
2019 HSC Mathematics Standard 1 Marking Guidelines

Section I

Multiple-choice Answer Key

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

Section II

Question 11

Criteria	Marks
• Provides correct answer or correct numerical expression	2
• Calculates the amount earned for 4 hours without allowance	1

Sample answer:

$$\begin{aligned} \text{Pay for shift} &= 28 \times 4 + 8 \\ &= \$112 + 8 \\ &= \$120 \end{aligned}$$

Question 12

Criteria	Marks
• Provides correct solution	2
• Applies a trigonometric ratio, or equivalent merit	1

Sample answer:

$$\begin{aligned} \tan 12^\circ &= \frac{h}{150} \\ \therefore h &= 150 \times \tan 12^\circ \\ &= 31.8834\dots \\ &= 32 \text{ m (nearest metre)} \end{aligned}$$

Question 13

Criteria	Marks
• Provides correct solution	2
• Calculates total amount repaid, or equivalent merit	1

Sample answer:

$$\begin{aligned} \text{Total paid} &= 200 \times 12 \times 3 \\ &= \$7200 \\ \therefore \text{Interest} &= 7200 - 6000 \\ &= \$1200 \end{aligned}$$

Question 14

Criteria	Marks
• Provides both correct missing values	2
• Provides correct value for A or uses incorrect answer for A correctly to calculate B	1

Sample answer:

With GST, chocolates cost $7 \times 1.10 = 7.70$

$\therefore A = \$7.70$

Total = $7.70 + 5 + 9 + 8.50 + 3.20 + 2.85$
 $= \$36.25$

$\therefore B = \$36.25$

Question 15

Criteria	Marks
• Provides correct solution	3
• Provides correct expression for the area of the semi-circle, or equivalent merit	2
• Provides correct expression for the area of the square, or correct radius or equivalent merit	1

Sample answer:

Area of square = 8×8
 $= 64 \text{ cm}^2$

Area of semi-circle = $\frac{1}{2} \times \pi \times \left(\frac{8}{2}\right)^2$
 $= 25.1327\dots$

\therefore total area = $64 + 25.1327\dots$
 $= 89.1327\dots$
 $= 89 \text{ cm}^2$ (nearest whole number)

Question 16

Criteria	Marks
• Provides correct solution	2
• Substitutes one correct value into the simple interest formula	1

Sample answer:

$$I = Prn$$

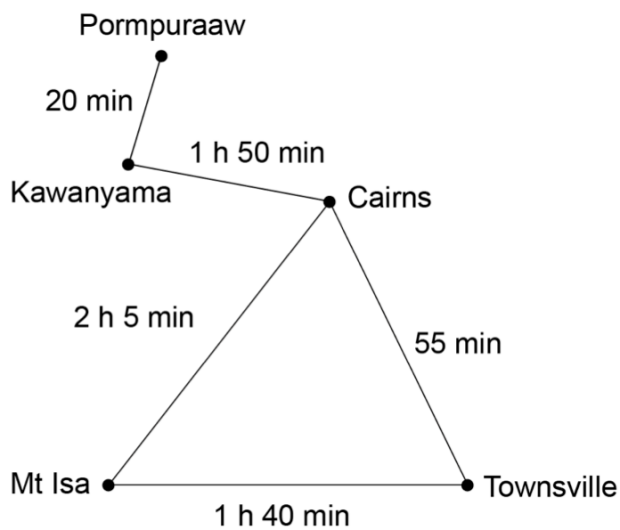
$$= 800 \times \frac{3}{100} \times \frac{7}{12}$$

$$= \$14$$

Question 17

Criteria	Marks
• Provides correct solution	2
• Draws a network diagram showing some understanding of the problem	1

Sample answer:



Question 18 (a)

Criteria	Marks
• Provides correct answer or correct numerical expression	1

Sample answer:

$$200 \times 2 = 400 \text{ km}$$

Question 18 (b)

Criteria	Marks
• Provides correct answer	1

Sample answer:

Section B

(It is the steepest.)

