MA99 EDUCATION

Mathematics Standard: Practice Paper 1

01

NSW MATHEMATICS STANDARD 11-12 SYLLABUS 2024

FOR HSC 2028 AND LATER

General Instructions

- Reading time: 10 minutes
- Working time: 2 hours and 30 minutes
- Write using black pen
- Calculators approved by NESA may be used
- The NESA Mathematics Standard 1 and Standard 2 reference sheet may be used.
- From Question 16 on, show your mathematical reasoning and/or calculations in every answer

Total marks: 100

Section I · 15 marks

Questions 1 to 15

Suggested time: about 20 minutes

Section II · 85 marks

Questions 16 to the end. Suggested time: about 2 hours 10 minutes.

This paper examines all eight focus areas of the Year 11 Mathematics Standard course (2024 syllabus). The questions are set in a café and other small food businesses around Sydney. Formulas that are not on the reference sheet are given in the question that needs them.

Marks may be deducted for careless or badly arranged work.

Section I · Answer Sheet

Shade ONE circle for each of Questions 1 to 15. If you change your mind, draw a cross through the incorrect answer and shade the new one.

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

Section I · 15 marks

Answer Questions 1 to 15 on the multiple choice answer sheet, spending about 20 minutes on this section.

Question 1

1 MARK

At a café in Glebe, each customer is asked to rate the service as poor, fair, good or excellent. Which of the following best describes this variable?

A Categorical and nominal

B Categorical and ordinal

C Numerical and discrete

D Numerical and continuous

Question 2

1 MARK

A pizzeria in Leichhardt sets the price, P dollars, of a round pizza of diameter d cm using the formula $P = 0.02d^2 + 4$. Which of the following gives d in terms of P?

A $d = \sqrt{\frac{P}{0.02}} - 4$

B $d = \frac{P-4}{0.02}$

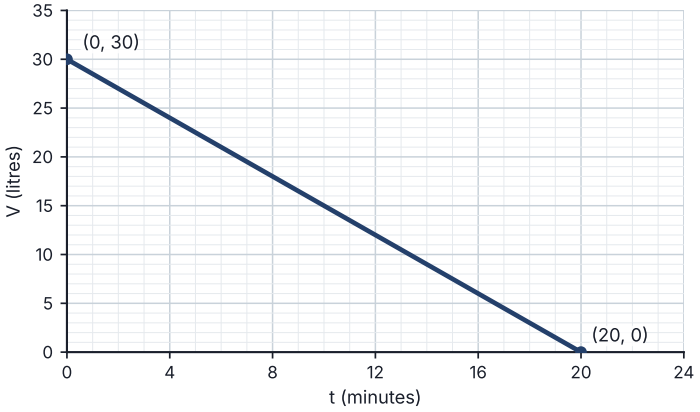
C $d = \frac{\sqrt{P-4}}{0.02}$

D $d = \sqrt{\frac{P-4}{0.02}}$

Question 3

1 MARK

A café's hot water urn holds 30 litres when full. The graph shows the volume, V litres, left in the urn t minutes after its tap is opened.



Volume of water left in the urn

Question

Which equation models the volume of water left in the urn?

A $V = 30 + 1.5t$

B $V = 30 - 1.5t$

C $V = 20 - 1.5t$

D $V = 30 - \frac{2}{3}t$

Question 4

1 MARK

A grain of raw sugar has a mass of 0.62 mg. What is this mass in grams, written in scientific notation?

A 6.2×10^{-2} g

B 6.2×10^{-3} g

C 6.2×10^{-4} g

D 6.2×10^{2} g

Question 5

1 MARK

Kai is a kitchen hand at a café in Bondi. His ordinary rate of pay is \$28.40 per hour. Last weekend he worked 6 hours on Saturday at time-and-a-half and 5 hours on Sunday at double time. What was Kai's pay for the weekend?

A \$312.40

B \$468.60

C \$539.60

D \$553.80

Question 6

1 MARK

The price of a bacon and egg roll at a café is \$14.30, including GST of 10%. How much GST is included in the price?

A \$1.30

B \$1.43

C \$13.00

D \$15.73

Question 7

1 MARK

A delivery rider for a Thai restaurant rides 6.3 km in 18 minutes. Using $\text{speed} = \dfrac{\text{distance}}{\text{time}}$, what is the rider's average speed in km/h?

A 0.35

B 1.89

C 2.86

D 21

Question 8

1 MARK

Sydney's standard time is UTC$+10$, and in December Sydney is on daylight saving time. Bogotá, in Colombia, is 5 hours behind UTC (UTC-5) all year. A Sydney café owner rings a coffee exporter in Bogotá at 9:00 am on Monday 7 December 2026, Sydney time. What is the time in Bogotá?

A 5:00 pm Sunday

B 6:00 pm Sunday

C 5:00 pm Monday

D 1:00 am Tuesday

Question 9

1 MARK

The cost of coffee beans bought by a café varies directly with their mass. A 2.5 kg bag costs \$95. What is the cost of 4 kg of the same beans?

A \$59.38

B \$152.00

C \$237.50

D \$380.00

Question 10

1 MARK

A bakery wants to join its 7 shops with data cable so that every shop is connected to every other shop, directly or through other shops, using the least total length of cable. Each cable joins two shops. How many cables are needed?

A 6
B 7
C 21
D 42

Question 11

1 MARK

Zara is a chef. Her normal weekly pay is $1150. She takes 4 weeks of annual leave and is paid a leave loading of 17.5% of her normal pay for those 4 weeks. How much is the leave loading?

A $80.50
B $201.25
C $805.00
D $5405.00

Question 12

1 MARK

A pizza of diameter 36 cm is cut into 8 equal slices. What is the perimeter of one slice, correct to one decimal place?

A 14.1 cm
B 28.3 cm
C 32.1 cm
D 50.1 cm

Question 13

1 MARK

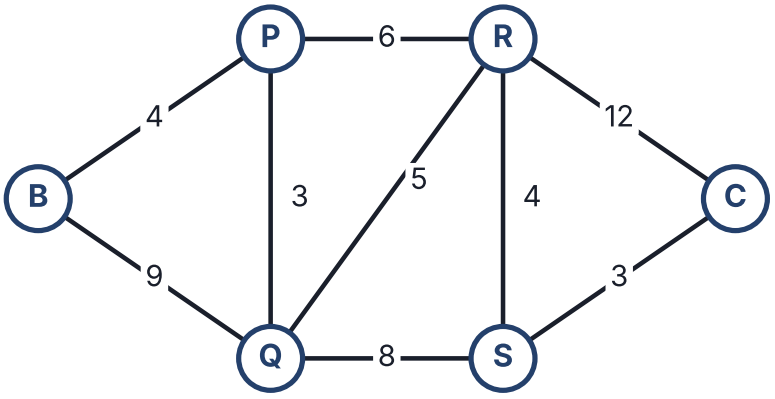
A café owner buys a juicer. Its marked price is reduced by 15%, and the reduced price is then reduced by a further 10%. What is the overall percentage reduction from the marked price?

A 1.5%
B 23.5%
C 25%
D 76.5%

Question 14

1 MARK

The network shows the travel times, in minutes, between a bakery B, a café C and four other locations.



Travel times in minutes

Question

What is the length of the shortest path from B to C?

A 17 minutes
B 18 minutes
C 19 minutes
D 20 minutes

Question 15

1 MARK

The five-number summary of the number of takeaway orders per day at a café over one month is 25, 42, 51, 58, 88. Above which value would a score be an outlier?

A 74
B 75
C 82
D 87

Section II · 85 marks

Answer Questions 16 to 38 in the spaces provided, spending about 2 hours 10 minutes on this section. Show your mathematical reasoning and/or calculations in every answer.

Question 16 · 3 marks

Tom works as a barista at a café in Newtown. His award (hypothetical) pays penalty rates as a multiple of his ordinary hourly rate. The spreadsheet shows his pay for one week. Some cells are blank.

