

2024 HSC Mathematics Standard 1 Marking Guidelines

Section I

Multiple-choice Answer Key

Question	Answer
1	C
2	B
3	A
4	D
5	C
6	B
7	A
8	D
9	D
10	A

Section II

Question 11

Criteria	Marks
• Provides correct answer with correct units	2
• Makes appropriate use of scale, or equivalent merit	1

Sample answer:

Scale 1 : 50

$$8 \text{ cm} \Rightarrow 8 \times 50 \text{ cm}$$

$$= 400 \text{ cm}$$

Height in metres

$$= 400 \div 100$$

$$= 4 \text{ m}$$

Question 12

Criteria	Marks
• Provides correct answer	2
• Provides correct strength or direction, or equivalent merit	1

Sample answer:

Strong and negative

Question 13 (a)

Criteria	Marks
• Provides correct answer	1

Sample answer:

Lower quartile = 1

Upper quartile = 7

$$IQR = 7 - 1$$

$$= 6$$

Question 13 (b)

Criteria	Marks
• Provides correct solution	2
• Makes appropriate use of IQR , or equivalent merit	1

Sample answer:

$$Q_3 + 1.5 \times IQR$$

$$= 7 + 1.5 \times 6$$

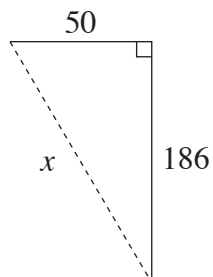
$$= 16$$

$16 > 15$, so 15 is not an outlier.

Question 14 (a)

Criteria	Marks
• Provides correct solution	2
• Attempts to use Pythagoras' theorem, or equivalent merit	1

Sample answer:

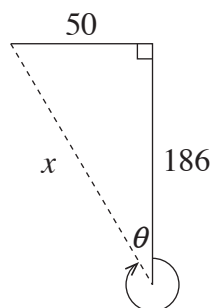


$$\begin{aligned}
 x^2 &= 186^2 + 50^2 \\
 x &= \sqrt{186^2 + 50^2} \\
 x &= 192.603\dots \\
 &= 193 \text{ m}
 \end{aligned}$$

Question 14 (b)

Criteria	Marks
• Provides correct answer (either true or compass bearing)	2
• Attempts to use a trigonometric ratio to find an angle, or equivalent merit	1

Sample answer:



$$\begin{aligned}
 \tan \theta &= \frac{50}{186} \\
 \theta &= 15^\circ 3' \\
 \therefore \text{Bearing} &= 360^\circ - 15^\circ 3' \\
 &= 344^\circ 57' \\
 &= 345^\circ
 \end{aligned}$$

Question 15 (a)

Criteria	Marks
• Provides the correct path	2
• Provides a continuous path from T to H	1

Sample answer:

$TYWH$

Question 15 (b)

Criteria	Marks
• Provides correct solution	2
• Provides a continuous path from Y to G , without C to G	1

Sample answer:

$YWHMG$ is 89 km

Question 16

Criteria	Marks
• Provides correct answer	2
• Performs an appropriate conversion, or equivalent merit	1

Sample answer:

$$\frac{650}{1000} \times 6 \times \$0.3013$$

$$= \$1.18$$

Question 17 (a)

Criteria	Marks
• Provides correct answer	1

Sample answer:

8, 10, 12, 14, 16, 18

Question 17 (b)

Criteria	Marks
• Provides correct solution	2
• Provides correct sample space, or equivalent merit	1

Sample answer:

$$\begin{aligned}
 P(\text{not even and } > 7) &= \frac{14}{20} \\
 &= \frac{7}{10}
 \end{aligned}$$

Alternative:

$$\begin{aligned}
 P(\text{even and } > 7) &= \frac{6}{20} \\
 &= \frac{3}{10}
 \end{aligned}$$

$$\begin{aligned}
 P(\text{NOT}) &= 1 - \frac{3}{10} \\
 &= \frac{7}{10}
 \end{aligned}$$

Question 18

Criteria	Marks
• Provides correct solution	3
• Calculates area of semicircle or triangle, or equivalent merit	2
• Finds base of triangle, or equivalent merit	1

