

Candidate Name

Centre Number

Candidate Number



ZIMBABWE SCHOOL EXAMINATIONS COUNCIL
General Certificate of Education Ordinary Level

MATHEMATICS
PAPER 1

4004/1

NOVEMBER 2021 SESSION 2 hours 30 minutes

Candidates answer on the question paper

Additional materials:
Mathematical Instruments

Allow candidates 5 minutes to count pages before the examination.

This booklet should not be punched or stapled and pages should not be removed.

Time 2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your Name, Centre number and Candidate number in the spaces at the top of this page.
Write your centre and candidate number in the box on the top right corner of every page of this paper.

Check that all the pages are in the booklet and ask the invigilator for a replacement if there are duplicate or missing pages.

Answer **all** questions.

Write your answers in the spaces provided on the question paper using **black** or **blue** pens.

If working is needed for any question, it must be shown in the space below that question.

Omission of essential working will result in loss of marks.

Decimal answers which are not exact should be given to three significant figures unless stated otherwise.

Mathematical tables, slide rules and calculators should **not** be brought into the examination room.

INFORMATION FOR CANDIDATES

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

This question paper consists of 25 printed pages and 3 blank page.

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Candidate Name

2

Centre Number

Candidate Number

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Answer all questions

NEITHER MATHEMATICAL TABLES NOR SLIDE RULE NOR CALCULATORS
MAY BE USED IN THIS PAPER

1 Express 30,098

(a) correct to the nearest tenth,

Answer (a)

[1]

(b) correct to **four** significant figures.

Answer (b)

[1]

(c) in standard form.

Answer (c)

[1]

2 (a) Express $4\frac{2}{3}$ as a recurring decimal.

Answer (a)

[1]



Candidate Name

3

Centre Number

Candidate Number

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(b)

Find the value of $10 - 10 \div 2 + 2 \times 2$.

Answer (b)

[2]

3

(a)

Write down the next term in the sequence 2; 3; 5; 8; 12;

Answer (a)

[1]

Turn over



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4

Candidate Name	Centre Number	Candidate Number

- (b) Simplify $\frac{20 - 8}{20 + 8}$, giving your answer as a common fraction in its simplest form.

Answer (b)

[2]

- 4 (a) (i) List the prime numbers between 14 and 20,

Answer (a)(i)

[1]

- (ii) Write the number 801 008 in words.

Answer (a)(ii) in answer space

[1]

- (b) Express 6,65 hours in hours and minutes.

Answer (b)

[1]



Candidate Name

Centre Number

Candidate Number

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- 5 (a) List the first three values of x such that $1 \leq x \leq 4$ where x is a natural number.

Answer (a)

[2]

- (b) Express 270 as a product of its prime factors in index form.

Answer (b)

[2]

- 6 (a) If the bearing of P from Q is 054° , find the bearing of Q from P.

Answer (a)

[1]

Turn over



6

Candidate Name	Centre Number	Candidate Number

- (b) Calculate the number of sides of a regular polygon with interior angles of 162° each.

Answer (b)

[2]

- 7 Express $\frac{1}{x^2 - 1} - \frac{1}{1 + x}$ as a single fraction in its simplest form.

Answer

[3]



Candidate Name

7

Centre Number

Candidate Number

--	--	--

8

(a)

Write down the largest four-digit number in base 5.

Answer (a)

[1]

(b)

Convert 111_8 to a number in base 7.

Answer (b)

[2]

[Turn over



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Candidate Name

Centre Number

Candidate Number

--	--	--

9 Factorise completely $x^2(y+1) - y - 1$.

Answer

10 Evaluate

[3]

(a) $\log_4 64,$

Answer (a)

[1]



Candidate Name

9

Centre Number

Candidate Number

--	--	--

(b) $\frac{\log 8}{\log 16}$

Answer (b)

[2]

11 Solve the simultaneous equations:

$$\begin{aligned} 2x + y &= 4 \\ 5y - 4x &= 13 \end{aligned}$$

Answer

[3]



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[Turn over

Candidate Name

Centre Number

Candidate Number

--	--	--

- 12** For the expressions $10(x + 1)$ and $8(x + 1)^2$,
find the

(a) H.C.F.

Answer(a)

[1]

(b) L.C.M.

Answer (b)

[2]



Candidate Name

11

Centre Number

Candidate Number

--	--	--

- 13 A triangle has sides of lengths 5 cm, 8 cm and 12 cm.
Find the cosine of the smallest angle as a common fraction in its simplest form.

Answer

[3]

- 14 (a) Solve the equation $5^x = 125$.

Answer (a)

[2]

[Turn over



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Candidate Name

Centre Number

Candidate Number

--	--	--

(b) Simplify $\left(\frac{98}{32}\right)^{-\frac{1}{2}}$.

Answer (b)

[2]

15 Given that $-2 \leq x \leq 5$ and $3 \leq y \leq 10$,
calculate the

(a) greatest possible value of $y^2 - x^2$,

Answer (a)

[2]

Candidate Name

13

Centre Number

Candidate Number

--	--	--

- (b) least possible value of x //

Answer (b)

[2]

- 16 (a) Solve the simultaneous inequalities $2x - 6 \leq 4x < 10 - x$.
Leave the answer in the form $a \leq x < b$, where a and b are integers.