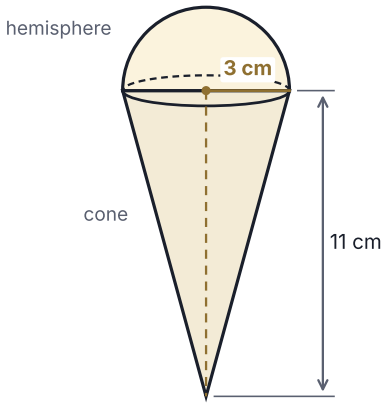
	A	B	C	D
1	Ordinary rate ($ per hour)	30.80		
2				
3	**Day**	**Hours**	**Multiplier**	**Pay ($)**
4	Monday (public holiday)	6	2.25	415.80
5	Wednesday	7.5	1	
6	Thursday	6	1	184.80
7	Saturday	8	1.25	
8	Sunday	5	1.5	231.00
9			**Total**	

(a) Write a formula that could be entered in cell D7 to calculate Tom's pay for Saturday. 1 MARK

(b) Calculate Tom's total pay for the week. 2 MARKS

Question 17 · 3 marks

A gelato bar in Cronulla serves gelato in a cone of radius 3 cm and height 11 cm. The cone is filled with gelato, and a hemisphere of gelato of radius 3 cm sits on top, as shown.



The cone and the hemisphere of gelato

Calculate the total volume of gelato, correct to the nearest millilitre.

Question 18 · 2 marks

A bakery in Rozelle sold some sourdough loaves for \$9 each and twice as many baguettes for \$4.50 each. Its takings from these sales were \$486. By writing and solving a linear equation, find the number of sourdough loaves sold.

Question 19 · 3 marks

The owner of three cafés plans to survey regular customers about a new menu. The cafés at Parramatta, Chatswood and Bondi have 1200, 800 and 500 regular customers respectively.

(a) The owner selects a stratified sample of 75 regular customers. How many of these should be customers of the Bondi café? 1 MARK

(b) Instead, the owner prints a link to an online survey on every receipt, and customers choose whether to respond. Name this sampling method and explain why the results may not be representative of all regular customers. 2 MARKS

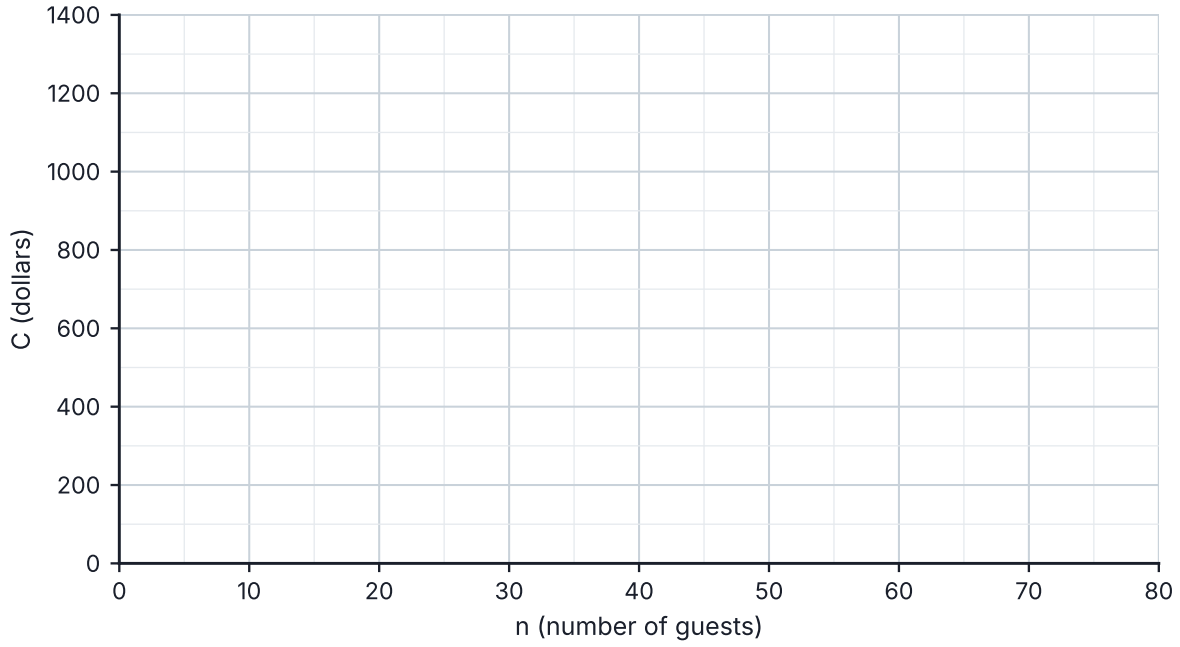
Question 20 · 6 marks

A café in Marrickville caters for functions. The table shows the total cost, C dollars, of catering for n guests.

Number of guests (n)	20	40	60
Total cost (C dollars)	430	680	930

(a) Find the equation of the straight line that models this relationship, in the form $C = mn + c$. 2 MARKS

(b) On the grid below, draw the graph of this model for $0 \leq n \leq 80$. 2 MARKS



Grid for Question 20 (b)

(c) A couple asks for a quote to cater for a wedding of 400 guests. Use the model to calculate the quote, and explain why this quote may not be reliable. 2 MARKS

Question 21 · 2 marks

While visiting London, a Sydney café owner pays £18.60 for lunch. This price includes value-added tax (VAT) at 20%. Calculate the amount of VAT included in the price.

Question 22 · 3 marks

A Sydney café buys its coffee from a farm near Manizales, in Colombia. Sydney is at $(34^\circ\text{S}, 151^\circ\text{E})$ and the farm is at $(5^\circ\text{N}, 75^\circ\text{W})$.

Using $15^\circ = 1$ hour time difference and the longitudes only (ignore time zones and daylight saving), calculate the time difference between Sydney and the farm, correct to the nearest minute. Hence find the time at the farm when it is 7:00 am on a Wednesday in Sydney.

Question 23 · 2 marks

The table shows the walking times, in minutes, between five stalls, A, B, C, D and E, at a weekend farmers' market. There are no other paths between the stalls. The path between B and C is one way, from B to C only.

Stalls	Walking time (min)	Stalls	Walking time (min)
A and B	3	B to C (one way)	2
A and D	5	B and E	6
A and E	4	C and D	7
D and E	2		

Draw a network diagram to represent this information, showing the weights and the one-way path.

Question 24 · 4 marks

Ana works at a wine bar in Surry Hills. After her shift she drinks 4 standard drinks over 3 hours. Ana weighs 62 kg. The blood alcohol content (BAC) of a female can be estimated using

$$BAC_{female} = \frac{10N - 7.5H}{5.5M}$$

where N counts the standard drinks, H is the drinking time in hours and M is the person's weight in kg. The number of hours for the BAC to return to zero after drinking stops is $\text{Time} = \dfrac{BAC}{0.015}$.

(a) Calculate Ana's BAC when she stops drinking, correct to three decimal places. 2 MARKS

(b) Ana stops drinking at 10:15 pm. Using your answer to part (a), find the time at which her BAC is estimated to reach zero. Give one reason why this estimate may not be reliable for Ana. 2 MARKS

Question 25 · 4 marks

The waiting times of 40 customers at a café during a lunchtime rush were recorded.

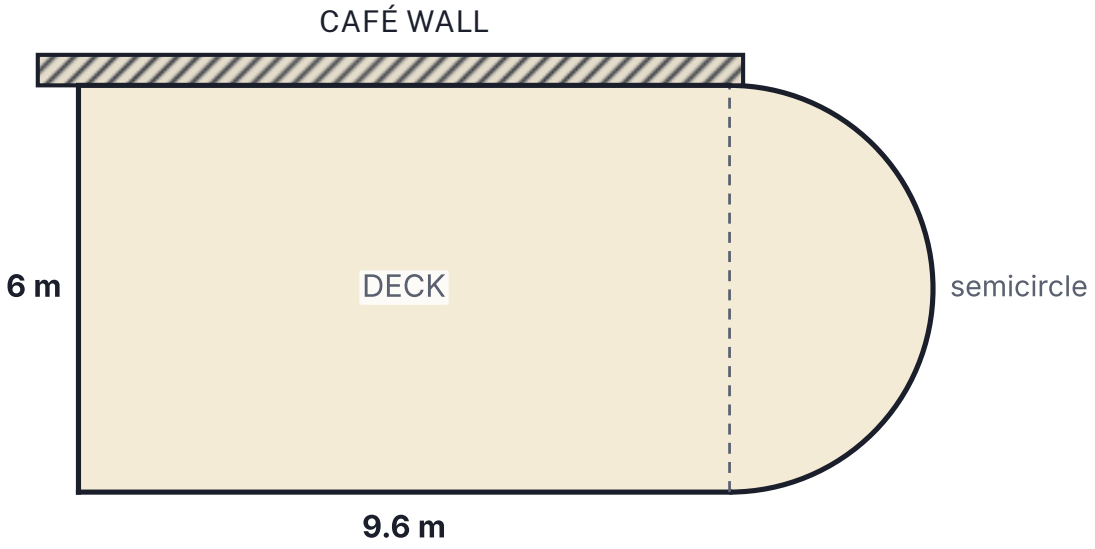
Waiting time (minutes)	Frequency
0 to less than 4	6
4 to less than 8	13
8 to less than 12	11
12 to less than 16	7
16 to less than 20	3

(a) Calculate the mean waiting time, using the class centres. 2 MARKS

(b) Find the population standard deviation of the waiting times, using the class centres, correct to one decimal place. Describe the shape of the distribution. 2 MARKS

Question 26 · 4 marks

A café is building an outdoor deck against one of its walls. The deck is a rectangle 9.6 m long and 6 m wide with a semicircle at one end, as shown.