Sample answer:

$$A_{(\text{triangle})} = \frac{1}{2} \times 7 \times 6$$

$$= 21$$

$$A_{(\text{half circle})} = \frac{1}{2} \times \pi \times 3^2$$

$$= 14.137\dots$$

$$A_{(\text{total})} = 35.137\dots$$

$$= 35 \text{ m}^2$$

Question 19

Criteria	Marks
• Provides correct solution	2
• Correct substitution, or equivalent merit	1

Sample answer:

$$L = 7.3a + 38$$

$$156 = 7.3a + 38$$

$$156 - 38 = 7.3a$$

$$a = \frac{118}{7.3}$$

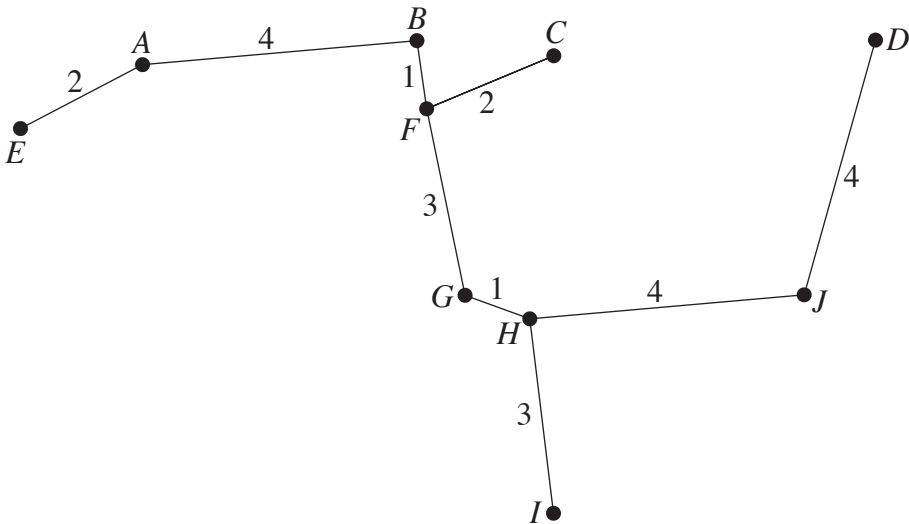
$$= 16.164\dots$$

$$= 16 \text{ years}$$

Question 20 (a)

Criteria	Marks
• Provides correct solution	2
• Draws a spanning tree, or equivalent merit	1

Sample answer:



Weight = 24

Question 20 (b)

Criteria	Marks
• Provides a correct reason for why it is possible to find another spanning tree with the same weight	1

Sample answer:

Yes, use BC instead of FC as the weight of BC is the same as the weight of FC .

Question 21

Criteria	Marks
• Provides correct solution	2
• Uses the simple interest formula with 1 correct substitution, or equivalent merit	1

Sample answer:

$$\begin{aligned}
 I &= PRN \\
 &= 1500 \times \frac{6}{100} \times \frac{3}{12} \\
 &= \$22.50
 \end{aligned}$$

Question 22

Criteria	Marks
• Provides correct solution	2
• Calculates time difference from table, or equivalent merit	1

Sample answer:

Time difference from timetable = 1 hour 37 minutes

Town B is 1 hour behind Town A.

1 hour 37 minutes + 1 hour = 2 hours 37 minutes

Question 23 (a)