Question 19

Criteria	Marks
• Provides correct solution with justification	3
• Calculates the interquartile range, or equivalent merit	2
• Finds a quartile, or equivalent merit	1

Sample answer:

$$Q_1 = 185 \text{ and } Q_3 = 194$$

$$\begin{aligned} IQR &= 194 - 185 \\ &= 9 \end{aligned}$$

$$\begin{aligned} \text{An outlier is less than } Q_1 - 1.5 IQR \\ &= 185 - 1.5 \times 9 \\ &= 171.5 \end{aligned}$$

Since $170 < 171.5$, the smallest height is considered an outlier.

Question 20 (a)

Criteria	Marks
• Provides correct answer	1

Sample answer:

6

Question 20 (b)

Criteria	Marks
• Provides correct solution	2
• Applies one correct scale conversion or attempts to find perimeter without using the scale, or equivalent merit	1

Sample answer:

$$\begin{aligned} \text{In cm, perimeter} &= 3.5 + 3.5 + 3 + 3 \\ &= 13 \text{ cm} \end{aligned}$$

$$\begin{aligned} \therefore \text{perimeter} &= 13 \times 0.5 \\ &= 6.5 \text{ m} \end{aligned}$$

Question 21

Criteria	Marks
• Provides correct solution	2
• Substitutes one correct value into a depreciation formula	1

Sample answer:

$$\begin{aligned} S &= V_0 (1 - r)^n \\ &= 24\,950 (1 - 0.14)^{10} \\ &= 5521.474 \\ &= \$5521.47 \end{aligned}$$

Question 22

Criteria	Marks
• Provides ONE valid reason	1

Sample answer:

Not enough choices.

Question 23 (a)

Criteria	Marks
<ul style="list-style-type: none"> Provides all three correct values 	1

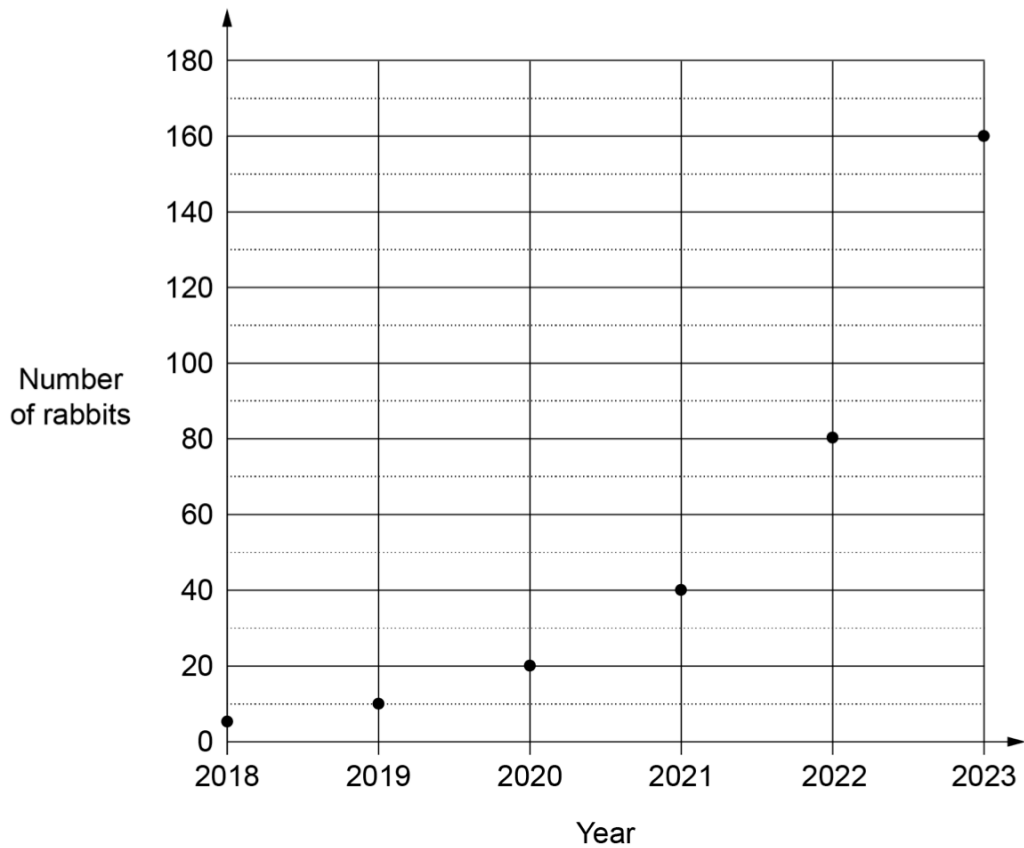
Sample answer:

