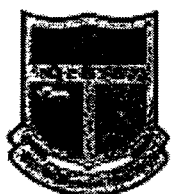


Calculator Model No: _____

NAME	CLASS	INDEX NUMBER



QUEENSWAY SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2025
SECONDARY 2

G3

MATHEMATICS

4052/01

Paper 1

3 October 2025

1 hour

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction tape.

Answer **all** questions.

The number of marks is given in brackets [] at the end of each question or part question.

If working is needed for any question, it must be shown with the answer.

Omission of essential working will result in loss of marks.

The total number of marks for this paper is 40.

The use of an approved scientific calculator is expected, where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142.

QSS/2025/EOY/S2/G3/4052/01

[Turn over

Answer **all** the questions.

- 1 A list of numbers is shown below.

$$\sqrt{0.2} \qquad 0.\dot{2} \qquad \frac{2}{10} \qquad 2 \qquad \pi$$

- (a) Arrange these numbers in ascending order.

Answer [1]

- (b) List down all the irrational number(s).

Answer [1]

- 2 The ratio of boys to girls in a class is 3: 4.
After 2 boys joined the class, the ratio of the boys to girls became 4: 5.
How many students were there in the class at first?

Answerstudents [2]

QSS/2025/EOY/S2/G3/4052/01

- 3 (a) Solve the inequality $5 - x < \frac{11}{2}$.

Answer [2]

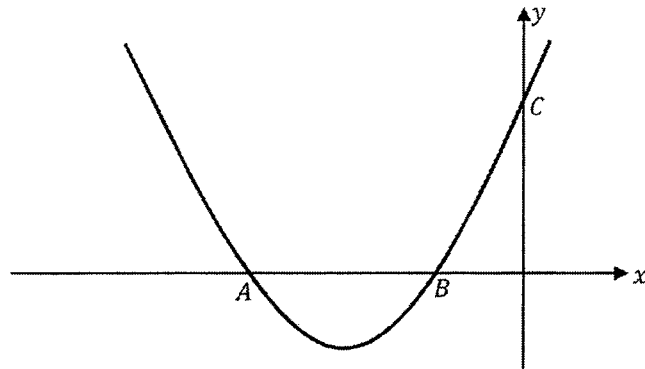
- (b) Hence, state the smallest prime number that satisfies the inequality.

Answer [1]

- 4 12 workers can complete a job in 10 days. How many additional workers will be required to complete the job in 8 days instead?

Answerworkers [2]

- 5 In the diagram, the curve $y = 2x^2 + 5x + 3$ cuts the x -axis at two points A and B , and the y -axis at point C .



- (a) Calculate the coordinates of A , B and C .

Answer $A = (\dots\dots\dots, \dots\dots\dots)$

$B = (\dots\dots\dots, \dots\dots\dots)$

$C = (\dots\dots\dots, \dots\dots\dots)$ [3]

- (b) Write down the line of symmetry of the curve.

Answer [1]

- (c) Jane claims that the minimum y -value of the curve is -0.1 . Do you agree with her? Show your working clearly.

Answer

 [1]

- 6 (a) Factorise $x^2 - 121$.

Answer [1]

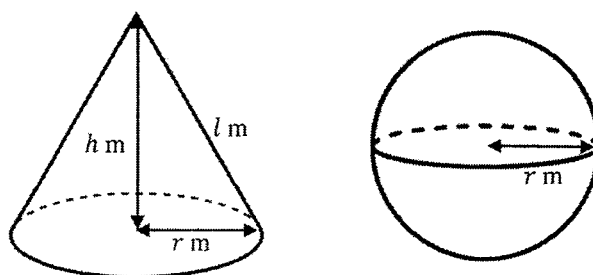
- (b) Hence, using your answer in (a), find the two factors of 779, other than 1 and 779.

Answerand [2]

- 7 Given that $a^2 + b^2 = 15$ and $5ab = 17$, calculate the value of $(a - b)^2$.

Answer [2]

- 8 A company is producing two separate exhibition display structures, one in the shape of a cone and the other in the shape of a sphere, both with radius r m. The cone has a height of h m, and a slant height of l m.



- (a) Both structures have the same volume.
Form an equation to show that $h = 4r$.

Answer

[2]

- (b) Given that the slant height, l , of the cone is 5.4 m, calculate the value of r .

Answer $r = \dots\dots\dots$ [2]

- (c) The company is selling the exhibition display structure in sets, each comprising of one conical and one spherical structure. Find the number of tins of paint needed to paint 10 sets if each tin of paint covers 30 m^2 .