Plan of the deck (not to scale)

(a) Calculate the area of the deck, in square metres, correct to two decimal places. 2 MARKS

(b) A glass balustrade will be built along the edge of the deck, except along the café wall. The balustrade costs $185 per metre. Calculate the cost of the balustrade, correct to the nearest dollar. 2 MARKS

Question 27 · 5 marks

A café owner wants to buy a commercial coffee machine with a price of $9680, including GST.

(a) Calculate the amount of GST included in the price. 1 MARK

(b) The supplier offers two ways to pay. 4 MARKS

- **Option 1:** pay the full price now and receive a discount of 5%.
- **Option 2:** buy on terms, paying a deposit of 20% of the price, then 36 monthly repayments of $259.

The café has $12 500 in its savings account. Compare the total cost of the two options. Which option would you recommend? Justify your answer.

Question 28 · 4 marks

Perth uses UTC$+8$ all year. Sydney uses UTC$+10$, and daylight saving time (UTC$+11$) from the first Sunday in October to the first Sunday in April.

(a) A Perth coffee roaster sends beans to a Sydney café on a flight that leaves Perth at 9:40 pm on Tuesday 12 January 2027, Perth time. The flight takes 4 hours 5 minutes. Find the day and time, in Sydney time, at which the flight lands. Give the time in 24-hour time. 2 MARKS

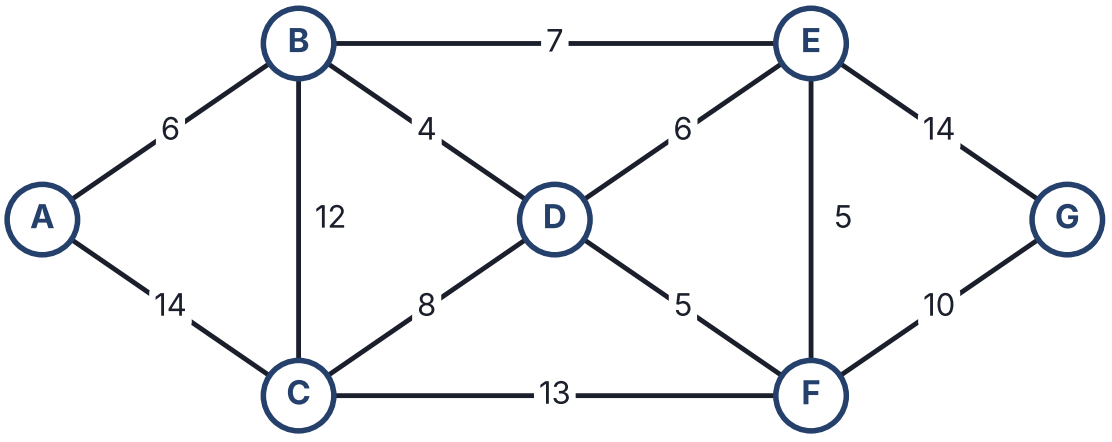
(b) In July, the café owner rings the roaster at 08:30 Sydney time. What time is it in Perth? Explain why the time difference between Sydney and Perth in July is not the same as in January. 2 MARKS

Question 29 · 2 marks

At a bakery in Haberfield, the mass of flour, F kg, used to make croissants varies directly with the number of croissants, n. A batch of 36 croissants uses 2.7 kg of flour. Find the greatest number of croissants that can be made from a 12.5 kg bag of flour.

Question 30 · 4 marks

A bakery at A delivers bread each morning to a café at G. The network shows the roads between A, G and five other locations, with the travel times in minutes.



Travel times in minutes

(a) Find the shortest path from A to G, and the time it takes. 2 MARKS

(b) One morning, road works close the road between B and D. The delivery van leaves the bakery at 5:52 am. Find the earliest time at which it can arrive at the café. 2 MARKS

Question 31 · 5 marks

Lucas is a head chef at a restaurant in Darlinghurst. In the 2025-26 income year he earned a salary of $86 250 and $420 in bank interest. He claims these allowable deductions: knives and tools $720, cleaning of work uniforms $150, and a donation to a charity that is a deductible gift recipient $250.

The table shows the 2025-26 resident tax rates (Australian Taxation Office).

Taxable income	Tax on this income
$0 to $18 200	Nil
$18 201 to $45 000	16c for each $1 over $18 200
$45 001 to $135 000	$4288 plus 30c for each $1 over $45 000
$135 001 to $190 000	$31 288 plus 37c for each $1 over $135 000
$190 001 and over	$51 638 plus 45c for each $1 over $190 000

Source: Australian Taxation Office, Tax rates: Australian residents, 2025-26 (ato.gov.au, retrieved 3 October 2026). The Medicare levy is 2% of taxable income. Ignore tax offsets.

(a) Calculate Lucas's taxable income. 1 MARK

(b) During the year, Lucas's employer withheld $18 520 in PAYG tax. Determine whether Lucas will receive a refund or will have to pay more tax, and by how much. 4 MARKS

Question 32 · 4 marks

A café's delivery van travels at v km/h. The driver's reaction distance, R metres, is given by $R = \dfrac{5vt}{18}$, where t is the reaction time in seconds. On a dry road, the van's braking distance, B metres, is given by $B = 0.008v^2$.

$$\text{stopping distance} = \text{reaction distance} + \text{braking distance}$$

(a) Show that the stopping distance of the van at 60 km/h is 48.8 m when the driver's reaction time is 1.2 seconds. 2 MARKS

(b) On a wet road, the van's braking distance is given by $B = 0.012v^2$. Find the greatest speed, correct to one decimal place, at which the van's braking distance on a wet road is no more than 40 m. 2 MARKS

Question 33 · 2 marks

A tea supplier's tracking website shows that a parcel for a Sydney café was dispatched at 14:20 UTC on Wednesday 3 March 2027. Using the information about Sydney time in Question 28, find the time and date in Sydney when the parcel was dispatched.

Question 34 · 4 marks

Mei is a pastry chef. Part of her monthly budget is shown. Weekly amounts are converted to monthly amounts using 1 year = 52 weeks = 12 months.

Item	Weekly amount ($)	Monthly amount ($)
Net pay	1236	5356.00
Rent	525	
Groceries	165	715.00
Transport	48	
Phone		65.00
Entertainment		300.00

(a) Calculate Mei's total monthly expenses and the amount she can save each month. 2 MARKS

(b) Financial advisers suggest an emergency fund of 3 to 6 months of living expenses. Mei decides on 4 months of her expenses, and she has already saved $3800. How many months will it take her to reach this goal if she saves the amount found in part (a) each month? 2 MARKS

Question 35 · 5 marks

The stem-and-leaf plot shows the number of pies sold each day at a bakery in Bankstown over 15 days.