Start of year	2018	2019	2020	2021	2022	2023
Number of rabbits	5	10	20	40	80	160

Question 23 (b)

Criteria	Marks
<ul style="list-style-type: none"> Writes correct scale and plots all three points 	2
<ul style="list-style-type: none"> Writes correct scale or plots one correct point 	1

Sample answer:



Question 23 (c)

Criteria	Marks
<ul style="list-style-type: none"> Provides correct answer with correct reason 	1

Sample answer:

Exponential

It is a curve not a straight line.

Question 24

Criteria	Marks
• Provides correct solution	3
• Finds correct relative frequency for rolling a 3, or equivalent merit	2
• Attempts to multiply 20 by a relative frequency, or equivalent merit	1

Sample answer:

$$100\% - 30\% - 15\% = 55\%$$

$$\begin{aligned} 55\% \text{ of } 20 &= 0.55 \times 20 \\ &= 11 \text{ times} \end{aligned}$$

Question 25

Criteria	Marks
• Provides correct solution	3
• Correctly calculates the arc length	2
• Substitutes a correct angle or radius into the arc length formula or equivalent merit	1

Sample answer:

$$\begin{aligned} \text{Arc length} &= \frac{120}{360} \times 2\pi \times 10 \\ &= 20.94\dots\text{m} \end{aligned}$$

$$\begin{aligned} \text{Perimeter} &= 20.94\dots + 10 + 10 \\ &= 40.94\dots \\ &= 40.9 \text{ m} \quad (1 \text{ decimal place}) \end{aligned}$$

Question 26

Criteria	Marks
• Provides correct solution	4
• Provides an expression for the cost of builder and labourer, or equivalent merit	3
• Provides an expression for the cost of builder and/or labourer working from Monday to Friday, or equivalent merit	2
• Provides an expression for the cost of materials, or equivalent merit	1

Sample answer:

$$\begin{aligned} \text{Materials cost} &= 5400 + 1800 + 160 + 375 \\ &= \$7735 \end{aligned}$$

$$\begin{aligned} \text{Hours worked M-F} &= 8 - 1 \\ &= 7 \text{ hours} \\ \therefore 7 \times 5 &= 35 \text{ hours} \end{aligned}$$

$$\begin{aligned} \text{Builder's pay} &= (35 \times 70) + (4 \times 1.5 \times 70) \\ &= \$2870 \end{aligned}$$