Answer $\dots\dots\dots$ tins [3]

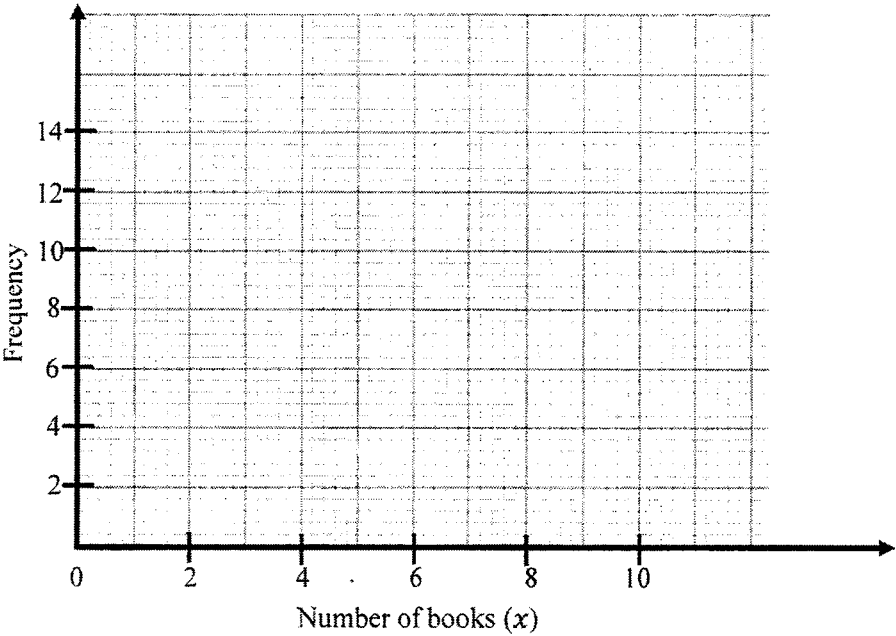
- 9 The number of books read by a group of students in a month are recorded in the table below.

Number of books (x)	Frequency
$0 < x \leq 2$	10
$2 < x \leq 4$	14
$4 < x \leq 6$	8
$6 < x \leq 8$	6
$8 < x \leq 10$	4

- (a) Calculate an estimate of the mean number of books read in a month.

Answerbooks [2]

- (b) Draw a histogram to illustrate the data.



[1]

(c) A student read 4 books in a month.

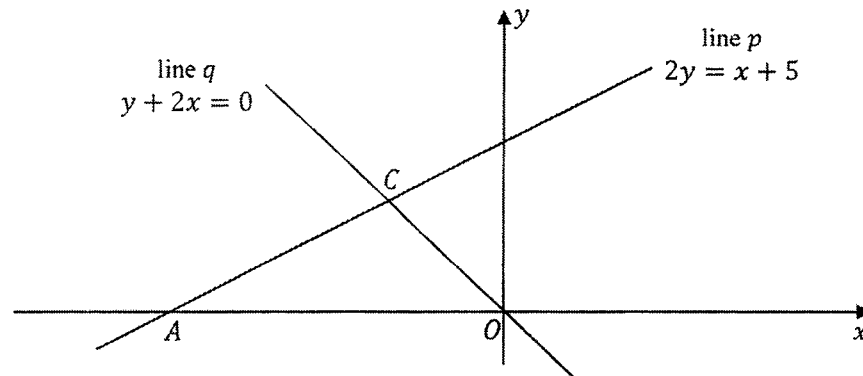
In which class interval from the frequency table would this number be placed?

Answer [1]

(d) Calculate the probability that a student reads more than 6 books.

Answer [1]

- 10 In the diagram, the equation of line p is $2y = x + 5$ and the equation of line q is $y + 2x = 0$. Line p and line q intersect at point C .



- (a) By solving the simultaneous equations $y + 2x = 0$ and $2y = x + 5$, show that the coordinates of C is $(-1, 2)$.

Answer

[3]

- (b) It is also given that line p intersects the x -axis at point A and line q passes through $(0,0)$. Calculate the area of triangle OAC .

Answerunits² [2]

11 An area of 3 cm^2 on a map represents an actual area of 75 km^2 .

- (a) 1 cm on the map is represented by $x \text{ km}$.
Calculate the value of x .

Answer $x = \dots\dots\dots$ [2]

- (b) The road distance between Town A and Town B on the map is 8.1 cm.
John leaves Town A at 09 15 by car and intends to deliver a parcel to Town B
by 10 00.
Calculate the speed, in km/h, John should travel at in order to deliver the
parcel on time.

