SPRINGFIELD SECONDARY SCHOOL

End-Of-Year Examination 2023

Sec 1 Normal Academic

STUDENT NAME	

CLASS		REGISTER NUMBER		

MATHEMATICS SYLLABUS A

4045

2 October 2023

1 hour 45 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

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

Section A
Answer **all** questions.

Section B
Answer **all** questions.

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

At the end of the examination, fasten all your work securely together.

For Examiner's Use	
Section A	/30
Section B	/30
Total	/60

Do not turn over this question paper until you are told to do so.

[Turn Over

Section A (30 marks)
Answer **all** the questions in this section.

1 **(a)** Evaluate $\dfrac{[0.53-(-5.7)]\times 5^3}{1.1-1.05}$.

Answer ..... [1]

(b) Give your answer to **part (a)** correct to nearest ten thousands.

Answer ..... [1]

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2 By writing each number correct to 1 significant figure, estimate the value of $\dfrac{2.53\times 515}{\sqrt{5(-24)+515}}$.

Answer ..... [2]

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3 Alex has two pieces of string.
The lengths of the two pieces of string are 120 cm and 225 cm respectively.
He wants to divide the two pieces of string into strips of equal length, without having any leftovers.

(a) What is the longest length of each strip of string Alex can obtain?

Answer ..... cm [2]

(b) Hence, how many strips of string will Alex obtain?

Answer ..... [1]

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4 The ratio of $a : b = 2 : 3$ and $b : c = 9 : 11$.

Find the ratio of $a : b : c$.

Answer ..... : ..... : ..... [2]

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5 **(a)** Simplify $5(3 - p) + 6(5p - 2)$.

Answer ..... [2]

(b) Hence, solve the equation $5(3 - p) + 6(5p - 2) = -122$.

Answer ..... [2]

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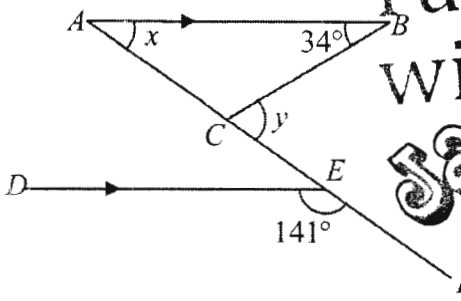
6 There are 1800 students in a school.
This is 12.5% more than last year.

Calculate the number of students in the school last year.

Answer ..... [2]

7



In the figure above, AB is parallel to DE and $ACEF$ is a straight line.

Stating reasons clearly, find the values of

(a) x,

Answer ..... [2]

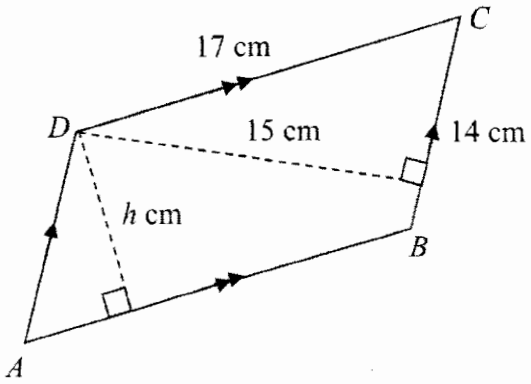
(b) y,

Answer ..... [1]

(c) reflex angle DEF.

Answer ..... [1]

8



The figure shows a parallelogram $ABCD$ where $BC = 14$ cm and $CD = 17$ cm. The perpendicular distance of D to BC is 15 cm and the perpendicular distance of D to AB is h cm.

Calculate

(a) the area of the parallelogram,

Answer ..... cm^2 [1]

(b) the value of h.

Answer $h =$ ..... [2]

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9 Write down an algebraic expression for the following statement.

Add $-8a + 3a^2$ to the **product** of $6a$ and $4a$.

Simplify the expression where possible.

Answer ..... [2]

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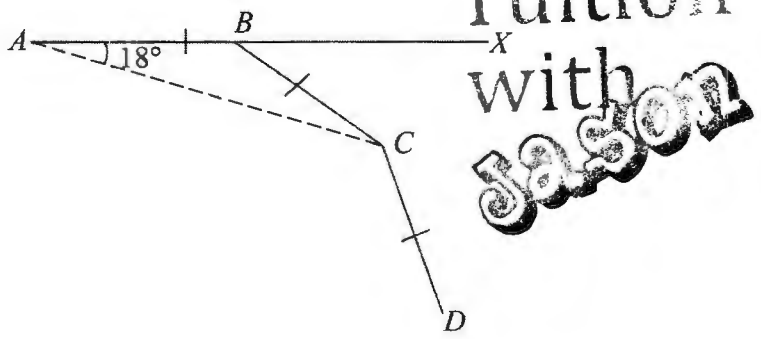
10 A car takes $5\frac{3}{4}$ hours to travel 480 km.

Calculate how far it can travel in 23 minutes.