Stem	Leaf
2	3 8
3	1 4 5 6 8
4	0 1 1 3 5 7
5	2
6	
7	9

Key: 2 | 3 means 23 pies

(a) Find the five-number summary of the data. 2 MARKS

(b) Show, using calculations, that the data contain exactly one outlier. Explain the effect of this outlier on the mean and on the median. 3 MARKS

Question 36 · 5 marks

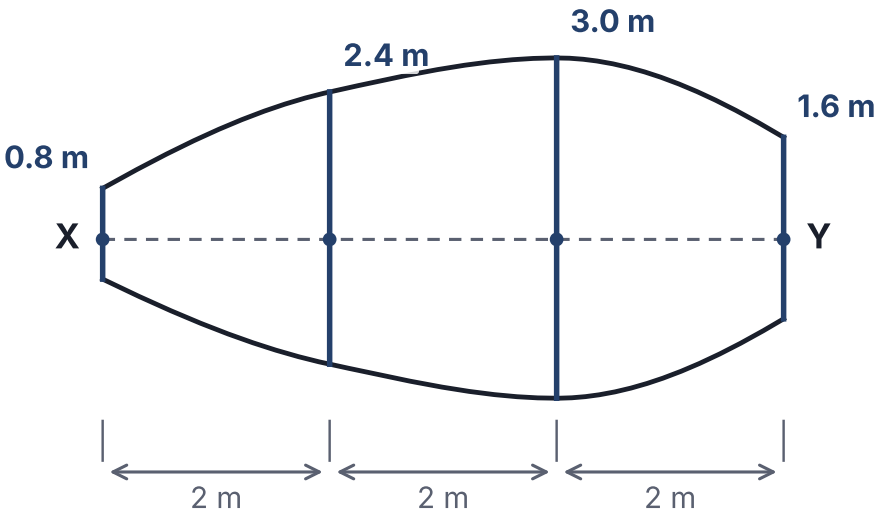
Rosa sells coffee beans to cafés for a roaster. Each week she is paid a retainer of $450 plus commission of 2% on the first $25 000 of her sales and 4% on her sales above $25 000.

(a) Calculate Rosa's earnings in a week when her sales are $31 800. 3 MARKS

(b) For weekly sales of s dollars, where $s > 25\,000$, show that Rosa's earnings, E dollars, are given by $E = 0.04s - 50$. Hence find the sales Rosa needs to earn \$1500 in a week. 2 MARKS

Question 37 · 4 marks

A café courtyard has a fish pond. The width of the pond is measured every 2 m along a 6 m line XY, as shown. The pond has vertical sides and a flat bottom, and the water is 60 cm deep.

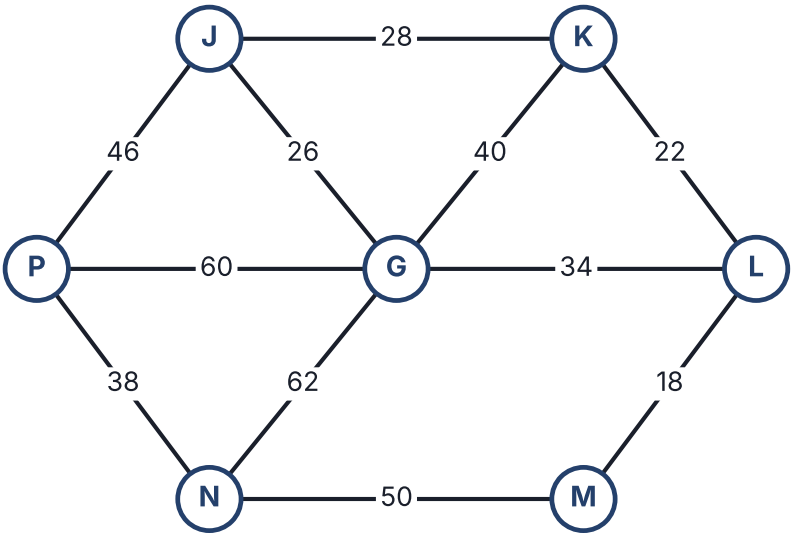


Widths of the pond in metres (not to scale)

Use three applications of the Trapezoidal rule to calculate the volume of water in the pond, in litres.

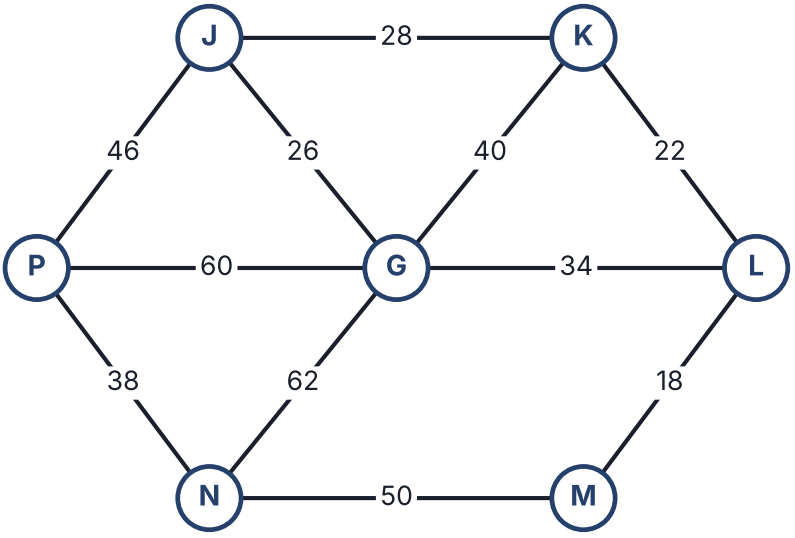
Question 38 · 5 marks

At a night food market, a generator G supplies power to six stalls, J, K, L, M, N and P. Cable can be laid along the paths shown. The lengths are in metres.



Possible cable paths, lengths in metres

(a) Find a minimum spanning tree for the network, and the minimum total length of cable needed to connect all the stalls to the generator. 3 MARKS



A copy of the network: you may draw your minimum spanning tree on it

(b) The stall holder at M says that the route of the cable from G to M in the minimum spanning tree is much longer than it needs to be. Find the shortest path from G to M, and explain why it is not part of the minimum spanning tree. 2 MARKS

End of paper.

About this resource

MA99 EDUCATION

Scope

NSW Mathematics Standard, Year 11. Written to the NSW Mathematics Standard 11-12 Syllabus (2024), all Year 11 focus areas, for students sitting the HSC in 2028 and later years. Every value and solution was re-derived independently by computer algebra before printing. Contexts in the questions are invented unless a source is named.

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MA99 EDUCATION

Mathematics Standard: Practice Paper 1 · Worked Solutions

01

NSW MATHEMATICS STANDARD 11-12 SYLLABUS 2024 FOR HSC 2028 AND LATER

Worked solutions · Section I

Each answer gives the working, the key and the error behind every wrong option. Section I is worth 15 marks, one for each question. The key is 1 B, 2 D, 3 B, 4 C, 5 C, 6 A, 7 D, 8 A, 9 B, 10 A, 11 C, 12 D, 13 B, 14 A, 15 C.

Question 1

The responses are words, so the variable is categorical. The categories have a natural order, from poor up to excellent, so it is ordinal.

(B)

(A) Nominal categories have no order (for example, favourite drink); these ratings do. (C) and (D) describe numbers that are counted or measured; the responses here are words, not numbers.

Question 2

$$P - 4 = 0.02d^2 \quad \text{subtract 4}$$

$$d^2 = \frac{P-4}{0.02} \quad \text{divide by 0.02}$$

$$d = \sqrt{\frac{P-4}{0.02}} \quad d > 0, \text{ so take the positive square root}$$

(D)

(A) undoes the operations in the wrong order: the 4 is added last, so it must be removed first. (B) forgets to take the square root. (C) takes the square root of $P - 4$ but then divides by 0.02 instead of by $\sqrt{0.02}$.

Question 3

The vertical intercept is 30, and the line falls 30 litres in 20 minutes, so the gradient is $-\frac{30}{20} = -1.5$. The equation is $V = 30 - 1.5t$.

(B)

(A) has the wrong sign: the volume is decreasing, so the gradient is negative. (C) uses the horizontal intercept, 20, as the vertical intercept. (D) calculates run over rise, $\frac{20}{30} = \frac{2}{3}$, instead of rise over run.

Question 4

$0.62 \text{ mg} = 0.62 \times 10^{-3} \text{ g} = 0.000\,62 \text{ g} = 6.2 \times 10^{-4} \text{ g}$

(C)

(A) rewrites 0.62×10^{-3} as 6.2×10^{-2}, adding 1 to the power instead of subtracting 1. (B) replaces milli by 10^{-3} but does not adjust the power after writing 0.62 as 6.2. (D) multiplies by 1000 instead of dividing, giving 620 g.

Question 5

$$\text{Saturday: } 6 \times 1.5 \times 28.40 = 255.60$$

$$\text{Sunday: } 5 \times 2 \times 28.40 = 284.00$$

$$\text{Total} = 255.60 + 284.00 = \$539.60$$

(C)

(A) is 11 hours at the ordinary rate, with no penalty rates: $11 \times 28.40 = 312.40$. (B) pays all 11 hours at time-and-a-half: $11 \times 42.60 = 468.60$. (D) swaps the two multipliers: $6 \times 56.80 + 5 \times 42.60 = 553.80$.