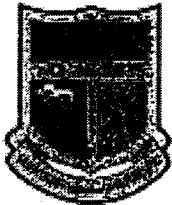
Answer $\dots\dots\dots \text{km/h}$ [2]

END OF PAPER

QSS/2025/EOY/S2/G3/4052/01

Calculator Model: _____

NAME:	CLASS:	INDEX NO:
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QUEENSWAY SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2025
SECONDARY 2

G3

MATHEMATICS **4052/02**
Paper 2 **7 October 2025**
1 hour 30 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction tape.

Answer **all** questions.
The number of marks is given in brackets [] at the end of each question or part question.

If working is needed for any question, it must be shown with the answer.
Omission of essential working will result in loss of marks.
The total number of marks for this paper is 60.

The use of an approved scientific calculator is expected, where appropriate.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π , use either your calculator value or 3.142.

2

Section A (28 marks)

- 1 Annabelle has 12 pieces of \$20 notes and \$5 notes in her wallet. The total value of these notes is less than 16,000 cents. By forming an inequality in x , where x represents the number of \$20 notes, find the maximum number of \$20 notes.

Answer [3]

- 2 There are 24 marbles in a jar. 15 of the marbles are blue, and the rest are green. After x green marbles are removed from the jar, the probability of picking a green marble is $\frac{1}{4}$.
By forming an equation in terms of x , find the value of x .

Answer $x =$ [2]

QSS/2025/EOY/S2/G3/4052/02

3

3 Expand and simplify the following.

(a) $(2x+3y)(x+2y)$

Answer [2]

(b) $3x^2 - (x+y)(x-y)$

Answer [2]

4 (a) Simplify $\frac{a(a-b)}{2b} \div \frac{(a-b)^2}{2a}$.

Answer [2]

(b) Express as a single fraction in its simplest form.

$$\frac{3}{x^2-9} + \frac{1}{3-x}$$

Answer [3]

4

5 It is given that y is directly proportional to the square root of x and $y=10$ when $x=25$.
Find

(a) an equation connecting x and y ,

Answer [2]

(b) the value of x when $y=12$,

Answer $x=$ [1]

(c) the value of y when $x=64$.

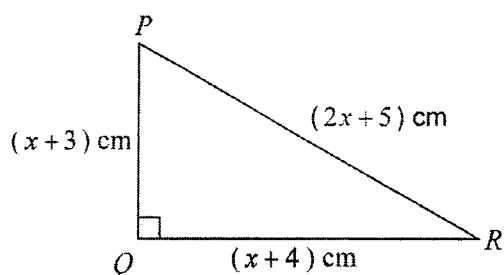
Answer $y=$ [1]

6 It is given that $A=2b(d^2-3)$. Express d in terms of A and b .

Answer $d=$ [3]

5

- 7 The diagram shows a right-angled triangle PQR . $PQ = (x + 3)$ cm, $QR = (x + 4)$ cm and $PR = (2x + 5)$ cm.



- (a) Write down an equation in x and show that it reduces to $2x^2 + 6x = 0$.

Answer

[3]

- (b) Solve the equation $2x^2 + 6x = 0$.

Answer $x = \dots\dots\dots$ or $\dots\dots\dots$ [2]

- (c) Explain why one of the solutions in part (b) must be rejected.

Answer $\dots\dots\dots$

$\dots\dots\dots$

$\dots\dots\dots$

[1]

- (d) Hence, find the area of triangle PQR .

Answer $\dots\dots\dots\text{cm}^2$ [1]

6

Section B (32 mark)

- 8 The back-to-back stem-and-leaf diagram represents the scores of the students in Class A and Class B for the same examination. In each class, 20 students sat for the examination.

Class A		Class B
9 3	4	0 1 2
8 6	5	2 4 4
8 7 2 2 1 0	6	
9 2 2 2 1	7	3 5 5 6 7
8 1	8	0 1 3 4
5 4 0	9	1 3 6 6 6

Key (Class A)

3 | 4 means 43 marks

Key (Class B)

4 | 0 means 40 marks

- (a) Find the percentage of students in Class A who scored at least 75 marks.

Answer% [1]

- (b) Find the modal mark for Class A.

Answermarks [1]

- (c) Find the median mark of Class B.

Answermarks [1]

- (d) Which class performed better in the examination? Explain your answer.

Answer

..... [2]

- (e) The teacher moderated the test by adding 2 marks to all students in Class A and Class B. Explain how the mode and median of the two classes have changed.

Answer

.....

