2025 HSC Mathematics Standard 2 Marking Guidelines

Section I

Multiple-choice Answer Key

Question	Answer
1	B
2	A
3	C
4	D
5	D
6	B
7	C
8	A
9	B
10	A
11	C
12	D
13	A
14	C
15	D

Section II

Question 16

Criteria	Marks
• Provides correct solution	2
• Finds the cost of ten-litre cans, or equivalent merit	1

Sample answer:

Cost of ten-litre cans: $\$205 \times 8$
$= \$1640$

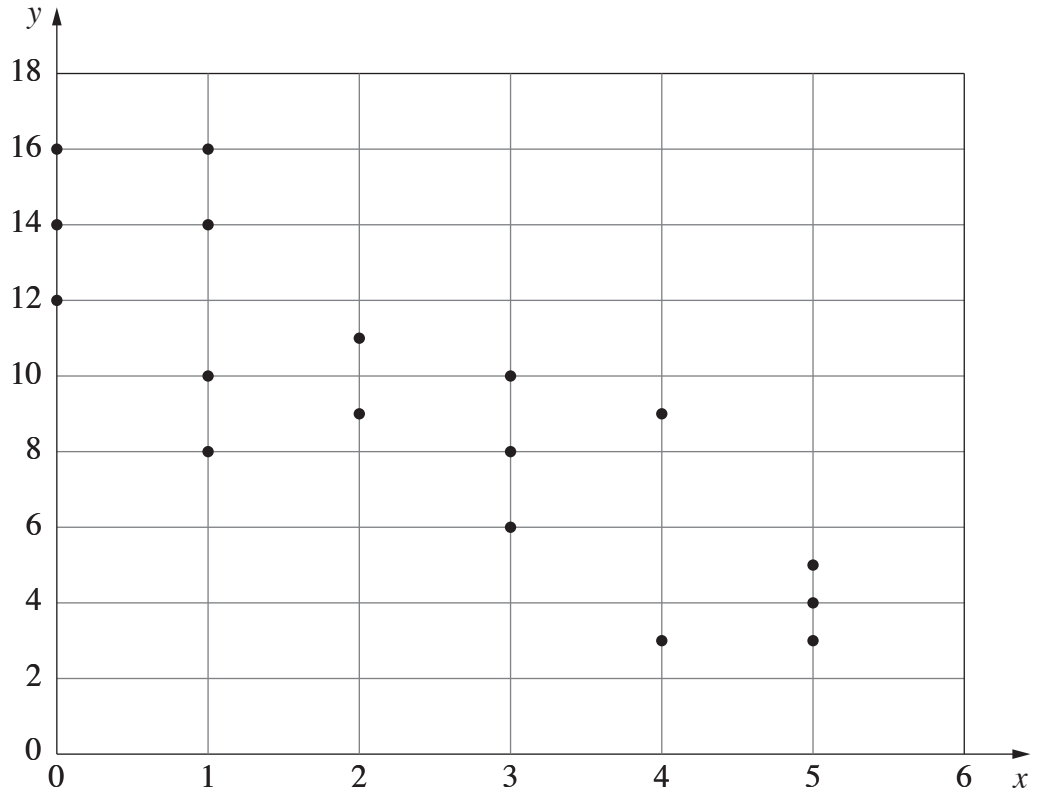
Cost of four-litre cans: $\$90 \times 20$
$= \$1800$

Savings $= \$1800 - \$1640$
$= \$160$

Question 17

Criteria	Marks
• Provides correct solution	3
• Finds correct gradient and y-intercept, or equivalent merit	2
• Plots both points on the graph, or equivalent merit	1

Sample answer:



$$m = \frac{\text{rise}}{\text{run}}$$

$$m = -\frac{10}{5}$$

$$= -2$$

Using $y = mx + c$:

$m = -2, \quad c = 14$

$y = -2x + 14$

Question 18

Criteria	Marks
• Provides correct answer	2
• Multiplies \$5000 by an entry from table, or equivalent merit	1