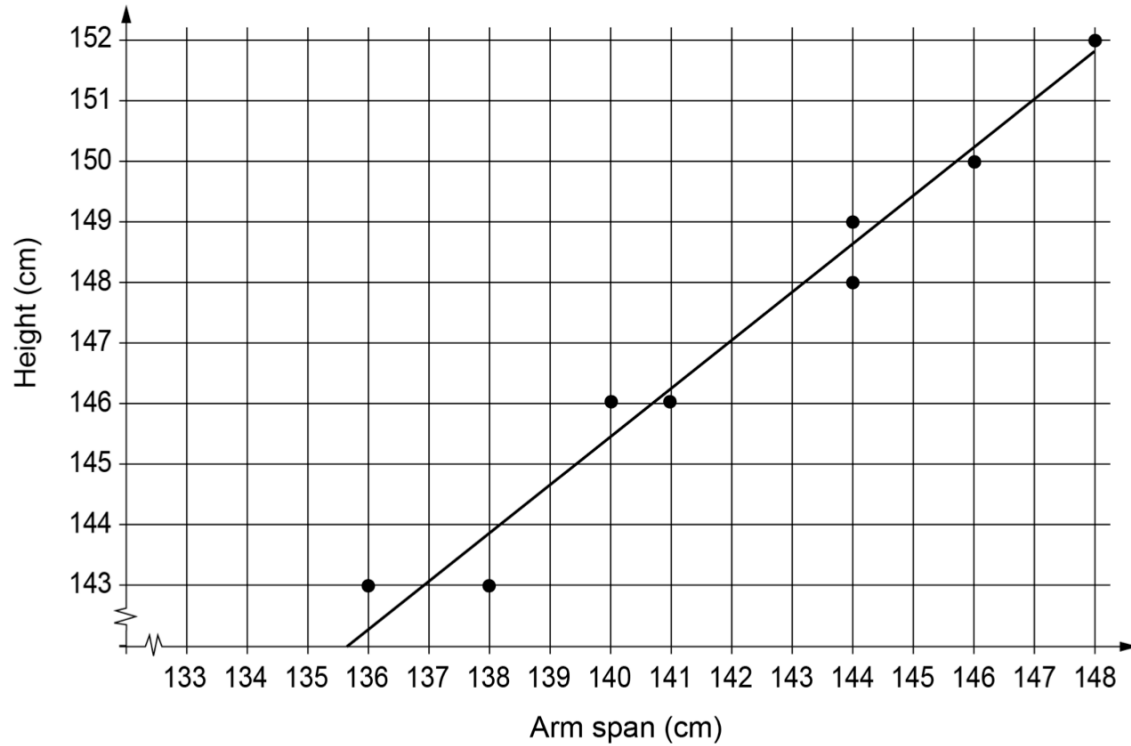
$$\begin{aligned} \text{Labourer's pay} &= (35 \times 30) + (4 \times 1.5 \times 30) \\ &= \$1230 \end{aligned}$$

$$\begin{aligned} \therefore \text{Total cost} &= 7735 + 2870 + 1230 \\ &= \$11\,835 \end{aligned}$$

Question 27 (a)

Criteria	Marks
• Draws line of best fit	1

Sample answer:



Question 27 (b)

Criteria	Marks
• Provides correct answer based on their line of best fit	1

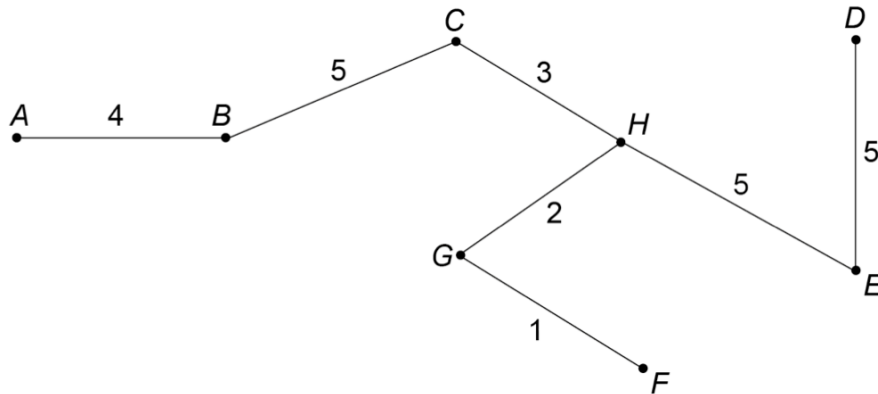
Sample answer:

From the graph, the height is 151 cm

Question 28 (a)

Criteria	Marks
• Provides a correct minimum spanning tree and correct minimum length	2
• Calculates the minimum length from an incorrect network diagram, or equivalent merit	1

Sample answer:



[Other minimum spanning trees are possible]

The minimum length of water pipes needed is 25 kilometres.

Question 28 (b)

Criteria	Marks
• Provides correct answer	1

Sample answer:

Path goes from C to G to H to E.