..... [2]

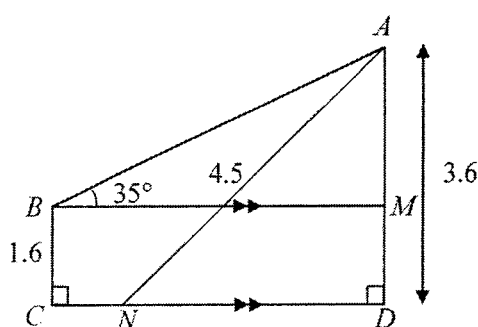
QSS/2025/EOY/S2/G3/4052/02

7

- 9 (a) At 12 00, two ships depart from the same port. Ship A sails east at an average speed of 550 km/h, while ship B sails south at an average speed of 420 km/h. After 3 hours, find the distance between the two ships.

Answerkm [3]

(b)



In the diagram, $ABCD$ is a quadrilateral, and M is a point on AD such that BM is parallel to CD . $BC = 1.6$ cm and $AD = 3.6$ cm and N is a point on CD such that $AN = 4.5$ cm. Angle $BCD = \text{angle } ADC = 90^\circ$ and angle $ABM = 35^\circ$.

Calculate

- (i) the length of BM ,

Answercm [2]

- (ii) angle NAB ,

Answer° [3]

- (iii) the length of CN .

Answercm [2]

8

- 10 (a) Sarah wants to build a rectangular garden. The total perimeter of the garden is 36 meters. The breadth of the garden is x m, and the area of the garden is y m².



Show that $y = 18x - x^2$.

Answer

[1]

- (b) The variables x and y are connected by the equation $y = 18x - x^2$. Some corresponding values of x and y are given in the table below.

x	0	2	4	6	8	10	12
y	0	32	56	72	80	80	p

- (i) Find the value of p .

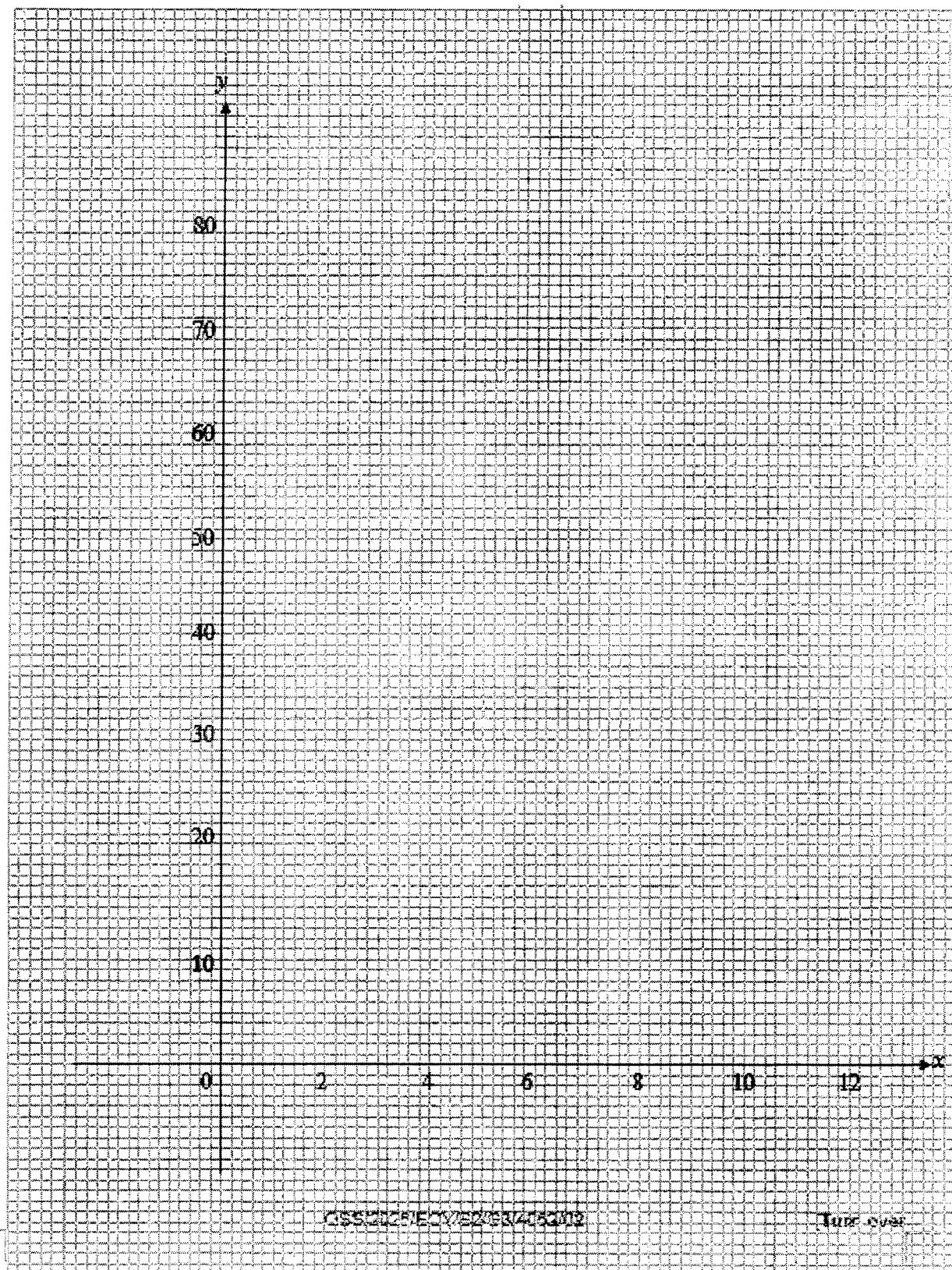
Answer $p = \dots\dots\dots$ [1]