Sample answer:

$$\text{Amount} = \$5000 \times 12.288$$
$$= \$61\,440$$

Question 19 (a)

Criteria	Marks
• Provides correct solution	2
• Provides one correct entry	1

Sample answer:

Activity	*Immediate prerequisite(s)*
B	$\times$
E	C, D
F	E

Question 19 (b)

Criteria	Marks
• Provides correct path and duration	2
• Provides a correct path, or equivalent merit	1

Sample answer:

Critical path is $BDEFH$

Minimum duration $= 4 + 5 + 5 + 7 + 5$

$= 26$

Question 19 (c)

Criteria	Marks
• Provides correct reason	1

Sample answer:

No, as the float time for activity A is 3.

Question 20 (a)

Criteria	Marks
• Provides correct answer	2
• Finds correct value of t, or equivalent merit	1

Sample answer:

$$t = \frac{6+2}{2}$$
$$= 4$$

$$h = 4^2 - 8 \times 4 + 12$$
$$= -4$$

Question 20 (b)

Criteria	Marks
• Provides correct answer	1

Sample answer:

$t = 4 + 4 = 8$ using axis of symmetry

$\therefore \quad t = 8$

Question 21 (a)

Criteria	Marks
• Provides correct answer	1

Sample answer:

$$\text{Cost} = 2.5 \times 0.29 \times 6$$
$$= \$4.35$$

Question 21 (b)

Criteria	Marks
• Provides correct solution	2
• Finds cost per day, or equivalent merit	1

Sample answer:

$$\text{Cost per day} = \frac{640}{92}$$
$$= 6.956\ldots$$
$$\text{Cost per hour} = 3.2 \times 0.29 = 0.928$$
$$\text{Number of hours} = \frac{6.956\ldots}{0.928}$$
$$= 7.49\ldots$$
$$\approx 7.5 \text{ hours}$$

OR

$$\$640 = 92 \times h \times 0.29 \times 3.2$$
$$\$640 = 85.376h$$
$$h = \frac{640}{85.376}$$
$$h = 7.49\ldots$$
$$\approx 7.5 \text{ hours}$$

Question 22 (a)

Criteria	Marks
• Provides correct answer	1

Sample answer:

$$\text{Capacity} = 26 + 24 + 12$$
$$= 62 \text{ L/min}$$

Question 22 (b) (i)

Criteria	Marks
• Provides correct solution	2
• Provides $x = 30$, or equivalent merit	1

Sample answer:

Outflow of $C = 5 + 13 + 12 = 30$

Inflow must equal outflow.

$\therefore \quad x = 30$

Question 22 (b) (ii)

Criteria	Marks
• Provides correct answer	1

Sample answer:

DE, CF, DG, FG

Question 22 (b) (iii)

Criteria	Marks
• Provides correct answer	1

Sample answer:

$ACEG$

Question 23

Criteria	Marks
• Provides correct solution	2
• Calculates correct dividend yield for one company, or equivalent merit	1

Sample answer:

$$\text{Company A yield} = \frac{4.92}{25.43} \times 100$$
$$\approx 19\%$$

$$\text{Company B yield} = \frac{0.45}{2.13} \times 100$$
$$\approx 21\%$$

$\therefore$ Company B would be better to invest in.

Question 24

Criteria	Marks
• Provides correct solution	2
• Provides a correct ratio for tagged snails, or equivalent merit	1

Sample answer:

$$\frac{18}{90} \times 20 = 4 \text{ snails}$$

Question 25 (a)

Criteria	Marks
• Provides correct form and direction	2
• Provides correct direction, or equivalent merit	1

Sample answer:

Form: Linear
Direction: Negative

Question 25 (b)

Criteria	Marks
• Provides correct interpretation of both slope and y-intercept	2
• Provides correct interpretation of y-intercept, or equivalent merit	1

Sample answer:

Slope: For every 1 minute increase in time spent watching television per day the time spent exercising decreases by 0.7 minutes per day.

y-intercept: If someone doesn't watch television they are expected to exercise for 64.3 minutes per day.