Question 29

Criteria	Marks
• Provides correct solution	2
• Attempts to use the correct ratio, or equivalent merit	1

Sample answer:

Ratio 1 : 3 : 6

$1 + 3 + 6 = 10$ shares

$3.5 \div 10 = 0.35 \text{ m}^3$ per share

\therefore Amount of sand = 0.35×3
 $= 1.05 \text{ m}^3$

Question 30 (a)

Criteria	Marks
• Provides correct answer	1

Sample answer:

20 bird houses

Question 30 (b)

Criteria	Marks
• Provides correct answer	2
• Provides correct cost or revenue or equivalent merit	1

Sample answer:

A profit will be made

$R = 1600$ and $C = 1100$

Profit = $1600 - 1100$
 $= \$500$

Question 31

Criteria	Marks
• Provides correct solution	3
• Uses a trigonometric ratio with the correct value of AC, or equivalent merit	2
• Calculates AC, or equivalent merit	1

Sample answer:

$$AC^2 = 2.5^2 + 6^2$$

$$= 42.25$$

$$\therefore AC = 6.5$$

$$\cos \theta = \frac{4.9}{6.5}$$

$$\therefore \theta = 41.075\dots^\circ$$

$$= 41^\circ 5' \text{ (nearest minute)}$$

Question 32

Criteria	Marks
• Provides correct solution	3
• Correctly uses compound interest, or equivalent merit	2
• Calculates the correct number of days, or equivalent merit	1

Sample answer:

$$\text{Closing balance} = 3700 \times \left(1 + \frac{0.1825}{365}\right)^{11}$$

$$= \$3720.40$$

$$\text{Minimum payment due} = 0.02 \times 3720.40$$

$$= \$74.41$$

Question 33 (a)

Criteria	Marks
• Provides correct answer	1

Sample answer:

$$p = \frac{4}{7}d$$

Question 33 (b)

Criteria	Marks
• Provides correct answer or correct numerical expression	2
• Provides one correct currency conversion	1

Sample answer:

$$\begin{aligned} 93\,100 \text{ Japanese yen} &= \frac{93\,100}{76} \\ &= 1225 \text{ Australian dollars} \\ p &= \frac{1225 \times 4}{7} = 700 \end{aligned}$$

\therefore 93 100 Japanese yen = 700 British pounds

Question 34

Criteria	Marks
• Provides correct solution	3
• Provides correct substitution and makes one correct algebraic step, or equivalent merit	2
• Provides correct substitution, or equivalent merit	1

Sample answer:

$$\begin{aligned} 120 &= \frac{500(y+1)}{24} \\ 2880 &= 500(y+1) \\ 5.76 &= y+1 \\ \therefore y &= 4.76 \end{aligned}$$

Question 35 (a)

Criteria	Marks
• Provides correct answer or correct numerical expression	1

Sample answer:

$$22\,800 - 22\,472 = \$328$$

Question 35 (b)

Criteria	Marks
• Provides correct future values for both accounts	3
• Provides one correct amount after 8 years and makes progress towards the other correct amount after 8 years, or equivalent merit	2
• Uses $I = Prn$ or $A = P(1 + r)^n$, or equivalent merit	1

Sample answer:Account X: $I = Prn$

$$= 20\,000 \times \frac{7}{100} \times 8$$

$$= 11\,200$$

$$\therefore \text{Total} = 20\,000 + 11\,200$$

$$= \$31\,200$$

Account Y: $A = P(1 + r)^n$

$$= 20\,000 \left(1 + \frac{6}{100}\right)^8$$

$$= \$31\,876.96$$

\therefore Account Y has more money ($31\,876.96 > 31\,200$)

Question 36

Criteria	Marks
• Provides correct solution	4
• Calculates the area of the path and the area of the triangle in the same units, or equivalent merit	3
• Calculates area of the path, or equivalent merit	2
• Calculates one correct relevant area, or equivalent merit	1