- (ii) On the grid next page, draw the graph of $y = 18x - x^2$ for $0 \leq x \leq 12$. [3]

- (iii) Use your graph to estimate the breadth(s) of the garden when the area is 75 m².

Answer $\dots\dots\dots$ m [2]

9



- 11 Figure 1 shows a lunch buffet promotion by Kintamani Restaurant.



FURAMA RIVERFRONT **FURAMA** **ENGLISH * FURA**

SUMPTUOUS BUFFET & MORE

Weekday Buffet (Mon – Thurs)
 Lunch: \$45.00⁺⁺(A)
 Dinner: \$48.00⁺⁺(A)

Weekend Buffet (Fri – Sunday)
 Lunch: \$48.00⁺⁺(A)
 Dinner: \$52.00⁺⁺(A)

Seniors enjoy 30% off (60 years and above)
 Children enjoy 40% off (6 – 12 years old)
 Children below 6 years old dine complimentary.

Figure 1

++ means prices are subjected to 10% service charge and 9% GST (Goods and Services Tax).

GST is an additional 9% on top of the amount after service charge.

Any discounts are applied before the service charge and GST.

Adapted from <https://www.furama.com/riverfront/Dining/Kintamani-Indonesian-Restaurant>

- (a) On Sunday at 7 p.m., John took his wife, both aged 40, to Kintamani Restaurant for dinner. Using Figure 1, calculate the total amount he paid for the meal.

Answer \$ [2]

- (b) A company has booked a lunch celebration at the restaurant on a Thursday. A total of 10 staff members will be attending, and one of the staff members will be bringing her 3 children, aged 4, 6, and 13. Two of the staff members are over 65 years old.
- (i) Using Figure 1, calculate the total amount the company needs to pay for the meal if they dine in at Kintamani Restaurant.

Answer \$ [3]

QSS/2025/EOY/S2/G3/4052/02

11

- (ii) The company decided to look for two additional restaurants to compare prices. Figure 2 shows the price of the buffet at Estate Restaurant and Figure 3 shows the price of the buffet at the Line Restaurant.

Estate Restaurant. Hilton Singapore Orchard

From 15 July 2024 to 31 December 2025, American Express Card Members enjoy the following discounts. These credit card discounts do not apply to children's prices.

20% off all Estate buffets, excluding breakfast and à la carte menus.

Inclusive of:

- Dinner Buffet: From \$98++ per adult (Sunday to Thursday)
- Friday & Saturday Seafood Nights: From \$128++ per adult
- Grand Sunday Brunch: From \$158++ per adult

25% off all Estate Lunch buffet

Inclusive of:

- Lunch Buffet: From \$72++ per adult (Monday to Thursday)
- Lunch Buffet: From \$78++ per adult (Fridays, Saturdays)

Children aged 6 to 12 years inclusive dine at 50% off the adult price. Children aged 5 years and below dine complimentary.

Adapted from <https://www.americanexpress.com/en-sg/benefits/promotions/dining/hilton/>

Figure 2

THE LINE

Pricing List

*Subject to seasonal prices on
eve of on Public Holidays and special occasions

Lunch | 12.30pm to 2.30pm

Thursday	\$68++ per adult
Friday	\$78++ per adult
Saturday	\$88++ per adult
Sunday	\$108++ per adult

Children aged 6 to 11 years old dine at 50% of adult's price and children below 6 years old dine free with every one paying adult. Prices are subjected to change without prior notice, please reach out to dining.sls@shangri-la.com or call (65) 6213 4398 for assistance.