Question 25 (c)

Criteria	Marks
• Provides correct answer	1

Sample answer:

$y = 64.3 - 0.7x$
$y = 64.3 - 0.7 \times 42$
$= 34.9$ minutes

Question 25 (d)

Criteria	Marks
• Provides correct reason	1

Sample answer:

– 2 hours or 120 minutes of television suggests –19.7 minutes of exercise and can't do negative minutes of exercise.

Alternative answer:

– 2 hours or 120 minutes is outside the dataset so extrapolating is not reliable.

Question 26 (a)

Criteria	Marks
• Provides correct answer	2
• Attempts to use 2 applications of the trapezoidal rule, or equivalent merit	1

Sample answer:

$$A \approx \frac{5.1}{2}(6 + 3.8) + \frac{5.1}{2}(3.8 + 0)$$

$$\approx 34.68 \text{ cm}^2$$

Question 26 (b)

Criteria	Marks
• Provides correct solution	2
• Finds at least 2 correct areas as part of a surface area calculation, or equivalent merit	1

Sample answer:

$$1300 = (2 \times 34.68) + (10.2 \times 40) + (6 \times 40) + \text{curved surface}$$

$$1300 = 717.36 + \text{curved surface}$$

$$1300 - 717.36 = \text{curved surface}$$

$$582.64 \text{ cm}^2 = \text{curved surface}$$

Question 26 (c)

Criteria	Marks
• Provides correct solution including correct significant figures	2
• Provides correct absolute error, or equivalent merit	1

Sample answer:

$$\text{Absolute error} = \frac{1}{2} \times 0.1 \text{ cm}$$

$$= 0.05 \text{ cm}$$

$$\% \text{ error} = \frac{0.05}{10.2} \times 100\%$$

$$= 0.4901\ldots\%$$

$$= 0.490\% \qquad (3 \text{ significant figures})$$

Question 27

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

Sample answer:

Interest days $= 68 - 45 = 23$

$$\text{Amount} = \$392\left(1+\frac{13.74}{365}\%\right)^{23}$$

$$= \$395.41$$

$$\text{Interest charged} = \$395.41 - \$392$$

$$= \$3.41$$

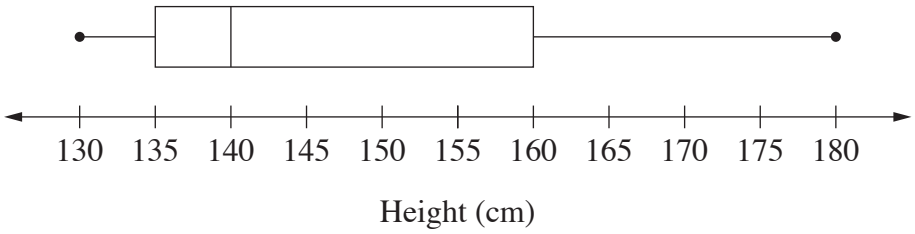
Question 28

Criteria	Marks
• Provides correct box-plot	3
• Provides correct five-number summary, or equivalent merit	2
• Provides correct median, or equivalent merit	1

Sample answer:

From the graph the five-number summary is:

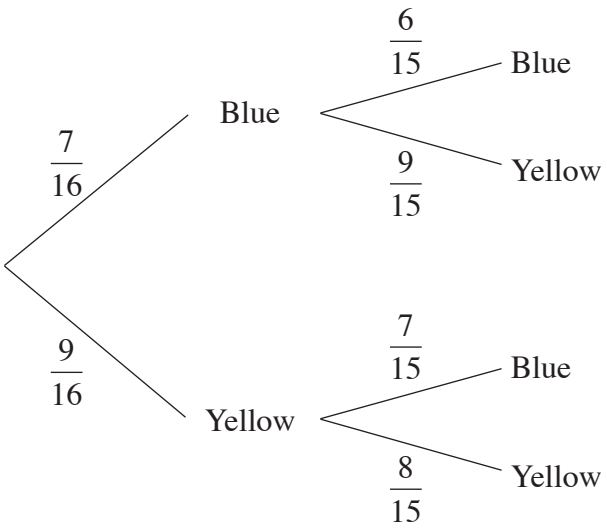
Minimum	130
Q_1	135
Median	140
Q_3	160
Maximum	180