Criteria	Marks
• Provides correct answer	1

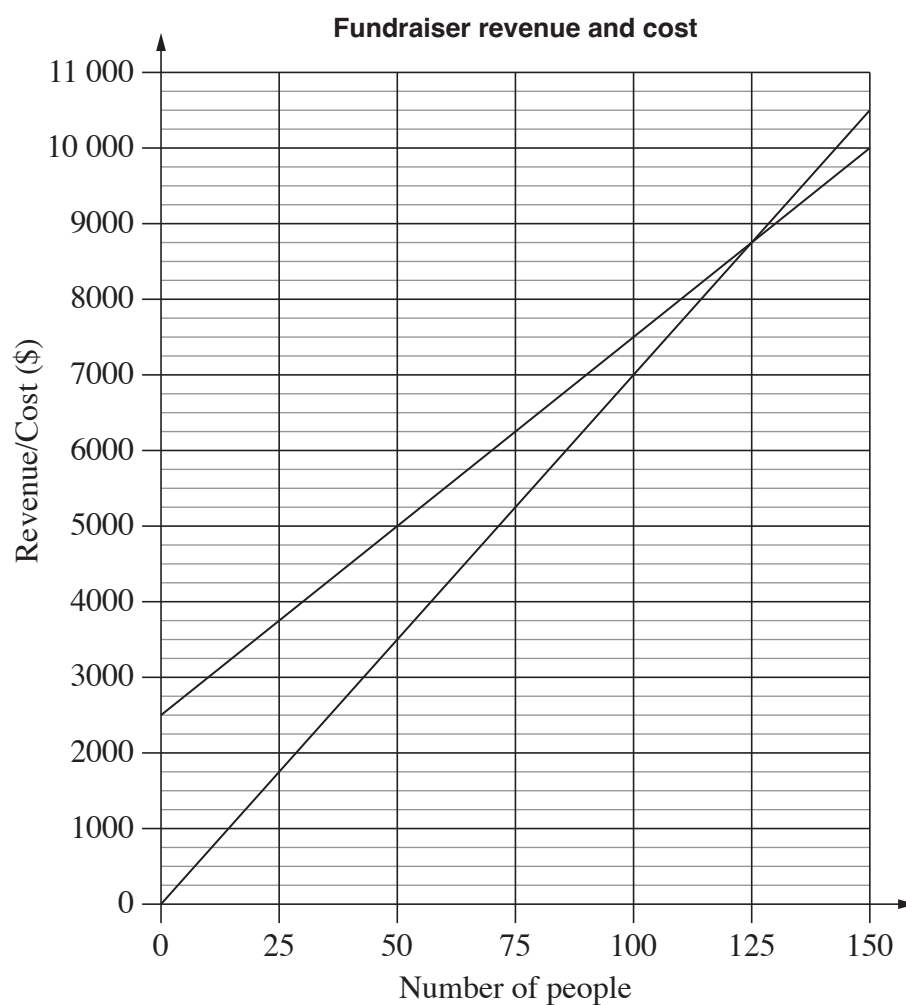
Sample answer:

<i>Number of people</i>	0	25	50	75	100	125	150
<i>Cost</i>	2500	3750	5000	6250	7500	8750	10 000

Question 23 (b)

Criteria	Marks
• Provides correct solution	2
• Plots one point from the table, or equivalent merit	1

Sample answer:



Question 23 (c)

Criteria	Marks
• Provides correct answer	1

Sample answer:

125 tickets

Question 23 (d)

Criteria	Marks
• Provides correct solution	3
• Calculates correct cost and revenue, or equivalent merit	2
• Calculates correct revenue, or equivalent merit	1

Sample answer:

$$\text{Revenue} = 300 \text{ tickets} \times \$70 = \$21\,000$$

$$\text{Cost} = 2500 + 300 \times \$50 = \$17\,500$$

$$\text{Profit} = 21\,000 - 17\,500$$

$$= \$3500$$

Question 24

Criteria	Marks
• Compares skewness, median and spread correctly	3
• Compares spread and medians of two graphs, or equivalent merit	2
• Compares spread of two graphs, or equivalent merit	1

Sample answer:

- Class A negatively skewed, Class B positively skewed.
- *IQR* for A and B is equal.
- Class A median is 4, Class B median is 3.

Answer could include:

- Range for A and B is equal.

Question 25

Criteria	Marks
• Provides correct solution	2
• Attempts to use trigonometry with an angle of 4° , or equivalent merit	1

Sample answer:

$$\sin 4^\circ = \frac{35}{\text{path}}$$

$$\text{Path} = \frac{35}{\sin 4^\circ}$$

$$= 501.74\dots$$

$$= 502 \text{ m}$$

Question 26

Criteria	Marks
• Provides correct solution	3
• Uses the compound interest formula correctly, or equivalent merit	2
• Attempts to use the compound interest formula, or equivalent merit	1

Sample answer:

$$A = P(1 + r)^n$$

$$= 600(1 + 0.07\%)^{30}$$

$$= 612.728\dots$$

$$A = \$612.73$$

$$\text{Interest} = \$612.73 - \$600$$

$$= \$12.73$$

Question 27

Criteria	Marks
• Provides correct solution	3
• Finds Zazu's normal time earnings and overtime hourly rate, or equivalent merit	2
• Finds Zazu's normal time earnings, or equivalent merit	1

Sample answer:

$$\begin{aligned}\text{Normal time earnings} &= 38 \times 45 \\ &= 1710\end{aligned}$$

$$\begin{aligned}\text{Overtime paid} &= 2790 - 1710 \\ &= 1080\end{aligned}$$

$$\begin{aligned}\text{Overtime hours} &= \frac{\$1080}{(45 \times 1.5)} \\ &= 16 \text{ hours}\end{aligned}$$

Therefore 16 hours overtime.

