

PAPER

1

SAMPLE



MATHEMATICS

**DO NOT OPEN THIS BOOKLET
UNTIL INSTRUCTED.**

STUDENT'S NAME:

Read the instructions on the **ANSWER SHEET** and fill in your **NAME, SCHOOL** and **OTHER INFORMATION**.

Use a pencil. Do **NOT** use a coloured pencil or a pen.

Rub out any mistakes completely.

You **MUST** record your answers on the **ANSWER SHEET**.

Mark only **ONE** answer for each question.

Your score will be the number of correct answers.

Marks are **NOT** deducted for incorrect answers.

There are **4 MULTIPLE-CHOICE QUESTIONS** (1–4).

Use the information provided to choose the **BEST** answer from the four possible options.

On your **ANSWER SHEET** fill in the oval that matches your answer.

There is **1 FREE-RESPONSE QUESTION** (5).

Write your answer in the boxes provided on the **ANSWER SHEET** and fill in the ovals that match your answer.

You may use a ruler and spare paper.

A **CALCULATOR** is required.

1. Terry is in Station Rd and is going to a party in West St, which runs parallel to Station Rd. The angles between some of the streets are shown.



NOT TO SCALE

Which of these statements must be true?

- (A) $w = y$
- (B) $x = w$
- (C) $y = x$
- (D) $z = y$

2. A company uses this formula to predict total profit P based on the number of products x sold.

$$P = n^2 + 60n - 4000$$

How many products are sold if there is zero profit?

- (A) 0
- (B) 40
- (C) 100
- (D) 4000

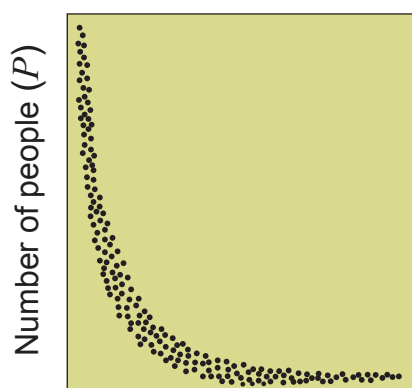
3.

$$7.101 \div (3.019 - 0.798)$$

What is the value of this expression correct to three significant figures?

- (A) 3.19
- (B) 3.197
- (C) 3.20
- (D) 3.200

4. This scatter diagram shows the relationship between the air temperature T and the number of people P visiting a beachside shopping centre.



Air temperature (T)

Which formula could describe the relationship between the air temperature and the number of people?

- (A) $P = 5T^2$
- (B) $P = -5T$
- (C) $P = -\frac{T}{5}$
- (D) $P = \frac{5}{T}$

QUESTION 5 IS FREE RESPONSE.

Write your answer in the boxes provided on the ANSWER SHEET and fill in the ovals that match your answer.

5. Mario knows that a number is divisible by nine if the sum of its digits is divisible by nine.

He has eight cards with the digits 1 to 8 written on them as shown.



Mario selects three of these cards to make a three-digit number that is divisible by nine. He then replaces these three cards and repeats this selection procedure to select different three-digit numbers divisible by nine.

How many **even** three-digit numbers is it possible for him to find in this way?

END OF PAPER

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THE FOLLOWING YEAR LEVELS SHOULD SIT THIS PAPER:

Australia	Year 11
Brunei	Pre-University 1
Hong Kong	Form 5
Indian Subcontinent¹	Class 11
Indonesia	Year 12
Malaysia	Form 5 & Lower 6
Middle East²	Class 11
New Zealand/Pacific³	Year 12
Singapore	Secondary 4 & 5
Southern Africa⁴	Grade 11

1 Indian Subcontinent Region: India, Sri Lanka, Nepal, Bhutan and Bangladesh.

2 Middle East Region: United Arab Emirates, Qatar, Kuwait, Saudi Arabia, Egypt, Bahrain, Oman, Turkey, Lebanon, Tunisia, Morocco, Libya, Algeria and Jordan.

3 Pacific Region: Vanuatu, Papua New Guinea and Fiji.

4 Southern Africa Region: South Africa, Botswana, Lesotho, Swaziland, Zimbabwe and Namibia.



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HOW TO FILL OUT THIS SHEET:



USE A PENCIL

- Print your details clearly in the boxes provided.
- Make sure you fill in only one oval in each column.
- Rub out all mistakes completely.
- Do not use a coloured pencil or pen.