Question 29

Criteria	Marks
• Provides correct solution	2
• Provides a calculation that shows evidence of understanding without replacement, or equivalent merit	1

Sample answer:



$$P(BB) + P(YY)$$

$$= \left(\frac{7}{16} \times \frac{6}{15}\right) + \left(\frac{9}{16} \times \frac{8}{15}\right)$$

$$= \frac{19}{40}$$

Question 30

Criteria	Marks
• Provides correct answer	2
• Provides one correct linear equation	1

Sample answer:

$P = 11B$

$\$465P + \$350B = \$494\,000\,000$

Question 31

Criteria	Marks
• Provides correct solution	3
• Provides evidence of using 0.37 in a tax calculation, or equivalent merit	2
• Shows evidence of using correct line in the table, or equivalent merit	1

Sample answer:

$$\$47\,420 = \$31\,288 + 0.37(\text{taxable income} - \$135\,000)$$
$$\$16\,132 = 0.37(\text{taxable income} - \$135\,000)$$
$$\$43\,600 = \text{taxable income} - \$135\,000$$

$$\begin{aligned}\text{Taxable income} &= \$43\,600 + \$135\,000\\ &= \$178\,600\end{aligned}$$

Question 32

Criteria	Marks
• Provides correct solution	3
• Provides evidence of equating volumes to find h, or equivalent merit	2
• Finds the volume of a sphere, or equivalent merit	1

Sample answer:

$$\begin{aligned}\text{Volume of 30 spheres} &= \frac{4}{3} \times \pi \times 1.5^3 \times 30\\ &= 424.115\ldots\end{aligned}$$

$$\begin{aligned}\text{Volume of pyramid} &= \text{volume of spheres} + \text{space}\\ &= 424.115\ldots + 634\\ &= 1058.115\end{aligned}$$

$$\text{Volume of pyramid} = \frac{1}{3} \times (14 \times 14) \times h$$

$$1058.115 = \frac{1}{3} \times (14 \times 14) \times h$$

$$\begin{aligned}h &= \frac{1058.115 \times 3}{14 \times 14}\\ &\approx 16.2 \text{ cm}\\ h &= 16 \text{ cm} \quad \text{(to the nearest whole number)}\end{aligned}$$

Question 33

Criteria	Marks
• Provides correct solution	5
• Provides total amount to be repaid, or equivalent merit	4
• Calculates the interest on the loan, or equivalent merit	3
• Finds the total amount to be borrowed, or equivalent merit	2
• Finds the number of $100 needed to calculate stamp duty, or equivalent merit	1

Sample answer:

$$\text{Stamp duty} = \$24\,200 \div 100$$
$$= 242$$

$$\therefore \quad \text{Total stamp duty} = 242 \times 3$$
$$= \$726$$

$$\text{Amount borrowed} = \$726 + \$24\,200 + \$50$$
$$= \$24\,976$$

$$\text{Interest on loan} = \$24\,976 \times 6.8\% \times 3$$
$$= \$5095.10$$

$$\text{Total amount to be repaid} = \$24\,976 + \$5095.10$$
$$= \$30\,071.10$$

$$\text{Monthly repayment} = \$30\,071.10 \div 36$$
$$= \$835.31$$

Question 34

Criteria	Marks
• Provides correct solution	3
• Finds Lin's correct future value, or equivalent merit	2
• Finds the correct rate and number of periods, or equivalent merit	1