**Special promotion! Get 1 for 1 on the adult price!*

Adapted from <https://www.shangri-la.com/singapore/shangrila/dining/restaurants/the-line/>

Figure 3

12

Both restaurants apply a 10% service charge and a 9% GST to the prices. The GST is calculated as an additional 9% on the amount after the service charge has been included. Any discounts are applied before the service charge and GST.

The company would like to select the restaurant with the lowest total cost for the upcoming company event. The company's boss is an American Express cardholder as well.

Which restaurant should they choose? Explain your reasoning and show your calculations clearly.

Answer

[3]

END OF PAPER

QSS/2025/EOY/S2/G3/4052/02



QUEENSWAY SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2025
SECONDARY 2

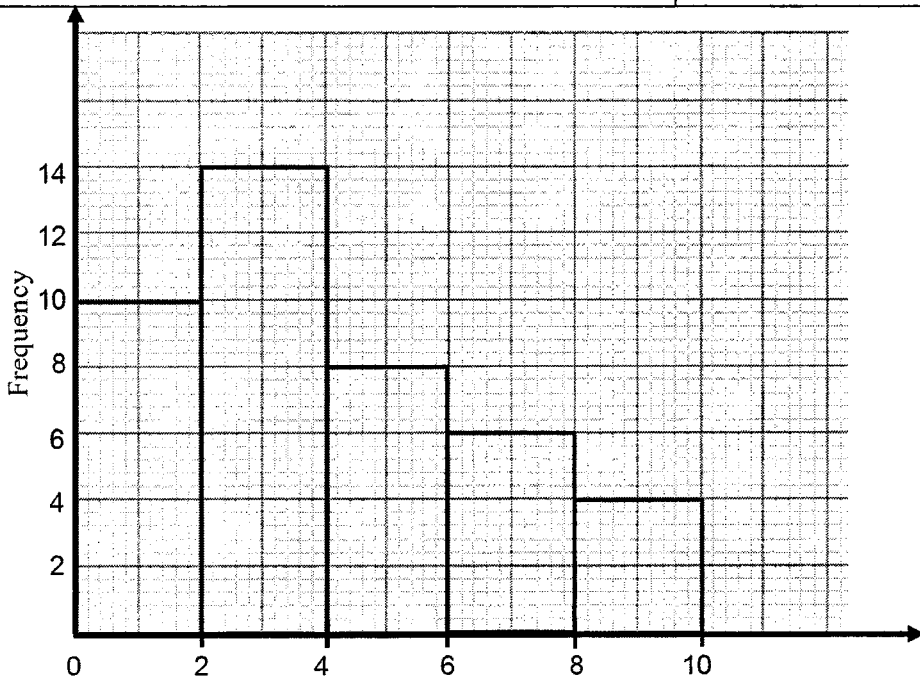
2G3 EOY Paper 1
2025 Marking
Scheme

1	(a)	$\frac{2}{10}, 0.2, \sqrt{0.2}, 2, \pi$	B1
	(b)	$\sqrt{0.2}, \pi$	B1
2		<u>Boys (old) : Girls : Boys (New)</u> 3 : 4 5 : 4 15 : 20 : 16 1 unit ----- 2 students 35 units ----- 70 students	M1 A1
3	(a)	$5 - x < \frac{11}{2}$ $-x < \frac{1}{2}$ $x > -\frac{1}{2}$	M1 (for combining 5 and $\frac{11}{2}$) A1
	(b)	2	B1
4		12 workers ----- 10 days 120 workers ----- 1 day 15 workers ----- 8 days 15 - 12 = 3	M1 A1
5	(a)	$y = 2x^2 + 5x + 3$ For A and B, sub in $y = 0$ $0 = 2x^2 + 5x + 3$ $0 = (2x + 3)(x + 1)$ $x = -1.5$ or $x = -1$ For C, sub in $x = 0$ $y = 2(0)^2 + 5(0) + 3$ $y = 3$ $A = (-1.5, 0), \quad B = (-1, 0), \quad C = (0, 3)$	B3
	(b)	$x = \frac{-1 + (-1.5)}{2} = -1.25$ $x = -1.25$	A1 (must put x)