Question 6

A GST-inclusive price is 110% of the price before GST, so the GST is $\frac{1}{11}$ of it: $\frac{14.30}{11} = \$1.30$.

(A)

(B) takes 10% of the GST-inclusive price, $0.1 \times 14.30 = 1.43$, but the 10% applies to the price before GST. (C) is the price before GST, $14.30 \div 1.1 = 13.00$, not the GST. (D) adds GST a second time: $14.30 \times 1.1 = 15.73$.

Question 7

$18 \text{ min} = \frac{18}{60} \text{ h} = 0.3 \text{ h}$, so speed $= \frac{6.3}{0.3} = 21$ km/h.

(D)

(A) is $6.3 \div 18$, a speed in km per minute, not km/h. (B) multiplies instead of dividing: $6.3 \times 0.3 = 1.89$. (C) divides time by distance: $18 \div 6.3 \approx 2.86$

Question 8

In December Sydney is on daylight saving time, UTC$+11$. Bogotá is UTC-5, so Bogotá is $11 + 5 = 16$ hours behind Sydney. 9:00 am Monday minus 16 hours is 5:00 pm Sunday.

(A)

(B) forgets daylight saving and uses a 15 hour difference. (C) finds the right clock time but does not go back past midnight to Sunday. (D) adds the 16 hours instead of subtracting them (Bogotá is west of Sydney, so its time is earlier).

Question 9

$C = km$ with $95 = k \times 2.5$, so $k = 38$ ($38 per kg). For 4 kg, $C = 38 \times 4 = \$152$.

(B)

(A) inverts the ratio: $95 \times \frac{2.5}{4} \approx 59.38$, a smaller cost for a larger mass. (C) multiplies the cost by the given mass: $95 \times 2.5 = 237.50$. (D) treats $95 as the price of 1 kg: $95 \times 4 = 380$.

Question 10

The cheapest way to connect every shop is a minimum spanning tree. A tree with 7 vertices has $7 - 1 = 6$ edges.

(A)

(B) gives one cable per shop; 7 edges on 7 vertices always form a cycle, so one cable is wasted. (C) joins every pair of shops directly: $\frac{7 \times 6}{2} = 21$. (D) counts every pair twice: $7 \times 6 = 42$.

Question 11

Normal pay for 4 weeks: $4 \times 1150 = \$4600$. Leave loading: $0.175 \times 4600 = \$805$.

(C)

(A) uses 1.75% instead of 17.5%: $0.0175 \times 4600 = 80.50$. (B) is the loading for one week only: $0.175 \times 1150 = 201.25$. (D) is the total holiday pay, $4600 + 805$, not the loading.

Question 12

Each slice is a sector with $r = 18$ cm and $\theta = \dfrac{360^\circ}{8} = 45^\circ$.

$$l = \frac{45}{360} \times 2\pi \times 18 = 4.5\pi = 14.137\ldots \quad \text{arc length}$$

$$\text{perimeter} = 14.137\ldots + 18 + 18 = 50.137\ldots \approx 50.1 \text{ cm} \quad \text{add both radii}$$

(D)

(A) is the arc length alone. (B) uses the diameter, 36 cm, as the radius and leaves out the straight edges: $\dfrac{45}{360} \times 2\pi \times 36 \approx 28.3$. (C) adds only one radius: $14.1 + 18 = 32.1$.

Question 13

After both reductions the price is $0.85 \times 0.90 = 0.765$ of the marked price, so the overall reduction is $1 - 0.765 = 0.235 = 23.5\%$.

(B)

(A) multiplies the two percentages: $15\% \times 10\% = 1.5\%$. (C) adds them; the second 10% is taken from a smaller price, so the total is less than 25%. (D) is the fraction of the marked price that is paid, not the reduction.

Question 14

Check the routes from B to C (or use Dijkstra's algorithm):

Path	Length (min)
B, P, R, S, C	4 + 6 + 4 + 3 = **17**
B, P, Q, S, C	4 + 3 + 8 + 3 = 18
B, P, Q, R, S, C	4 + 3 + 5 + 4 + 3 = 19
B, Q, S, C	9 + 8 + 3 = 20
B, P, R, C	4 + 6 + 12 = 22

(A)

(B) is the path through Q and S, which misses the quicker link P to R. (C) comes from always taking the shortest edge out of the current vertex (B to P, P to Q, Q to R, ...), which is not a reliable method. (D) is the quickest route that uses only three roads, B, Q, S, C: fewer roads does not mean less time.

Question 15

$IQR = Q_3 - Q_1 = 58 - 42 = 16$. A score is an outlier if it is more than $Q_3 + 1.5 \times IQR = 58 + 24 = 82$.

(C)

(A) forgets the 1.5: $58 + 16 = 74$. (B) adds $1.5 \times IQR$ to the median: $51 + 24 = 75$. (D) multiplies Q_3 by 1.5: $1.5 \times 58 = 87$.

Worked solutions · Section II

Question 16 (a)

=B7*C7*B1, or =B7*C7*B1 (the dollar signs fix the reference to B1 if the formula is filled down).

MARKING GUIDELINES

CRITERIA	MARKS
Provides a correct formula	1

Use cell references, not the numbers themselves, so the formula still works when the rate or the hours change.

Question 16 (b)

$$\text{Wednesday: } 7.5 \times 1 \times 30.80 = 231.00 \quad \text{row 5}$$

$$\text{Saturday: } 8 \times 1.25 \times 30.80 = 308.00 \quad \text{row 7}$$

$$415.80 + 231.00 + 184.80 + 308.00 + 231.00 = 1370.60$$

Tom's total pay for the week is $1370.60.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct solution	2
Finds the pay for Wednesday and for Saturday, or equivalent merit	1

The public holiday row is already complete. Students who recalculate it at time-and-a-half instead of the 2.25 multiplier lose the mark.

The completed spreadsheet:

	A	B	C	D
1	Ordinary rate ($ per hour)	30.80		
2				
3	**Day**	**Hours**	**Multiplier**	**Pay ($)**
4	Monday (public holiday)	6	2.25	415.80
5	Wednesday	7.5	1	231.00
6	Thursday	6	1	184.80
7	Saturday	8	1.25	308.00
8	Sunday	5	1.5	231.00
9			**Total**	1370.60

Question 17

$$V_{cone} = \frac{1}{3}Ah = \frac{1}{3} \times \pi \times 3^2 \times 11 = 33\pi$$

$$V_{hemisphere} = \frac{1}{2} \times \frac{4}{3}\pi \times 3^3 = 18\pi \quad \text{half a sphere}$$

$$V = 33\pi + 18\pi = 51\pi = 160.22\ldots \text{ cm}^3$$

$$1 \text{ cm}^3 = 1 \text{ mL} \quad \text{reference sheet}$$

The total volume of gelato is 160 mL (to the nearest millilitre).

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct solution	3
Finds the volume of the cone and of the hemisphere, or equivalent merit	2
Finds the volume of the cone or of the hemisphere	1

The common error is to use the whole sphere, $\frac{4}{3}\pi r^3 = 36\pi$, giving 217 mL.

Question 18

Let x be the number of sourdough loaves. Then $2x$ baguettes were sold.

$$9x + 4.50 \times 2x = 486 \quad \text{the equation}$$

$$9x + 9x = 486$$

$$18x = 486$$

$$x = 27$$

The bakery sold 27 sourdough loaves (and 54 baguettes: $243 + 243 = 486$ checks).

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct solution	2
Writes a correct linear equation, or equivalent merit	1

Read 'twice as many baguettes' carefully: the equation $9 \times 2x + 4.50x = 486$ puts the 2 on the wrong item.

Question 19 (a)

Total regular customers: $1200 + 800 + 500 = 2500$. Bondi: $\dfrac{500}{2500} \times 75 = 15$.

15 customers from the Bondi café.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct answer	1

Question 19 (b)

This is self-selected sampling. Only customers who choose to respond are included. They may be those with strong opinions (very pleased or very unhappy), or those with time and internet access, and customers who do not take a receipt never see the link. The sample may therefore not reflect the views of all regular customers.

MARKING GUIDELINES

CRITERIA	MARKS
Names the method and explains why the sample may not be representative	2
Names the method, or gives a relevant reason	1

'It is biased' on its own earns nothing: say who is more likely to answer, and why that distorts the results.

