40 is a small sample. (Sample size not relevant.) • Everyone has different heart rates. (No recognition of the difference between gym/non-gym members.) • Other things affect heart rate like weight/age. (True, but no mention of sampling method.) • They may not all be doing the same exercise at the gym. • He may miscount for some/all. (This is referring to experimental method rather than sampling method.) Ignore excess comments.

Question	Answer	Marks	Part marks	Guidance
13(a)	$(-8) < (4n) \leq (20)$	**1**		Both answers correct for the mark.
13(b)	$-2 < n \leq 5$ final answer	**2**	Award 1 mark for –2 **or** 5 in an inequality.	**FT** using *their* inequality signs in **(a)** for 1 or 2 mark(s). For 2 marks, the inequality must have the correct structure with n in the centre, do **not** accept an incorrect structure for the **FT** for 2 marks, e.g. $-2 > n \leq 5$ would score 1 mark. $-2 < n \leq 5$ followed by integer solutions scores 1 mark.
14	($)74.49	**2**	Award 1 mark for 62.5×1.04 oe **or** *their* 65×1.146 oe	oe, e.g. $62.50 + 0.04 \times 62.5$, $62.5 \times \frac{104}{100}$, 65 *Their* 65 could come from a slip in working, e.g. 62.5×1.4
15	$y = -2x + 6$	**2**	Award 1 mark for [gradient =] $-\frac{6}{3}$ oe **or** for $y = mx + 6$ where $m \neq 0$	For 2 marks, answers must be in the form $y = mx + c$ and m must be an integer. 1 mark implied by, e.g. $-2x$ but not –2 alone. m can be non-numerical.
16(a)	A correct demonstration that the first **four** terms sum to 1 e.g. $-0.7 + 1.2 - 0.7 + 1.2 = 1$	**2**	Award 1 mark for correctly applying the term-to-term rule once, e.g. finding 1.2 **or** for correct next term **FT** *their* previous term.	For 2 marks, terms can be in any order when adding.
16(b)	3 **and** 100	**1**		Both answers in the correct order for the mark.

Question	Answer	Marks	Part marks	Guidance
17	*R* marked 4.4 cm from *L* **and** on a bearing of 130 ° from *S*.	**2**	Award 1 mark for a bearing of 130 ° from *S* **or** an arc 4.4 cm from *L*.	Accept tolerance of ±2 ° for the bearing. Accept tolerance of ±2 mm for the distance. 1 mark may be implied by a point on a bearing of 130° from *S* **or** a point 4.4 cm from *L*, if there is a choice of points mark the worst. Ignore a line drawn joining *S* to *L*.
18(a)	A ruled line connecting (0, –2) and (5, 0).  	**2**	Award 1 mark for (0, –2) **or** (5, 0).	Mark the line first. 1 mark implied by • either point plotted • a line passing through (0, –2) **or** (5, 0) • –2 entered correctly in the table • 5 entered correctly in the table.
18(b)	(*x* =) 1.6 to 1.8 **and** (*y* =) –1.4 to –1.2 **or** both values correct from *their* graph.	**2**	Award 1 mark for (*x* =) 1.6 to 1.8 **or** (*y* =) –1.4 to –1.2 **or** one value correct from *their* graph **or** *x* **and** *y* in tolerance but reversed.	**FT** for 1 or 2 marks from *their* straight line in part **(a)** provided there is a single point of intersection on the grid, $\pm\frac{1}{2}$ small square accuracy.
19	pentagon	**1**		Accept any clear indication.

Question	Answer	Marks	Part marks	Guidance
20	15 cao	**3**	Award 2 marks for 15.1 to 15.2 **or** $\pi \times \left(\frac{14}{2}\right)^2 \times 31 \div 315$ oe **or** Award 1 mark for $\pi \times \left(\frac{14}{2}\right)^2 \times 31$ oe **or** for dividing *their* volume by 315 **or** for **truncating** *their* final more accurate answer to an integer.	Accept values for π between 3.14 and $\frac{22}{7}$ throughout. May be in the working. Accept $\frac{217\pi}{45}$ for 2 marks. 1 mark can be implied by a volume between 4769 and 4774 **or** 1519π *Their* volume must be clearly from a value labelled as volume or from working that is an attempt at volume, e.g using an incorrect radius or a stray × 2 or ÷ 2
21	245 **and** 125	**3**	Award 2 marks for 245 **or** 125 **or** Award 1 mark for 6 **or** –6 found or better **or** for finding a value of $5(\textit{their } a + 1)^2$	Answers can be in either order. Implied if embedded, e.g. $6^2 \times 5 = 180$, Or better, e.g. –5 or 7 (even if, e.g. as answers or labelled as *a*).

Question	Answer	Marks	Part marks	Guidance
22	5.8 (cm)	**4**	Award 3 marks for $\sqrt{4^2+\left(10.5-\sqrt{6.5^2-1.6^2}\right)^2}$ oe or better. **or** Award 2 marks for [AE =] 10.5 $\sqrt{6.5^2-1.6^2}$ oe or better. **or** Award 1 mark for $BE^2 + 1.6^2 = 6.5^2$ oe or better **or** [DE^2 =] 4^2 + *their* AE^2 oe or better.	Marks may be awarded on the diagram. Or better, e.g. 3 marks for $\sqrt{4^2+4.2^2}$ This is likely to be done in stages, e.g. [BE =] $\sqrt{6.5^2-1.6^2}$ or 6.3 **and** $\sqrt{4^2+\left(10.5-6.3\right)^2}$ Or better, e.g. [AE =] 4.2 10.5 – $\sqrt{39.69}$ Or better, e.g. [BE =] 6.3 [BE^2 =] $6.5^2 - 1.6^2$, [BE =] $\sqrt{42.25-2.56}$ *Their AE* does not have to come from an attempt at Pythagoras but must clearly be *their* length for *AE*, e.g. labelled on the diagram. It could also be a result from using incorrect Pythagoras, e.g. $\sqrt{6.5^2+1.6^2}$, from 10.5 – *k*.
23	$a = 10$ $b = 27$ **or** $a = 46$ $b = 125$	**2**	Award 1 mark for answers in these ranges: $2.92 \le a < 3$ $b = 8$, **or** $9.855 \le a < 10.125$ $b = 27$ **or** $23.36 \le a < 24$ $b = 64$ **or** $45.625 \le a < 46.875$ $b = 125$ **or** for an answer with: positive integers a and b **and** b is a cube number **and** the decimal equivalent rounds to 0.37 correct to 2sf, e.g. $a = 371$ $b = 1000$	e.g. common ones are: $a = 2.96$ $b = 8$ $a = 9.99$ $b = 27$ $a = 23.68$ $b = 64$ $a = 46.25$ $b = 125$