2

	(c)	Sub in $x = -1.25$ $y = 2(-1.25)^2 + 5(-1.25) + 3$ $= -0.125$ I do not agree with her as lowest y value is -0.125 and not -0.1 .	A1
6	(a)	$x^2 - 121 = (x + 11)(x - 11)$	A1
	(b)	$x^2 - 121 = 779$ $x^2 = 900$ $x = 30$ or $x = -30$ (reject) $779 = (x + 11)(x - 11)$ $779 = (30 + 11)(30 - 11)$ The factors are 41 and 19.	M1 A1
7		$5ab = 17$ $ab = 3.4$ $(a - b)^2 = a^2 - 2ab + b^2$ $= 15 - 2(3.4)$ $= 8.2$	M1 A1
8	(a)	Volume of cone = volume of sphere $\frac{1}{3}\pi r^2 h = \frac{4}{3}\pi r^3$ $\pi r^2 h = 4\pi r^3$ $h = 4r$	M1 A1
	(b)	By Pythagoras Theorem, $(4r)^2 + r^2 = 5.4^2$ $16^2 + r^2 = 5.4^2$ $17r^2 = 29.16$ $r^2 = \frac{29.16}{17}$ $= 1.30969$ $= 1.31$ (3sf)	M1 A1
	(c)	Total surface area $= \pi r l + 5\pi r^2$ $= \pi \times 1.30969 \times 5.4 + 5 \times \pi \times 1.30969^2$ $= 49.162$ Number of tins $= 10(49.162) \div 30$ $= 16.387 = 17$ tins	M1 (allow follow through for incorrect radius) M1 A1

3

9	(a)	$\text{Mean} = \frac{1(10)+3(14)+5(8)+7(6)+9(4)}{10+14+8+6+4}$ $= 4.05 \text{ or } 4\frac{1}{21}$	M1 A1
	(b)	 Frequency Number of books (x) M1 – bars correctly drawn	
	(c)	$2 < x \leq 4$	B1
	(d)	$P(\text{student reads more than 6 books}) = \frac{6+4}{10+14+8+6+4}$ $= \frac{5}{21}$	B1

4

10	(a)	$y + 2x = 0$ $y = -2x$ ----- equation 1 $2y = x + 5$ ----- equation 2 Sub equation 1 into equation 2 $2(-2x) = x + 5$ $-4x = x + 5$ $-5x = 5$ $x = -1$ Sub $x = -1$ into equation 1 $y = -2(-1)$ $y = 2$ $C = (-1, 2)$ (shown)	M1 A1 A1
	(b)	At A, $y = 0$ Sub $y = 0$ into $2y = x + 5$ $2(0) = x + 5$ $x = -5$ Area of $OBA = \frac{1}{2} \times OA \times \text{height}$ $= \frac{1}{2} \times 5 \times 2$ $= 5 \text{ units}^2$	M1 A1
11	(a)	3 cm^2 represents 75 km^2 1 cm^2 represents 25 km^2 1 cm represents 5 km	M1 A1
	(b)	8.1 cm represents 40.5 km Speed = Distance $\div$ time $= 40.5 \div \frac{3}{4}$ $= 54 \text{ km/h}$	M1 A1



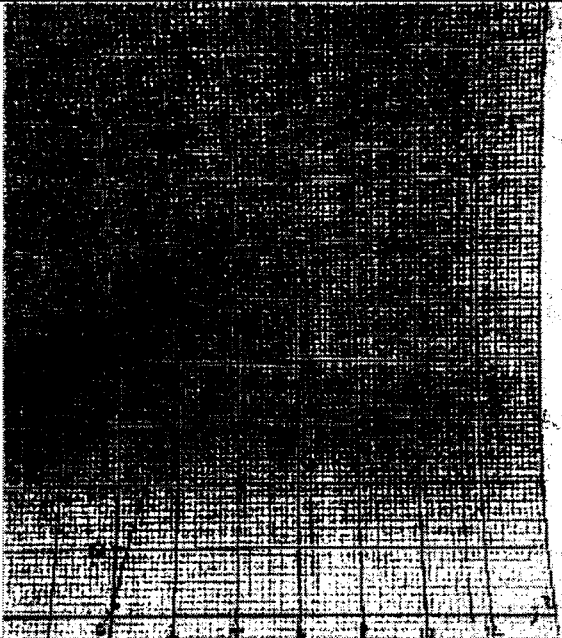
Queensway End-Of-Year Exams 2025 Marking Scheme Paper 2