Question 20 (a)

$$m = \frac{680 - 430}{40 - 20} = \frac{250}{20} = 12.5$$ gradient from two points

$$430 = 12.5 \times 20 + c \Rightarrow c = 180$$ substitute (20, 430)

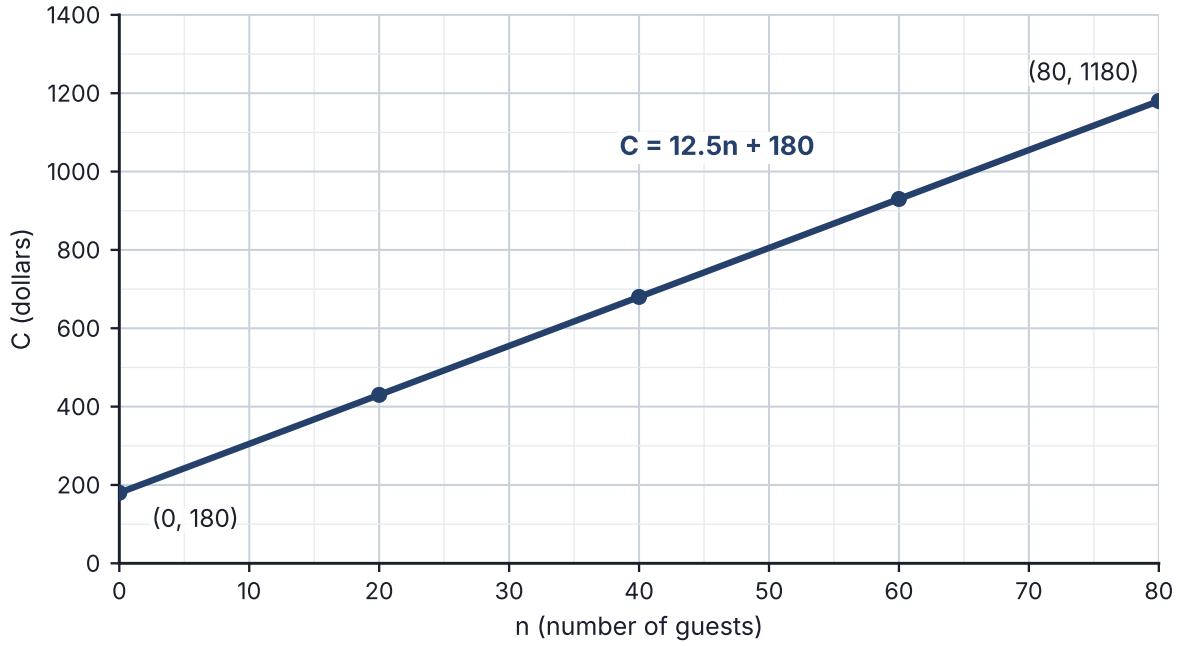
$C = 12.5n + 180$ (check: $12.5 \times 60 + 180 = 930$). The café charges \$12.50 per guest plus a fixed \$180.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct equation	2
Finds the gradient, or equivalent merit	1

Question 20 (b)

At $n = 0$, $C = 180$; at $n = 80$, $C = 12.5 \times 80 + 180 = 1180$. Plot $(0, 180)$ and $(80, 1180)$ (the table values lie on the line too) and join them with a straight line.



The model $C = 12.5n + 180$ for $0 \leq n \leq 80$

MARKING GUIDELINES

CRITERIA	MARKS
Draws a correct straight line over the full domain	2
Draws a straight line with the correct vertical intercept or the correct gradient	1

Question 20 (c)

$C = 12.5 \times 400 + 180 = 5180$, so the quote is $5180.

This is an extrapolation: 400 guests is far beyond the data (20 to 60 guests) used to build the model. For a very large function the cost per guest may change (a bulk discount on food, or extra staff, equipment hire and a larger venue), so the linear model may not apply.

MARKING GUIDELINES

CRITERIA	MARKS
Calculates the quote and gives a valid reason	2
Calculates the quote, or gives a valid reason	1

Name the issue (extrapolation beyond the data) and give a reason in the context, not just 'the model might be wrong'.

Question 21

$$\text{price before VAT} = \frac{18.60}{1.2} = 15.50 \quad \text{the price is 120\% of the pre-VAT price}$$

$$\text{VAT} = 18.60 - 15.50 = 3.10$$

The VAT included is £3.10.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct solution	2
Finds the price before VAT, or equivalent merit	1

The common error is 20% of the VAT-inclusive price, $0.2 \times 18.60 = £3.72$.

Question 22

$151^\circ + 75^\circ = 226^\circ$ one place is east, one is west: add

$\frac{226}{15} = 15.0666\ldots \text{ h}$ $15^\circ = 1$ hour

$0.0666\ldots \times 60 = 4 \text{ min}$

The time difference is 15 hours 4 minutes. The farm is west of Sydney, so its time is behind.

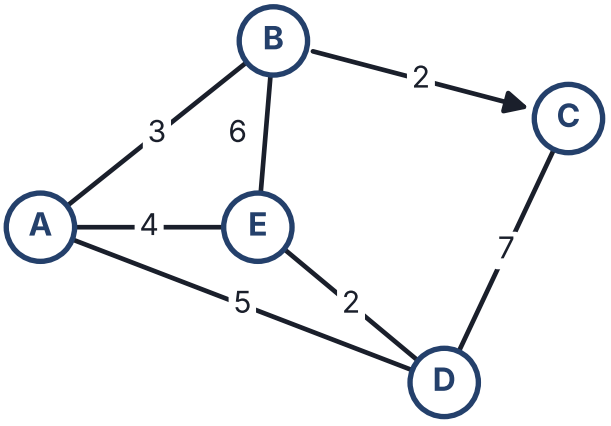
7:00 am Wednesday minus 15 h 4 min is 3:56 pm on Tuesday at the farm.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct solution	3
Finds the time difference of 15 hours 4 minutes, or equivalent merit	2
Finds the difference in longitude, 226°	1

Subtracting the longitudes, $151 - 75 = 76^\circ$, is the error to avoid: east and west longitudes are on opposite sides of the Greenwich meridian.

Question 23



One correct network diagram: the arrow shows the one-way path from B to C

Five vertices, seven weighted edges; the edge between B and C carries an arrow from B to C. Any layout is correct if the connections and weights match the table.

MARKING GUIDELINES

CRITERIA	MARKS
Draws a correct network with all weights and the direction shown	2
Draws a network with the correct edges, or with one error or omission	1

Students often draw every edge without arrows. The one-way path must show its direction.

Question 24 (a)

$$BAC = \frac{10 \times 4 - 7.5 \times 3}{5.5 \times 62} \quad \text{N = 4, H = 3, M = 62}$$

$$= \frac{17.5}{341} = 0.051\,31\ldots$$

Ana's BAC is 0.051 (to three decimal places).

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct answer	2
Substitutes correctly into the formula	1

Question 24 (b)

$$\text{Time} = \frac{0.051}{0.015} = 3.4 \text{ h}$$

$$0.4 \times 60 = 24 \text{ min} \quad \text{3.4 h = 3 h 24 min}$$

10:15 pm plus 3 h 24 min gives 1:39 am the next morning.

The estimate may not be reliable because the formula ignores factors such as whether Ana has eaten, her metabolism and health, and the actual alcohol in each drink (poured drinks are often larger than a standard drink).

MARKING GUIDELINES

CRITERIA	MARKS
Finds the correct time and gives a valid limitation	2
Finds the correct time, or gives a valid limitation	1

Writing 3.4 hours as 3 hours 40 minutes is the common error: 0.4 of an hour is 24 minutes.

Question 25 (a)

With class centres x and frequencies f:

Class	Class centre	Frequency	Centre × frequency
0 to less than 4	2	6	12
4 to less than 8	6	13	78
8 to less than 12	10	11	110

Class	Class centre	Frequency	Centre × frequency
12 to less than 16	14	7	98
16 to less than 20	18	3	54
Total		40	352

$\bar{x} = \dfrac{352}{40} = 8.8$, so the mean waiting time is 8.8 minutes.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct solution	2
Finds the class centres and the sum of fx, or equivalent merit	1

Question 25 (b)

Enter the class centres with their frequencies in the calculator's statistics mode: $\sigma = 4.578\ldots \approx$ 4.6 minutes.

The distribution is positively skewed: most waiting times are in the lower classes and the tail is to the right.