Answer ..... km [3]

11



AB, *BC* and *CD* are adjacent sides of a 10–sided figure and $AB = BC = CD$.
Line *AB* is produced to *X* such that *ABX* is a straight line.
Angle *CAB* is 18°.

(a) Given that the ratio of angle *BCA* to angle *ACD* is 1 : 7, find angle *ACD*.

Answer Angle *ACD* = ... [1]

(b) Find the ratio of angle *ABC* to angle *CBX*.
Give your answer in its simplest form.

Answer ..... : ..... [2]

Section B (30 marks)
Answer **all** the questions in this section.

12 $36,\ \sqrt[3]{1},\ \sqrt{4},\ 0.\dot{7}\dot{1},\ 0.717$

(a) From the above list, write down

(i) the smallest prime number,

Answer ..... [1]

(ii) perfect square(s).

Answer ..... [2]

(b) Write the numbers in order of size, starting with the smallest.

Answer ....., ..., ..., ..., ... [2]
smallest largest

13 The first four terms of a sequence are 5, 12, 19, 26, ...

(a) Write down the n^{th} term in the sequence.

Answer ..... [1]

(b) Find the 100^{th} term in the sequence.

Answer ..... [1]

(c) Explain why 130 is not a term of the sequence.

Answer .....

.....

.....

..... [2]

14 The charges for photocopy and binding services by two companies are given in the table below.

	Company A	Company B
Photocopy service	2 cents per page	1.8 cents per page
Binding service	$1 per book	$1.50 per book

(a) Calculate the number of pages that can be photocopied with Company B for $8.10.

Answer ..... [2]

(b) A customer wants to photocopy 2500 pages and bind them into a book.

If she goes to Company B instead of Company A, calculate the savings she obtains.

Answer $..... [3]

15 **(a)** A rectangle measures $2^2 \times 5^2$ cm by $3^2 \times 5^2$ cm.

(i) Find the area of the rectangle.
Express your answer as a product of its prime factors.

Answer ..... cm^2 [2]

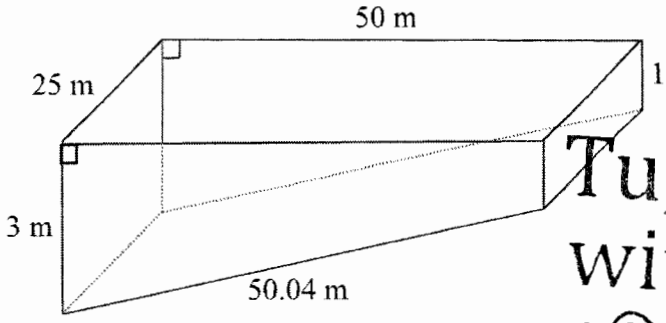
(ii) A square has the same area as the rectangle.
Find the length of a side of the square.

Answer ..... cm [2]

(b) If $x = 3, y = -1, z = -4$, find the value of $x(y-1)+z^2x$.

Answer ..... [2]

16 A swimming pool, 50 m long by 25 m wide is 1 m deep at the swallow end and 3 m deep at the other end. The pool is filled with water to the brim.



Find

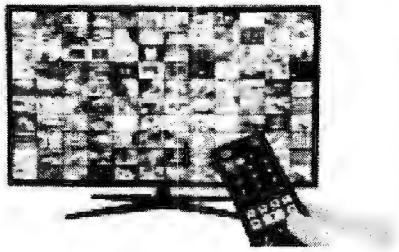
(a) the volume of the water in the pool,

Answer ..... m^3 [2]

(b) the total surface area of the pool which is in contact with water.

Answer ..... m^2 [3]

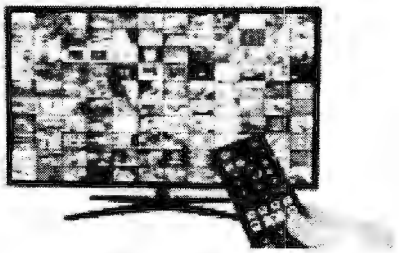
17 Two stores advertise the same LED television set during the Great Singapore Sale. The price of the LED television is $1500.



Store *A*

$1500 + 8% GST*

*GST: Goods and Service Tax



Store *B*

- 15% deposit
  Plus 12 monthly instalments of $120
- Price includes 8% GST*

(a) Calculate the price of the television set in Store *B*.

Answer $..... [3]

(b) Which store sells the television set at a lower price?
Justify your answer.

Answer .....