Sample answer:

$$\begin{aligned} \text{Area of garden} &= 8.4 \times 5.4 \\ &= 45.36 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Length of large rectangle} &= 8.4 + 1.8 + 1.8 \\ &= 12 \text{ m} \end{aligned}$$

$$\begin{aligned} \text{Width of large rectangle} &= 5.4 + 1.8 + 1.8 \\ &= 9 \text{ m} \end{aligned}$$

$$\begin{aligned} \therefore \text{Area of path and garden} &= 12 \times 9 \\ &= 108 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \therefore \text{Area of path} &= 108 - 45.36 \\ &= 62.64 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of paver} &= \frac{1}{2} \times 0.2 \times 0.15 \\ &= 0.015 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \therefore \text{Number of pavers} &= 62.64 \div 0.015 \\ &= 4176 \end{aligned}$$

2019 HSC Mathematics Standard 1 Mapping Grid

Section I

Question	Marks	Content	Syllabus outcomes
1	1	MS-N1 Networks and Paths	MS1-12-8
2	1	MS-M2 Working with Time	MS1-12-3
3	1	MS-M4 Rates	MS1-12-3
4	1	MS-M3 Right-angled Triangles	MS1-12-3
5	1	MS-M4 Rates	MS1-12-3
6	1	MS-M4 Rates	MS1-12-3
7	1	MS-S1 Data Analysis	MS1-12-2
8	1	MS-M4 Rates	MS1-12-3
9	1	MS-A3 Types of Relationships	MS1-12-6
10	1	MS-M5 Scale Drawings	MS1-12-4

Section II

Question	Marks	Content	Syllabus outcomes
11	2	MS-F1 Money Matters	MS1-12-5
12	2	MS-M3 Right-angled Triangles	MS1-12-4
13	2	MS-F3 Depreciation and Loans	MS1-12-5
14	2	MS-F1 Money Matters	MS1-12-5
15	3	MS-M1 Applications of Measurement	MS1-12-4
16	2	MS-F1 Money Matters	MS1-12-5
17	2	MS-N1 Networks and Paths	MS1-12-8
18 (a)	1	MS-M4 Rates	MS1-12-1
18 (b)	1	MS-M4 Rates	MS1-12-10
19	3	MS-S1 Data Analysis	MS1-12-2
20 (a)	1	MS-M5 Scale Drawings	MS1-12-4
20 (b)	2	MS-M5 Scale Drawings	MS1-12-4
21	2	MS-F3 Depreciation and Loans	MS1-12-5
22	1	MS-S3 Further Statistical Analysis	MS1-12-7
23 (a)	1	MS-A3 Types of Relationships	MS1-12-6

Question	Marks	Content	Syllabus outcomes
23 (b)	2	MS-A3 Types of Relationships	MS1-12-6
23 (c)	1	MS-A3 Types of Relationships	MS1-12-10
24	3	MS-S2 Relative Frequency and Probability	MS1-12-7
25	3	MS-M1 Applications of measurement	MS1-12-4
26	4	MS-F1 Money Matters	MS1-12-5
27 (a)	1	MS-S3 Further Statistical Analysis	MS1-12-2
27 (b)	1	MS-S3 Further Statistical Analysis	MS1-12-2
28 (a)	2	MS-N1 Networks and Paths	MS1-12-8
28 (b)	1	MS-N1 Networks and Paths	MS1-12-8
29	2	MS-M5 Scale Drawings	MS1-12-3
30 (a)	1	MS-A3 Types of Relationships	MS1-12-1
30 (b)	2	MS-A3 Types of Relationships	MS1-12-1
31	3	MS-M3 Right-angled Triangles	MS1-12-4
32	3	MS-F3 Depreciation and Loans	MS1-12-5
33 (a)	1	MS-A2 Linear Relationships	MS1-12-6
33 (b)	2	MS-A2 Linear Relationships	MS1-12-6
34	3	MS-A1 Formulae and Equations	MS1-12-1
35 (a)	1	MS-F2 Investment	MS1-12-5
35 (b)	3	MS-F2 Investment	MS1-12-5
36	4	MS-M1 Applications of Measurement	MS1-12-4