MARKING GUIDELINES

CRITERIA	MARKS
Gives the correct standard deviation and shape	2
Gives the correct standard deviation, or the correct shape	1

Use the population standard deviation, σ (σ_n on many calculators). The sample standard deviation, 4.64 here, is a different statistic, even though both round to 4.6 in this question.

Question 26 (a)

$$A_{rectangle} = 9.6 \times 6 = 57.6$$

$$A_{semicircle} = \frac{1}{2} \times \pi \times 3^2 = 14.137\ldots \quad \text{radius 3 m}$$

$$A = 57.6 + 14.137\ldots = 71.737\ldots$$

The area is 71.74 m^2.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct answer	2
Finds the area of the semicircle, or equivalent merit	1

The 6 m width is the diameter of the semicircle; using 6 as the radius gives 114.15 m^2.

Question 26 (b)

The balustrade runs along the 9.6 m side away from the wall, the 6 m straight end and the curved end.

$$\text{arc} = \frac{1}{2} \times 2\pi \times 3 = 3\pi = 9.424\ldots \quad \text{half the circumference}$$

$$\text{length} = 9.6 + 6 + 9.424\ldots = 25.024\ldots \text{ m}$$

$$\text{cost} = 25.024\ldots \times 185 = 4629.58\ldots$$

The balustrade costs $4630 (to the nearest dollar).

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct solution	2
Finds the length of the balustrade, or equivalent merit	1

Question 27 (a)

$\text{GST} = \frac{9680}{11} = 880$, so the GST included is $880.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct answer	1

Question 27 (b)

$$\text{Option 1: } 0.95 \times 9680 = 9196 \quad \text{5\% discount}$$

$$\text{Option 2 deposit: } 0.20 \times 9680 = 1936$$

$$\text{Option 2 repayments: } 36 \times 259 = 9324$$

$$\text{Option 2 total: } 1936 + 9324 = 11\,260$$

$$11\,260 - 9196 = 2064 \quad \text{difference}$$

Option 1 costs $9196 and Option 2 costs $11 260, so buying on terms costs $2064 more.

Recommendation. Option 1. The café can afford it from its savings ($12 500), it saves $2064, and it still leaves $3304 in the account. (Option 2 may be recommended if justified, for example to keep more cash for running costs or emergencies, provided the extra $2064 cost is acknowledged.)

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct totals for both options and a justified recommendation	4
Provides correct totals for both options, or equivalent merit	3
Finds the total cost of Option 2, or finds the cost of Option 1 and the deposit	2
Finds the cost of Option 1, or the deposit, or the total of the repayments	1

A recommendation with no figures, or figures with no recommendation, cannot earn full marks: 'justify' needs both the comparison and a reason linked to the café's situation.

Question 28 (a)

9:40 pm Tuesday plus 4 h 5 min is 1:45 am Wednesday, Perth time.

In January Sydney is on daylight saving time (UTC$+11$), 3 hours ahead of Perth (UTC$+8$).

1:45 am plus 3 hours: the flight lands at 04:45 on Wednesday 13 January, Sydney time.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct day and time	2
Finds the landing time in Perth time, or uses a 3 hour difference, or equivalent merit	1

Using a 2 hour difference (forgetting daylight saving) gives 03:45.

Question 28 (b)

In July Sydney is on standard time, UTC$+10$, only 2 hours ahead of Perth. 08:30 minus 2 hours is 06:30 in Perth.

In January Sydney uses daylight saving time (UTC$+11$) but Perth does not, so the difference is 3 hours in January and 2 hours in July.

MARKING GUIDELINES

CRITERIA	MARKS
Gives the correct time and a correct explanation	2
Gives the correct time, or a correct explanation	1

Question 29

$$F = kn, \quad 2.7 = k \times 36 \Rightarrow k = 0.075$$

$$12.5 = 0.075n \Rightarrow n = 166.66\ldots$$

The greatest number is 166 croissants (167 croissants would need 12.525 kg).

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct solution	2
Finds $k = 0.075$, or equivalent merit	1

Rounding 166.67 up to 167 is the trap: the bag does not hold enough flour for the 167th croissant.

Question 30 (a)

Dijkstra's algorithm from A (or checking the routes) gives these least times:

Vertex	Least time from A (min)	Reached from
A	0	
B	6	A

Vertex	Least time from A (min)	Reached from
D	6 + 4 = 10	B
E	6 + 7 = 13	B
C	14	A
F	10 + 5 = 15	D
G	15 + 10 = 25	F

The shortest path is A, B, D, F, G, taking $6 + 4 + 5 + 10 = 25$ minutes.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct path and time	2
Provides correct path or correct time	1

The quickest route with only three roads, A, B, E, G, takes 27 minutes: fewer edges is not the same as less time.

Question 30 (b)

Without the road between B and D, the least times from A become B: 6, E: 13 (via B), C: 14, F: 18 (via E), D: 19 (via E) and G: 27 (via E, since via F takes 28).

The new shortest path is A, B, E, G, taking $6 + 7 + 14 = 27$ minutes.

5:52 am plus 27 minutes: the van can arrive at 6:19 am.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct solution	2
Finds the new shortest time of 27 minutes, or equivalent merit	1

Question 31 (a)

$$\text{income} = 86\,250 + 420 = 86\,670 \quad \text{salary and interest}$$

$$\text{deductions} = 720 + 150 + 250 = 1120$$

$$\text{taxable income} = 86\,670 - 1120 = 85\,550$$

Lucas's taxable income is $85 550.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct answer	1

Bank interest is income and must be included before the deductions are subtracted.

Question 31 (b)

$\text{tax} = 4288 + 0.30 \times (85\,550 - 45\,000)$ third row of the table

$= 4288 + 12\,165 = 16\,453$

$\text{Medicare levy} = 0.02 \times 85\,550 = 1711$

$\text{total} = 16\,453 + 1711 = 18\,164$

$18\,520 - 18\,164 = 356$ withheld minus total

More tax was withheld than Lucas owes, so he receives a refund of $356.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct solution	4
Finds the tax payable and the Medicare levy, or equivalent merit	3
Finds the tax payable, $16 453	2
Uses the correct row of the tax table	1

Forgetting the Medicare levy gives a refund of $2067; taking 30% of the whole taxable income ignores the $4288 base and the $45 000 threshold.

Question 32 (a)

$$R = \frac{5 \times 60 \times 1.2}{18} = \frac{360}{18} = 20 \text{ m}$$

$B = 0.008 \times 60^2 = 0.008 \times 3600 = 28.8 \text{ m}$

$\text{stopping distance} = 20 + 28.8 = 48.8 \text{ m}$ as required

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct working leading to 48.8 m	2
Finds the reaction distance or the braking distance	1

In a 'show that' question every value must be calculated and shown; quoting 48.8 m earns nothing.

Question 32 (b)

$0.012v^2 = 40$ braking distance equal to 40 m

$v^2 = \dfrac{40}{0.012} = 3333.33\ldots$

$v = \sqrt{3333.33\ldots} = 57.735\ldots \quad v > 0$

The greatest speed is 57.7 km/h (correct to one decimal place).

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct solution	2
Finds $v^2 = 3333.3$, or equivalent merit	1

Question 33

On 3 March 2027 Sydney is still on daylight saving time (it ends on the first Sunday in April, 4 April 2027), so Sydney is UTC $+11$.

14:20 plus 11 hours is 25:20, which is 01:20 the next day: 01:20 on Thursday 4 March 2027.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct time and date	2
Adds 10 or 11 hours to the UTC time, or equivalent merit	1

Using UTC$+10$ gives 00:20 on Thursday: in March, Sydney is still on daylight saving time.

Question 34 (a)

$$\text{rent} = 525 \times \frac{52}{12} = 2275.00$$

$$\text{transport} = 48 \times \frac{52}{12} = 208.00$$

$$\text{expenses} = 2275 + 715 + 208 + 65 + 300 = 3563$$

$$\text{savings} = 5356 - 3563 = 1793$$

Mei's monthly expenses are $3563 and she can save $1793 per month.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct expenses and savings	2
Converts the rent and transport to monthly amounts, or equivalent merit	1

Multiplying weekly amounts by 4 assumes a 28 day month: $525 \times 4 = 2100$ understates the rent by \$175 a month.