Question 28

Criteria	Marks
• Provides correct solution	3
• Calculates Jun's interest, or equivalent merit	2
• Calculates Alex's interest, or equivalent merit	1

Sample answer:

$$\begin{aligned}\text{Alex's interest after 5 years} &= 1800 \times 7.5\% \times 5 \\ &= \$675\end{aligned}$$

$$\begin{aligned}\text{Jun's investment at 5 years} &= 1800 \times \left(1 + \frac{6}{4}\%\right)^{4 \times 5} \\ &= 2424.339\dots\end{aligned}$$

$$\begin{aligned}\text{Interest} &= 2424.34 - 1800 \\ &= \$624.34\end{aligned}$$

\therefore Alex earns more interest.

Question 29 (a)

Criteria	Marks
• Provides correct answer	1

Sample answer:

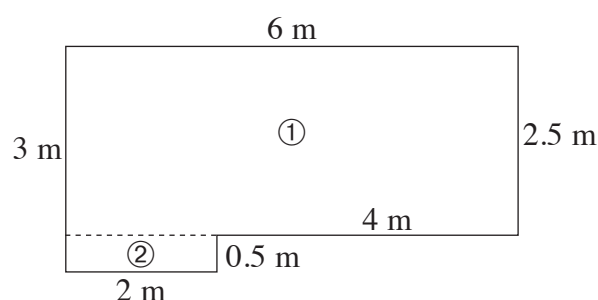
$$4000 \text{ mm} \times 500 \text{ mm}$$

$$= 4 \text{ m} \times 0.5 \text{ m}$$

Question 29 (b)

Criteria	Marks
• Provides correct solution	4
• Calculates required number of tiles, or equivalent merit	3
• Provides total floor area to be covered, or equivalent merit	2
• Provides 1 correct area, or equivalent merit	1

Sample answer:



Section ①

← 30 across
 ↓ 5 down = 150 tiles

Section ②

← 10 across
 ↓ 1 down = 10 tiles

Total = 160 tiles needed

$$160 \div 15 = 10.67 \text{ boxes} \\ = 11 \text{ boxes} \quad \left(\text{rounded to nearest full box} \right)$$

$$\text{Cost} = 11 \times 100 \\ = \$1100$$

Alternative:

$$A_1 = 6 \times 2.5 \text{ m} \\ = 15 \text{ m}^2$$

$$A_2 = 2 \times 0.5 \text{ m} \\ = 1 \text{ m}^2$$

$$A_{\text{total}} = 16 \text{ m}^2$$

$$A_{\text{tile}} = 0.2 \times 0.5 \\ = 0.1 \text{ m}^2$$

$$\text{Total tiles needed} = 16 \text{ m}^2 \div 0.1 \text{ m}^2 \\ = 160 \text{ tiles}$$

$$160 \div 15 = 10.67 \text{ boxes} \\ = 11 \text{ boxes} \quad \left(\text{rounded to nearest full box} \right)$$

$$\text{Cost} = 11 \times 100 \\ = \$1100$$

Question 30

Criteria	Marks
• Provides correct solution	4
• Uses the declining-balance method with correct values for r , n and V_0 , or equivalent merit	3
• Attempts to use the declining-balance method with an initial value from the straight-line method, or equivalent merit	2
• Attempts to use straight-line method, or equivalent merit	1

Sample answer:

Value after 4 years:

$$\begin{aligned}\text{Using straight-line method} &= 50\,000 - 1500 \times 4 \\ &= 44\,000\end{aligned}$$

Value after the next 6 years:

$$\begin{aligned}\text{Using declining-balance method} &= 44\,000(1 - 35\%)^6 \\ &= 3318.43\dots\end{aligned}$$

$$\begin{aligned}\text{Total depreciation} &= 50\,000 - 3318.43 \\ &= \$46\,681.57\end{aligned}$$

Question 31

Criteria	Marks
• Provides correct solution	3
• Provides correct calculations in hours, or equivalent merit	2
• Provides correct distance conversion, or equivalent merit	1