Mathematics – Sec 2G3

No	Essential Steps	Marking
1	$20x + (12 - x)(5) < 160$ $20x + 60 - 5x < 160$ $15x < 100$ $x < 6\frac{2}{3}$ 6	 M1 A1 A1
2	$\frac{1}{4} = \frac{9-x}{24-x}$ $24-x = 4(9-x)$ $24-x = 36-4x$ $3x = 12$ $x = 4$	 M1 A1
3a	$(2x+3y)(x+2y)$ $= 2x^2 + 4xy + 3xy + 6y^2$ $= 2x^2 + 7xy + 6y^2$	 M1 A1
3b	$3x^2 - (x+y)(x-y)$ $= 3x^2 - (x^2 - y^2)$ $= 2x^2 + y^2$	 M1 A1
4a	$\frac{a(a-b)}{2b} \times \frac{2a}{(a-b)^2}$ $= \frac{a^2}{b(a-b)}$	 M1 (change sign) A1
4b	$\frac{3}{(x-3)(x+3)} + \frac{1}{3-x}$ $= \frac{3}{(x-3)(x+3)} - \frac{1}{x-3}$ $= \frac{3}{(x-3)(x+3)} - \frac{x+3}{(x+3)(x-3)}$ $= \frac{-x}{(x-3)(x+3)}$ $= -\frac{x}{(x-3)(x+3)}$	 M1 for change sign M1 for same denominator A1 (Accept $-\frac{x}{(x-3)(x+3)}$)

5a	$y = k\sqrt{x}$ $10 = k(5)$ $k = 2$ $y = 2\sqrt{x}$	M1 A1
5b	$y = 2\sqrt{x}$ $6 = \sqrt{x}$ $x = 36$	A1
5c	$y = 2\sqrt{x}$ $y = 2(8)$ $y = 16$	A1
6	$A = 2b(d^2 - 3)$ $\frac{A}{2b} = d^2 - 3$ $d^2 = \frac{A}{2b} + 3$ $d = \pm \sqrt{\frac{A}{2b} + 3}$	M1 M1 A1
7a	$(2x+5)^2 = (x+3)^2 + (x+4)^2$ $4x^2 + 25 + 20x = x^2 + 9 + 6x + x^2 + 16 + 8x$ $2x^2 + 6x = 0$	M1 M1 A1
7b	$2x^2 + 6x = 0$ $2x(x+3) = 0$ $2x = 0$ or $x = -3$ $x = 0$	M1 A1
7c	$x = -3$ is rejected as the sides of the triangles will be negative which is not possible.	B1
7d	6 cm^2	B1
8a	30%	B1
8b	72 marks	B1
8c	76.5 marks	B1
8d	Median of A = 69.5 marks Median of B = 76.5 marks Class B did better as the median of class B is 76.5 marks which is higher than median of class A of 69.5 marks.	M1 (supporting with numeric values) A1
8e	Mode will increase by 2 marks. Median will increase by 2 marks.	B1 B1

9a	Distance of A from port $= 550 \times 3$ $= 1650\text{km}$ Distance of Plane B from port $= 420 \times 3$ $= 1260\text{km}$ Let the distance apart of the two ships be c By Pythagoras' Theorem $c^2 = 1650^2 + 1260^2$ $c = 2080\text{km}$	M1 (finding distance) M1 (finding distance) A1 If students final answer is 2076, overall deduct 1m under accuracy.
9bi	$\tan 35^\circ = \frac{3.6 - 1.6}{BM}$ $BM = 2.85629$ $BM = 2.86\text{cm}$	M1 A1
9bii	$\angle BAM = 180^\circ - 90^\circ - 35^\circ$ (angle sum of triangle) $= 55^\circ$ $\cos \angle DAN = \frac{3.6}{4.5}$ $\angle DAN = 36.8699$ $\angle NAB = 55^\circ - 36.8699^\circ$ $= 18.1301^\circ$ $= 18.1^\circ$	M1 M1 A1
9biii	$\tan 36.8699^\circ = \frac{ND}{3.6}$ $ND = 2.7000$ $2.85629 - 2.7000 = 0.156\text{ cm}$	M1 A1

	Or $ND = \sqrt{4.5^2 - 3.6^2}$ $= 2.7$ $2.85629 - 2.7 = 0.156 \text{ cm}$	M1 A1
10a	Area $= (x)\left(\frac{36-x-x}{2}\right)$ $= (x)(18-x)$ $= 18x - x^2$	B1 (show evidence of working)
10bi	72	B1
10bii		B2 for all points plotted B1 for line drawn with labelling
10biii	6.4m or 11.4m	B2 (± 0.2) Actual: 6.55m or 11.45m
11a	Total dinner cost = 104 Total amount paid $= 104 \times \frac{110}{100} \times \frac{109}{100}$ $= \$124.70$	M1 (finding total dinner cost exclude GST and service charge) A1
11b	Total adult cost (including senior) $= 45 \times 8 + 45 \times 2 \times \frac{70}{100}$ $= \$423$	M1