Sample answer:

$n = 7 \times 12$
$= 84$ periods

$r = \dfrac{6}{12}$

$$21\,000\left(1 + \frac{6}{12}\%\right)^{84}$$

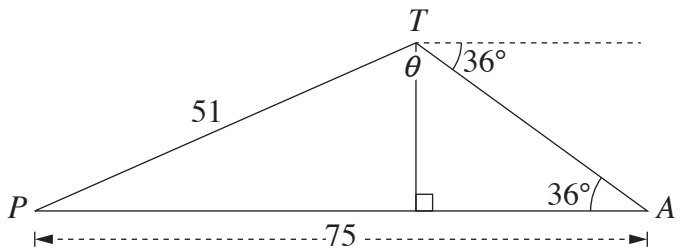
$= 31\,927.76$

$\therefore$ Monthly deposit $= \$31\,927.76 \div 104.07393$
$= \$306.78$

Question 35

Criteria	Marks
• Provides correct solution	3
• Correctly uses the sine rule, or equivalent merit	2
• Attempts to use the sine rule, or equivalent merit	1

Sample answer:



$\angle PTA = \theta$

$$\frac{\sin\theta}{75} = \frac{\sin 36°}{51}$$

$$\sin\theta = \frac{\sin 36°}{51} \times 75$$

$$\theta = 59.81\ldots°$$

$$\approx 60°$$

$\angle PTA$ is obtuse

$$\therefore \angle PTA = 180° - 60°$$

$$= 120°$$

$$\angle TPA = 180° - 120° - 36° = 24°$$

$$\frac{TA}{\sin 24°} = \frac{51}{\sin 36°}$$

$$TA = \frac{51}{\sin 36°} \times \sin 24°$$

$$\approx 35.29 \text{ m}$$

Question 36

Criteria	Marks
• Provides correct solution	4
• Finds value after 9 years, or equivalent merit	3
• Provides correct rate, or equivalent merit	2
• Uses 44 000 correctly in an appropriate formula, or equivalent merit	1

Sample answer:

$\$44\,000 = \$55\,000(1-r)$

$\dfrac{44\,000}{55\,000} = 1-r$

$0.8 = 1-r$

$\therefore \quad r = 0.2$

$r = 20\%$

OR

$55\,000 - 44\,000 = 11\,000$

$r = \dfrac{11\,000}{55\,000} \times 100\% = 20\%$

Value after 9 years

$= \$55\,000(1-0.2)^9$

$= \$7381.98$

Value of depreciation

$= \$7381.98 \times 0.2$

$= \$1476.40$

OR

Value after 9 years

$= \$55\,000(1-0.2)^9$

$= \$7381.98$

Value after 10 years

$= \$55\,000(1-0.2)^{10}$

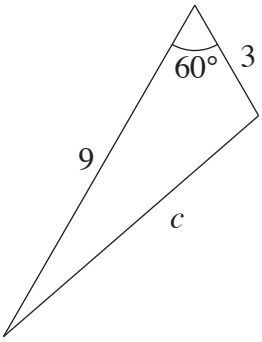
$= \$5905.58$

Difference = $1476.40

Question 37

Criteria	Marks
• Provides correct solution	4
• Finds the area of the grassed section, or equivalent merit	3
• Finds the length of a side of the grassed section, or equivalent merit	2
• Identifies an angle of 60°, or equivalent merit	1

Sample answer:



$c^2 = 9^2 + 3^2 - 2 \times 9 \times 3 \cos 60°$

$c \approx 7.937$

$$\text{Area} = \frac{1}{2} \times 7.937 \times 7.937 \times \sin 60° = 27.2798\ldots$$

$\frac{5}{20}$ minutes per $1\ \text{m}^2$

$\frac{5}{20} \times 27.2798$ minutes

$= 6.81$ minutes

≈ 7 minutes

Question 38

Criteria	Marks
• Provides correct solution	3
• Performs two correct conversions	2
• Performs one correct conversion	1