EXAMPLE 1: Debbie Bach

FIRST NAME

LAST NAME

DEBBIE

D	E	B	B	E
A	A		A	A
B	B			B
C	C		C	C
D	D			
E		E		

BACH

B	A	C	H	
A			A	A
			B	B
C	C		C	C
D	D			
E		E		

EXAMPLE 2: Chan Ai Beng

FIRST NAME

LAST NAME

EXAMPLE 3: Jamal bin Abas

FIRST NAME

LAST NAME

J	A	M	A	L	B	I	N
A		A		A	A	A	
B	B	B	B	B	B	B	
C	C	C	C	C	C	C	
D	D	D	D	D	D	D	
E	E	E	E	E	E	E	

A	B	A	S
	A		A
B		B	E
C	C	C	
D	D	D	
E	E	E	

FIRST NAME to appear on certificate

[illegible]

LAST NAME to appear on certificate

[illegible]

Are you male or female?

 Male

 Female

Does anyone in your home usually speak a language other than English?

☐ Yes

☐ No

School name:

Town / suburb:

Today's date:

Postcode:

DATE OF BIRTH

Day Month Year

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

STUDENT ID

(optional)

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

CLASS

(optional)

	(A)	(K)
	(B)	(L)
	(C)	(M)
	(D)	(N)
	(E)	(O)
	(F)	(P)
	(G)	(Q)
	(H)	(R)
	(I)	(S)
	(J)	(T)

TO ANSWER THE QUESTIONS

MULTIPLE CHOICE

Questions 1 to 4

Example: $4 + 6 =$

- (A) 2
- (B) 9
- (C) 10
- (D) 24

The answer is 10, so fill in the oval ☒ C , as shown.

☐ A ☐ B ☒ C ☐ D

START

- | | | | | |
|---|-------------------------|-------------------------|-------------------------|-------------------------|
| 1 | ☐ A | ☐ B | ☐ C | ☐ D |
| 2 | ☐ A | ☐ B | ☐ C | ☐ D |
| 3 | ☐ A | ☐ B | ☐ C | ☐ D |
| 4 | ☐ A | ☐ B | ☐ C | ☐ D |

FREE RESPONSE

Question 5

Example: $6 + 6 =$

- The answer is 12, so WRITE your answer in the boxes.
- Write only ONE digit in each box, as shown, and fill in the correct ovals, as shown.

	1	2
☐ 0	☐ 0	☐ 0
☐ 1	☒ 1	☐ 1
☐ 2	☐ 2	☒ 2
☐ 3	☐ 3	☐ 3
☐ 4	☐ 4	☐ 4
☐ 5	☐ 5	☐ 5
☐ 6	☐ 6	☐ 6
☐ 7	☐ 7	☐ 7
☐ 8	☐ 8	☐ 8
☐ 9	☐ 9	☐ 9



USE A PENCIL

DO NOT USE A COLOURED PENCIL OR PEN

SAMPLE

5

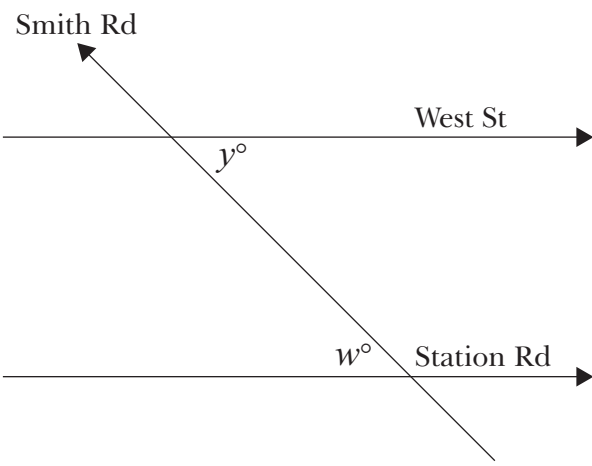
☐ 0	☐ 0	☐ 0
☐ 1	☐ 1	☐ 1
☐ 2	☐ 2	☐ 2
☐ 3	☐ 3	☐ 3
☐ 4	☐ 4	☐ 4
☐ 5	☐ 5	☐ 5
☐ 6	☐ 6	☐ 6
☐ 7	☐ 7	☐ 7
☐ 8	☐ 8	☐ 8
☐ 9	☐ 9	☐ 9