Sample answer:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$40 \text{ km/h} = \frac{0.15 \text{ km}}{T}$$

$$T = \frac{0.15}{40}$$

$$T = 0.00375 \text{ hours}$$

$$\begin{aligned}T &= 0.00375 \times 3600 \text{ seconds} \\ &= 13.5 \text{ seconds}\end{aligned}$$

Question 32 (a)

Criteria	Marks
• Provides correct solution	3
• Finds distance travelled, or equivalent merit	2
• Attempts to use $S = \frac{D}{T}$, or equivalent merit	1

Sample answer:

$$S = \frac{D}{T}$$

$$3 = \frac{D}{24 \div 60}$$

$$D = 3 \times \frac{24}{60}$$

$$= 1.2 \text{ km}$$

$$6 \text{ cm} : 1.2 \text{ km}$$

$$1 \text{ cm} : 0.2 \text{ km}$$

$$0.2 \text{ km} = 200 \text{ m} = 20\,000 \text{ cm}$$

$$1 : 20\,000$$

Question 32 (b)

Criteria	Marks
• Provides correct answer	2
• Attempts to use scale from part (a), or equivalent merit	1

Sample answer:

$$1 : 20\,000$$

$$7 \text{ cm} : 7 \times 20\,000$$

$$= 140\,000 \text{ cm}$$

$$= 1400 \text{ m}$$

$$= 1.4 \text{ km}$$

2024 HSC Mathematics Standard 1 Mapping Grid

Section I

Question	Marks	Content	Syllabus outcomes
1	1	MS-S2 Relative Frequency and Probability	MS11-8
2	1	MS-M4 Rates	MS1-12-3
3	1	MS-M4 Rates	MS1-12-10
4	1	MS-F1 Money Matters	MS11-5
5	1	MS-F1 Money Matters	MS11-5
6	1	MS-N1 Networks and Paths	MS1-12-8
7	1	MS-M3 Right-angled Triangles	MS1-12-4
8	1	MS-F2 Investment	MS1-12-5
9	1	MS-M1 Applications of Measurement	MS11-4
10	1	MS-A3 Types of Relationships	MS1-12-6

Section II

Question	Marks	Content	Syllabus outcomes
11	2	MS-M5 Scale Drawings	MS1-12-4
12	2	MS-S3 Further Statistical Analysis	MS1-12-2
13 (a)	1	MS-S1 Data Analysis	MS11-7
13 (b)	2	MS-S1 Data Analysis	MS11-10
14 (a)	2	MS-M3 Right-angled Triangles	MS1-12-4
14 (b)	2	MS-M3 Right-angled Triangles	MS1-12-4
15 (a)	2	MS-N1 Networks and Paths	MS1-12-8
15 (b)	2	MS-N1 Networks and Paths	MS1-12-10
16	2	MS-M1 Applications of Measurement MS-M4 Rates	MS1-12-3
17 (a)	1	MS-S2 Relative Frequency and Probability	MS11-7
17 (b)	2	MS-S2 Relative Frequency and Probability	MS11-10
18	3	MS-M1 Applications of Measurement	MS11-4
19	2	MS-A1 Formulae and Equations	MS11-10
20 (a)	2	MS-N1 Networks and Paths	MS1-12-8
20 (b)	1	MS-N1 Networks and Paths	MS1-12-10
21	2	MS-F1 Money Matters	MS11-6
22	2	MS-M2 Working with Time	MS11-10
23 (a)	1	MS-A3 Types of Relationships	MS1-12-9
23 (b)	2	MS-A3 Types of Relationships	MS1-12-6
23 (c)	1	MS-A3 Types of Relationships	MS1-12-10
23 (d)	3	MS-A3 Types of Relationships	MS1-12-1
24	3	MS-S1 Data Analysis	MS11-10
25	2	MS-M3 Right-angled Triangles	MS1-12-4

Question	Marks	Content	Syllabus outcomes
26	3	MS-F3 Depreciation and Loans	MS1-12-5
27	3	MS-F1 Money Matters	MS11-6
28	3	MS-F2 Investment	MS1-12-10
29 (a)	1	MS-M5 Scale Drawings	MS1-12-3
29 (b)	4	MS-M5 Scale Drawings	MS1-12-10
30	4	MS-F1 Money Matters MS-F3 Depreciation and Loans	MS1-12-10
31	3	MS-M4 Rates	MS1-12-3
32 (a)	3	MS-M5 Scale Drawings	MS1-12-3
32 (b)	2	MS-M5 Scale Drawings	MS1-12-4