Sample answer:

1 US gallon = 3.8 L

30 miles = 30×1.6 km = 48 km

$$\text{Fuel efficiency} = \frac{3.8 \text{ L}}{48 \text{ km}} \times \frac{100}{100}$$

$$= \frac{7.916\ldots \text{ L}}{100 \text{ km}}$$

$$= 7.9 \text{ L/100 km} \qquad \text{(1 decimal place)}$$

Question 39

Criteria	Marks
• Provides correct solution	3
• Finds the value of a, or equivalent merit	2
• Finds the value of k, or equivalent merit	1

Sample answer:

$y = ka^x$

At $x = 0$, $y = 15$, therefore $k = 15$

When $x = 2$, $y = 9$

$$9 = 15a^2$$

$$a^2 = \frac{9}{15}$$

$$a = \sqrt{0.6} = 0.7746\ldots$$

When $x = 4$

$$y = 15 \times (0.7746\ldots)^4$$

$$= 5.4 \text{ mg}$$

Question 40 (a)

Criteria	Marks
• Provides correct solution	4
• Attempt to use a z-score in a calculation, or equivalent merit	3
• Calculates the percentage of males that weigh more than x kg	2
• Calculates the number of male sheep, or equivalent merit	1

Sample answer:

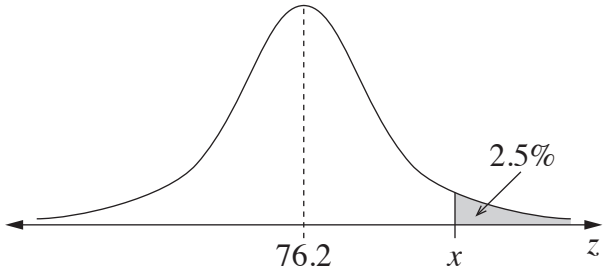
$$\text{Number of male sheep} = \frac{12\,600}{21} = 600$$

$$\text{Percentage of males weighing more than } x \text{ kg} = \frac{15}{600} \times 100 = 2.5\%$$

$$x = 76.2 + 2 \times 6.8$$

$$x = 76.2 + 13.6$$

$$x = 89.8 \text{ kg}$$



$\therefore$ z-score = 2

Question 40 (b)

Criteria	Marks
• Provides correct reason	1

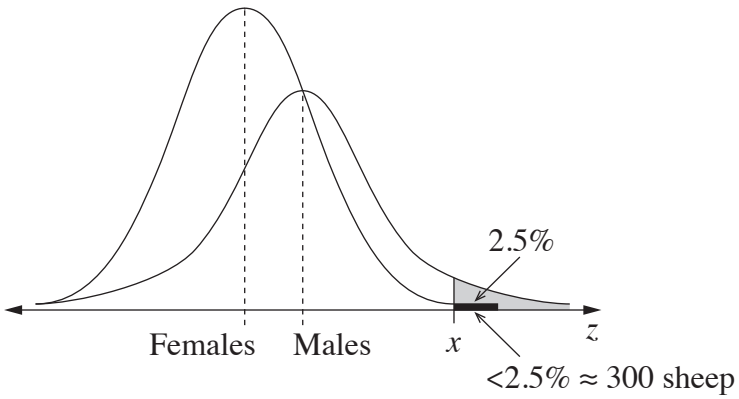
Sample answer:

$z = \dfrac{x - \mu}{\sigma}$ will be larger than 2 as the mean and standard deviation for females is smaller.

The percentage of female sheep with weight greater than x kg will be smaller than 2.5%.

So less than 300 females will weigh more than x kg.