Answer (a)

[3]

[Turn over



Candidate Name

Centre Number

Candidate Number

--	--	--

- (b) Represent the solution to part (a) on a number line.

Answer (b)

[1]

- 17 (a) Given that $v^2 = u^2 + 2as$,
make a the subject of the formula,

Answer (a)

- (b) Find a when $s = 5$, $u = 2$ and $v = 2$.

[2]

Answer (b)

[2]



Candidate Name

15

Centre Number

Candidate Number

--	--	--

18

D varies jointly as S and T.

- (a) Find an equation connecting D, S, T and a constant k .

Answer (a)

[1]

- (b) Find the value of k given that $D = 24$ when $S = 4$ and $T = 2$.

Answer (b)

[1]

- (c) Find the value of T given that $D = 50$ and $S = 10$ using the value of k in (b) above.

Answer (c)

[2]

Turn over



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- 19 The universal set ξ has subsets A and B such that
 $n(\xi) = 45$, $n(A) = 25$, $n(A' \cap B) = 9$ and $n(A \cap B) = n(A \cup B)'$.

(a) Show this information on a Venn diagram.

Answer (a) on the diagram

[3]

(b) Find $n(B)$.

Answer (b)

[1]

- 20 Given that $f(x) = \frac{3}{x+2}$, $x \neq -2$,

find

(a) $f(-1)$.

Answer (a)

[1]



Candidate Name

17

Centre Number

Candidate Number

- (b) the value of x for which $f(x) = -\frac{3}{4}$

Answer (b)

[3]

[Turn over]



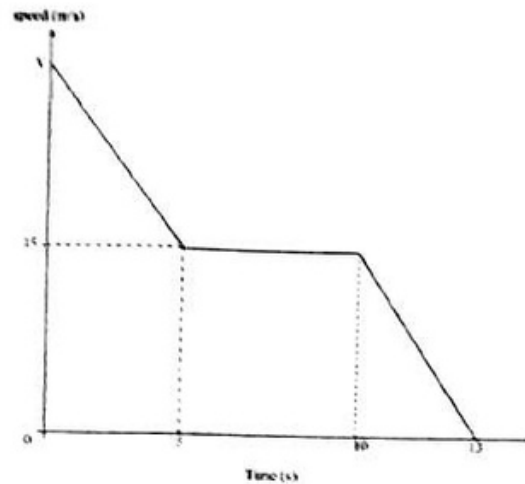
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21



The diagram above shows a speed - time graph of a moving object.
The object decelerates uniformly at 3 m/s^2 from a speed of $V \text{ m/s}$ to a speed of 15 m/s in 5 seconds.
It maintains the speed of 15 m/s for a further 5 seconds.
It then decelerates uniformly until it comes to rest after 3 seconds.
Calculate

(a) V ,

Answer (a)

[2]

Candidate Name

19

Centre Number

Candidate Number

- (b) the deceleration in the last 3 seconds.

Answer (b)

[1]

- (c) the distance travelled in the last 8 seconds.

Answer (c)

[2]

- 22 (a) By selling an article for S20, 00 a dealer made a profit of 25%.
Calculate the cost price of the article.

Answer (a)

[2]

- (b) Given that $\frac{7t - s}{2} = \frac{s - 5t}{3}$,
find the ratio $t : s$

Answer (b)

[3]

over



Candidate Name	20 Centre Number	Candidate Number

- 23 A straight line, l passes through the origin and the point $(1;2)$.
Find the

(a) gradient of line l .

Answer (a)

(b) equation of the line l .

[1]

Answer (b)

[2]



Candidate Name

21

Centre Number

Candidate Number

- (c) equation of the straight line through point $(0, -1)$ which is parallel to line l .

Answer (c)

[2]

24 (a)

On a map the distance between point A and point B is 10 cm.
The actual distance is $2\frac{1}{2}$ km.

Find the scale on the map, giving the answer in the form 1:n.

Answer (a)

[2]



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Candidate Name

Centre Number

Candidate Number

--	--	--

(b) Calculate the actual

(i) distance, in metres, between 2 places which are 3 cm apart on the map.

Answer (b)(i)

[1]

(ii) area in km^2 , represented by an area of 8 cm^2 on the map.

Answer (b)(ii)

[2]



25

Given that

$$\vec{OA} = \begin{pmatrix} -2 \\ 1 \end{pmatrix} \text{ and } \vec{OB} = \begin{pmatrix} 1 \\ -2 \end{pmatrix}, \text{ where } O \text{ is the origin.}$$

find

(a) \vec{AB}

Answer (a)

[2]

(b)

$|\vec{AB}|$ leaving the answer in surd form.

Answer (b)

[2]

turn over



Candidate Name

24

Centre Number

Candidate Number

--	--	--

(c) \vec{OM} , where M is the midpoint of AB.

Answer (c)

[2]

26 Given that matrix $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ and matrix $C = \begin{pmatrix} 1 & -4 \\ -2 & 3 \end{pmatrix}$,
find

(a) the determinant of matrix C,

Answer (a)

[2]



Candidate Name

25

Centre Number

Candidate Number

(b) $A - 3C,$

Answer (b)

[2]

(c) matrix B if $B = A \begin{pmatrix} 5 \\ 6 \end{pmatrix}$

Answer (c)

[2]

over



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