..... [2]

End of Paper

End of Year Examination 2023
Secondary 1 N(A) Mark Scheme

P - Deduct 1 mark overall for presentation
A - Deduct 1 mark overall for accuracy

Qn	Solution	Marks	Remarks	AO
	SECTION A			
1(a)	15575	B1		AO1
1(b)	20 000	B1	√ their (a)	AO1
2	$\frac{3\times500}{\sqrt{5(-20)+500}}=75$	M1, A1		AO1
3(a)	$120=2^3\times3\times5$ $225=3^2\times5^2$ HCF $=3\times5$ $=15$ Longest length = 15 cm	M1 A1	Award M1 for prime factorisation of either 120 or 225	AO2
3(b)	$(120+225)\div15=23$	B1		AO2
4	$a:b=2:3$ $=6:9$ $b:c=9:11$ $a:b:c=6:9:11$	 M1 A1		AO1
5(a)	$5(3-p)+6(5p-2)=15-5p+30p-12$ $=3+25p$	M1 A1		AO1
5(b)	$5(3-p)+6(5p-2)=-122$ $3+25p=-122$ $25p=-125$ $p=-5$	 M1 A1		AO1

6	$\frac{100}{112.5}\times 1800 = 1600$	M1, A1	Accept answer by ratio method	AO2
7(a)	$\angle x = \angle DEC$ (alternate angles, parallel lines) $= 180° - 141°$ (adjacent angles on a straight line) $= 39°$ $x = 39$	M1 A1	Minus 1 mark for missing or incorrect reasons	AO2
7(b)	$\angle y = \angle x + 34°$ (exterior angles of triangle) $= 39° + 34°$ $= 73°$ $y = 73$	B1		AO1
7(c)	Reflex angle $DEF = 360° - 141°$ $= 219°$	B1		AO1
8(a)	$14 \times 15 = 210$ cm^2	B1		AO1
8(b)	$17 \times h = 210$ cm^2 $h = 210 \div 17$ $= 12.4$ cm (3 s.f.)	M1 A1	Accept $12\frac{6}{17}$ cm	AO2
9	$(6a \times 4a) + (-8a + 3a^2) = 24a^2 - 8a + 3a^2$ $= 27a^2 - 8a$	M1 A1		AO1
10	$5\frac{3}{4}$ hours = 345 minutes 345 minutes ☮ 480 km 1 minute ☮ $\frac{480}{345} = \frac{32}{23}$ km 23 minutes ☮ $\frac{32}{23} \times 23 = 32$ km	M1 M1, A1	Convert hr to mins Accept method using Distance-Speed-Time formula	AO2

11(a)	1 unit ≙ 18° 7 units ≙ $18 \times 7 = 126°$	B1		AO1
11(b)	Angle $ABC = 180° - 18° - 18°$ (angle sum of triangle) $= 144°$ Angle $CBX = 18° + 18°$ $= 36°$ angle ABC : angle $CBX = 144 : 36$ $= 4 : 1$	M1 A1	for either angle ABC or angle CBX	AO2

SECTION B				
12(a)(i)	$\sqrt{4}$	B1		AO1
12(a)(ii)	$36,\ \sqrt[3]{1}$	B1, B1		AO1
12(b)	$0.717,\ 0.\dot{7}\dot{1},\ \sqrt[3]{1},\ \sqrt{4},\ 36$	B2, 1, 0		AO1
13(a)	$T_n = 5+7(n-1)$ $= 7n-2$	B1		AO2
13(b)	$T_{100} = 5+7(100-1)$ $= 698$	B1		AO1
13(c)	If 130 is a term in the sequence, $7n-2=130$ $7n=132$ $n=18\frac{6}{7}$ Since n is not a positive integer, then 130 is not a term of the sequence.	M1 A1	Must use **positive integer** in explanation	AO3
14(a)	$\$8.10 \div \$0.018 = 450$ pages	M1, A1		AO1
14(b)	**Company A** Total cost $= (2500\times 0.02)+1$ $= \$51$ **Company B** Total cost $= (2500\times 0.018)+1.50$ $= \$46.50$ Amount saved $= 51-46.50$ $= \$4.50$	M1 M1 A1		AO2
15(a)(i)	$2^2\times 5^2\times 3^2\times 5^2$ $= 2^2\times 3^2\times 5^4$	M1 A1		AO2
15(a)(ii)	$\sqrt{2^2\times 3^2\times 5^4}$ $= 2\times 3\times 5^2$ $= 150$ cm (shown)	 M1 A1		AO2
15(b)	$3(-1-1)+(-4)^2(3) = 42$	M1, A1	Or B2	AO1

16(a)	$\left[\frac{1}{2}\times(3+1)\times 50\right]\times 25$ $= 2500\ \text{m}^3$	M1 A1		AO1
16(b)	$\left[(3+50+1+50.04)\times 25\right]+2\left[\frac{1}{2}\times(3+1)\times 50\right]-(50\times 25)$ $= 1551\ \text{m}^2$	M2 A1	Award M1 for any 2	AO1
17(a)	$\text{Deposit} = \frac{15}{100}\times 1500$ $= \$225$ $\text{Price of LCD TV in Store } B = \$225+(12\times\$120)$ $= \$1665$	M1 M1 A1		AO2
17(b)	**Store A** $\text{Price of LCD TV} = \frac{108}{100}\times\$1500$ $= \$1620$ **Store B** Price of LCD TV = \$1665 Store *A* offers better deal since the price of the TV set is lower at Store *A*.	M1 A1		AO3