Answer could include:



2025 HSC Mathematics Standard 2 Mapping Grid

Section I

Question	Marks	Content	Syllabus outcomes
1	1	MS-N2 Network Concepts	MS2-12-8
2	1	MS-A4 Types of Relationships	MS2-12-1
3	1	MS-N2 Network Concepts	MS2-12-8
4	1	MS-F1 Money Matters	MS11-5
5	1	MS-M1 Applications of Measurement	MS11-3
6	1	MS-A1 Formulae and Equations	MS11-1
7	1	MS-S1 Data Analysis	MS11-7
8	1	MS-S2 Relative Frequency and Probability	MS11-10
9	1	MS-M7 Rates and Ratios	MS2-12-3
10	1	MS-A1 Formulae and Equations	MS11-1
11	1	MS-A4 Types of Relationships	MS2-12-6
12	1	MS-M2 Working with Time	MS11-3
13	1	MS-S2 Relative Frequency and Probability	MS11-10
14	1	MS-M6 Non-right-angled Trigonometry	MS2-12-4
15	1	MS-S5 The Normal Distribution	MS2-12-7

Section II

Question	Marks	Content	Syllabus outcomes
16	2	MS-M7 Rates and Ratios	MS2-12-3
17	3	MS-S4 Bivariate Data Analysis	MS2-12-2
18	2	MS-F5 Annuities	MS2-12-5
19 (a)	2	MS-N3 Critical Path Analysis	MS2-12-8
19 (b)	2	MS-N3 Critical Path Analysis	MS2-12-8
19 (c)	1	MS-N3 Critical Path Analysis	MS2-12-8, MS2-12-10
20 (a)	2	MS-A4 Types of Relationships	MS2-12-6
20 (b)	1	MS-A4 Types of Relationships	MS2-12-6
21 (a)	1	MS-M7 Rates and Ratios	MS2-12-3
21 (b)	2	MS-M7 Rates and Ratios	MS2-12-3, MS2-12-10
22 (a)	1	MS-N3 Critical Path Analysis	MS2-12-8
22 (b) (i)	2	MS-N3 Critical Path Analysis	MS2-12-8, MS2-12-10
22 (b) (ii)	1	MS-N3 Critical Path Analysis	MS2-12-8
22 (b) (iii)	1	MS-N3 Critical Path Analysis	MS2-12-8, MS2-12-10
23	2	MS-F4 Investment and Loans	MS2-12-5
24	2	MS-M7 Rates and Ratios	MS2-12-3

Question	Marks	Content	Syllabus outcomes
25 (a)	2	MS-S4 Bivariate Data Analysis	MS2-12-2
25 (b)	2	MS-S4 Bivariate Data Analysis	MS2-12-2
25 (c)	1	MS-S4 Bivariate Data Analysis	MS2-12-7
25 (d)	1	MS-S4 Bivariate Data Analysis	MS2-12-10
26 (a)	2	MS-M1 Applications of Measurement	MS11-4
26 (b)	2	MS-M1 Applications of Measurement	MS11-4
26 (c)	2	MS-M1 Applications of Measurement	MS11-3
27	3	MS-F4 Investment and Loans	MS2-12-5
28	3	MS-S1 Data Analysis	MS11-7, MS11-9
29	2	MS-S2 Relative Frequency and Probability	MS11-8
30	2	MS-A4 Types of Relationships	MS2-12-6
31	3	MS-F1 Money Matters	MS11-5
32	3	MS-M1 Applications of Measurement	MS11-4, MS11-10
33	5	MS-F1 Money Matters	MS11-5, MS11-10
34	3	MS-F5 Annuities	MS2-12-5, MS2-12-10
35	3	MS-M6 Non-right-angled Trigonometry	MS2-12-4
36	4	MS-F4 Investment and Loans	MS2-12-5
37	4	MS-M6 Non-right-angled Trigonometry	MS2-12-4
38	3	MS-M7 Rates and Ratios	MS2-12-3
39	3	MS-A4 Types of Relationships	MS2-12-6
40 (a)	4	MS-S5 The Normal Distribution	MS2-12-7
40 (b)	1	MS-S5 The Normal Distribution	MS2-12-7, MS2-12-10