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UNSW Global
AUSTRALIA

QUESTION	KEY	SOLUTION	STRAND	LEVEL OF DIFFICULTY
1	A	 Station Rd and West St are parallel, while Smith Rd crosses them. This results in angle y and angle w, that are alternate, being equal. Therefore, statement A is the correct statement.	Space and Geometry	Easy
2	B	This is a quadratic equation. It factorises to $(n + 100)(n - 40) = 0$ The solutions for this equation are $n = -100$ and $n = 40$. As n is the number of products, it cannot be negative. Hence, $n = 40$ is the correct solution. Alternatively, substituting the options will show that $n = 40$ gives $P = 0$.	Algebra and Patterns	Easy
3	C	The result of the calculation is 3.197208465. This number rounded to three significant figures is 3.20.	Number and Arithmetic	Medium
4	D	The diagram shows an inverse relation between the air temperature, T, and the number of people, P. As T increases, P decreases. Note that the relation is not linear. Option A is a quadratic equation that gives a parabola when graphed, where the relation is positive (considering positive values of T). This does not describe the given data. Options B and C are both linear equations that give straight lines sloping downwards when graphed. Again, these do not describe the given data. Option D is an equation that gives a hyperbola when graphed. For small values of T, P has a large value. As the values of T increase, the values of P decrease. This correctly describes the given data.	Chance and Data	Medium

5	18	Numbers to be considered are numbers with a digit sum that is divisible by 9. So the sum of the digits must be multiples of 9: 9, 18, 27... The highest digit sum that can be obtained from the numbers 1 to 8 is $8 + 7 + 6 = 21$. So only numbers whose digits sum to 9 or 18 need to be considered. The numbers must be even, so they must be of the form: $_ _ 2$, $_ _ 4$, $_ _ 6$ and $_ _ 8$. Take for example $_ _ 2$. To make this number's digits sum to 9, the first two digits must sum to 7. We can therefore have 342, or 432. We cannot have 252 or 522 as the number 2 cannot be used twice. This table summarises the solutions. <table><tr><th rowspan="2">Possible numbers</th><th>Sum to 9</th><th rowspan="2">Solutions</th><th>Sum to 18</th><th rowspan="2">Solutions</th></tr><tr><th>First two digits sum to:</th><th>First two digits sum to:</th></tr><tr><td rowspan="4">$_ _ 2$</td><td rowspan="4">7</td><td>432</td><td rowspan="4">16</td><td rowspan="4">-</td></tr><tr><td>342</td></tr><tr><td>162</td></tr><tr><td>612</td></tr><tr><td rowspan="2">$_ _ 4$</td><td rowspan="2">5</td><td>234</td><td rowspan="2">14</td><td>684</td></tr><tr><td>324</td><td>864</td></tr><tr><td rowspan="3">$_ _ 6$</td><td rowspan="3">3</td><td>126</td><td rowspan="4">12</td><td>486</td></tr><tr><td rowspan="2">216</td><td>846</td></tr><tr><td>756</td></tr><tr><td rowspan="4">$_ _ 8$</td><td rowspan="4">1</td><td rowspan="4">-</td><td>576</td></tr><tr><td rowspan="3">10</td><td>468</td></tr><tr><td>648</td></tr><tr><td>738</td></tr><tr><td></td><td></td><td></td><td></td><td>378</td></tr></table> Therefore there are 18 possible numbers that Mario can find. Note: This is one possible method. The question can be solved using other methods.	Possible numbers	Sum to 9	Solutions	Sum to 18	Solutions	First two digits sum to:	First two digits sum to:	$_ _ 2$	7	432	16	-	342	162	612	$_ _ 4$	5	234	14	684	324	864	$_ _ 6$	3	126	12	486	216	846	756	$_ _ 8$	1	-	576	10	468	648	738					378	Chance and Data	Hard
Possible numbers	Sum to 9	Solutions		Sum to 18		Solutions																																									
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		324		864																																											
$_ _ 6$	3	126	12	486																																											
		216		846																																											
				756																																											
$_ _ 8$	1	-		576																																											
			10	468																																											
				648																																											
				738																																											
				378																																											

Level of difficulty refers to the expected level of difficulty for the question.

Easy	more than 70% of candidates will choose the correct option
Medium	about 50–70% of candidates will choose the correct option
Medium/Hard	about 30–50% of candidates will choose the correct option
Hard	less than 30% of candidates will choose the correct option