The completed budget:

Item	Weekly amount ($)	Monthly amount ($)
Net pay	1236	5356.00
Rent	525	2275.00
Groceries	165	715.00
Transport	48	208.00
Phone		65.00
Entertainment		300.00

Question 34 (b)

$$\text{goal} = 4 \times 3563 = 14\,252$$

$$\text{still needed} = 14\,252 - 3800 = 10\,452$$

$$\frac{10\,452}{1793} = 5.83\ldots$$

After 5 months she is still short, so it takes 6 months.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct solution	2
Finds the amount still needed, or equivalent merit	1

Question 35 (a)

There are 15 scores. The median is the 8th score. Q_1 is the median of the 7 scores below it and Q_3 the median of the 7 scores above it.

Lower half: 23, 28, 31, **34**, 35, 36, 38. Median: **40**. Upper half: 41, 41, 43, **45**, 47, 52, 79.

Five-number summary: 23, 34, 40, 45, 79 (minimum, Q_1, median, Q_3, maximum).

MARKING GUIDELINES

CRITERIA	MARKS
Provides the correct five-number summary	2
Provides at least three correct values	1

Question 35 (b)

$$IQR = 45 - 34 = 11, \quad 1.5 \times IQR = 16.5$$

$$Q_1 - 1.5 \times IQR = 34 - 16.5 = 17.5 \quad \text{lower limit}$$

$$Q_3 + 1.5 \times IQR = 45 + 16.5 = 61.5 \quad \text{upper limit}$$

No score is below 17.5 (the minimum is 23). The only score above 61.5 is 79, so the data contain exactly one outlier, 79.

With the outlier the mean is $\frac{613}{15} \approx 40.9$; without it the mean is $\frac{534}{14} \approx 38.1$. The median changes only from 40 to 39.

The outlier pulls the mean up noticeably but has little effect on the median.

MARKING GUIDELINES

CRITERIA	MARKS
Shows exactly one outlier and explains the effect on both measures	3
Shows that 79 is an outlier and that 23 is not, or equivalent merit	2
Finds the IQR and one outlier limit	1

'Exactly one' needs both limits: show that no score lies below 17.5 as well as that 79 lies above 61.5.

Question 36 (a)

$0.02 \times 25\,000 = 500$ first \$25 000

$0.04 \times (31\,800 - 25\,000) = 0.04 \times 6800 = 272$ sales above \$25 000

$E = 450 + 500 + 272 = 1222$

Rosa earns \$1222 that week.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct solution	3
Finds both parts of the commission, or equivalent merit	2
Finds one part of the commission	1

Applying 4% to all of the sales, $0.04 \times 31\,800 = 1272$, ignores the sliding scale.

Question 36 (b)

$E = 450 + 500 + 0.04(s - 25\,000)$

$= 950 + 0.04s - 1000 = 0.04s - 50$ as required

$1500 = 0.04s - 50 \Rightarrow 0.04s = 1550 \Rightarrow s = 38\,750$

Rosa needs sales of \$38 750.

MARKING GUIDELINES

CRITERIA	MARKS
Shows the result and finds the sales correctly	2
Shows the result, or finds the sales from the given equation	1

The gradient 0.04 is the rate of change: above \$25 000, each extra dollar of sales earns 4 cents.

Question 37

Use $A \approx \dfrac{h}{2}(d_f + d_l)$ three times with $h = 2$:

$$A_1 \approx \frac{2}{2}(0.8 + 2.4) = 3.2$$

$$A_2 \approx \frac{2}{2}(2.4 + 3.0) = 5.4$$

$$A_3 \approx \frac{2}{2}(3.0 + 1.6) = 4.6$$

$$A \approx 3.2 + 5.4 + 4.6 = 13.2 \text{ m}^2$$

$$V = 13.2 \times 0.6 = 7.92 \text{ m}^3 \quad \text{60 cm = 0.6 m}$$

$$7.92 \text{ m}^3 = 7.92 \times 1000 = 7920 \text{ L} \quad 1 \text{ m}^3 = 1000 \text{ L}$$

The pond holds (7920 L) of water.

MARKING GUIDELINES

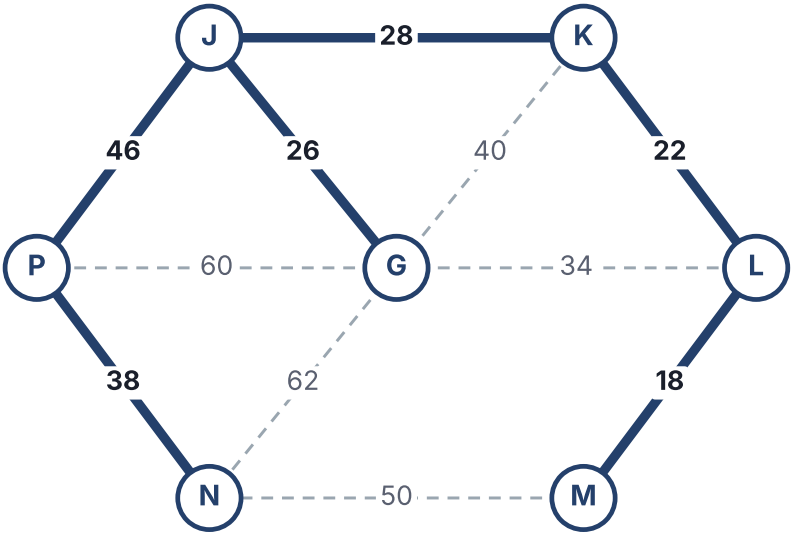
CRITERIA	MARKS
Provides correct solution	4
Finds the volume in cubic metres, or equivalent merit	3
Finds the area of the water surface, 13.2 m^2	2
Applies the Trapezoidal rule correctly once	1

Using 60 for the depth (not 0.6 m) gives an answer 100 times too large; convert to metres before multiplying.

Question 38 (a)

Kruskal's algorithm: take the edges in order of length, rejecting any edge that makes a cycle.

Edge	Length (m)	Decision
LM	18	accept
KL	22	accept
GJ	26	accept
JK	28	accept
GL	34	reject (cycle G, J, K, L)
NP	38	accept
GK	40	reject (cycle G, J, K)
JP	46	accept (6 edges: done)



The minimum spanning tree (thick edges)

Length: $18 + 22 + 26 + 28 + 38 + 46 = 178$, so 178 m of cable is needed.

MARKING GUIDELINES

CRITERIA	MARKS
Provides correct tree and total length	3
Provides a correct tree, or a spanning tree with one error and the correct total for it	2
Selects at least four correct edges	1

Question 38 (b)

The shortest path from G to M is G, L, M, length 52 m $(34 + 18)$. In the minimum spanning tree the cable runs G, J, K, L, M: $26 + 28 + 22 + 18 = 94$ m.

The edge GL (34 m) is not in the minimum spanning tree because, when it is considered, G and L are already joined by the shorter edges GJ, JK and KL, so adding it would make a cycle. A minimum spanning tree minimises the total length of cable, not the distance from G to each stall.

MARKING GUIDELINES

CRITERIA	MARKS
Finds the shortest path and gives a correct explanation	2
Finds the shortest path, or gives a correct explanation	1

What this paper examined

Marks for each Year 11 focus area, against the target for a Mathematics Standard practice paper.

Focus area	Section I	Section II	Marks	Target
Formulas and equations	2, 7	18 (2), 24 (4), 32 (4)	12	12
Linear relationships	3, 9	20 (6), 29 (2), 36 (b) (2)	12	12
Earning money	5, 11	16 (3), 31 (5), 36 (a) (3)	13	13
Managing money	6, 13	21 (2), 27 (5), 34 (4)	13	13

Focus area	Section I	Section II	Marks	Target
Applications of measurement	4, 12	17 (3), 26 (4), 37 (4)	13	13
Time and location	8	22 (3), 28 (4), 33 (2)	10	10
Networks, paths and trees	10, 14	23 (2), 30 (4), 38 (5)	13	13
Data analysis	1, 15	19 (3), 25 (4), 35 (5)	14	14
Total	15	85	**100**	100

Several questions combine two focus areas: Questions 24 (b) and 30 (b) use elapsed time from Time and location, Question 36 joins Earning money and Linear relationships, and Question 34 uses net pay from Earning money in a budget. Their marks are counted under the focus area each part mainly examines.

End of worked solutions.

About this resource

MA99 EDUCATION

Scope

NSW Mathematics Standard, Year 11. Written to the NSW Mathematics Standard 11-12 Syllabus (2024), all Year 11 focus areas, for students sitting the HSC in 2028 and later years. Every value and solution was re-derived independently by computer algebra before printing. Contexts in the questions are invented unless a source is named.

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