Candidate Name	Centre Number	Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

MATHEMATICS 4004/1

PAPER 1

JUNE 2023 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 26 printed pages and 2 blank pages.

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Candidate Name | Centre Number

Answer **all** questions.

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

1 Express

(a) 54,497 correct to the nearest tenth,

Answer (a) .....
[1]

(b) 0,000342 in standard form,

Answer (b) .....
[1]

(c) 478,367 correct to two significant figures.

Answer (c) .....
[1]

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2 Simplify, giving the answer as common fraction in its lowest terms

(a) $\frac{2}{7} + \frac{1}{3}$

Answer (a) .....

[1]

(b) $\frac{2}{5} \div 10$

Answer (b) .....

[1]

(c) $\frac{18}{35} \times \frac{14}{27}$

Answer (c) .....

[1]

3 **(a)** Evaluate giving the answers as exact decimals

(i) $0,\ 024 \times 0,3,$

Answer (a)(i) .....

[1]

(ii) $(0,\ 4)^3$.

Answer (a)(ii) .....

[1]

(b) Express $0,224$ as a percentage.

Answer (b) .....

[1]

4 The universal set $\xi = \{75;\ 76;\ 77;\ 78;\ 79;\ 80\}$

M and R are subsets ξ.

$M = \{even\ numbers\}$,

$R = \{multiples\ of\ 4\}$.

(a) (i) List elements of set M.

Answer (a)(i) .....

[1]

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(ii) List elements of set R.

Answer (a)(ii) .....

[1]

(b) Find $n\left(M^{1} \cup R\right)$.

Answer (b) .....

[1]

5 **(a)** Simplify $2(a-2)-4(a+3)$

Answer (a) .....

[1]

(b) Express $\frac{3}{m-2}-\frac{2}{4m+3}$ as a single fraction.

Answer (b) .....

[2]

6 (a) State the special name of a quadrilateral with four lines of symmetry.

Answer (a) .....

[1]

(b) A quadrilateral has interior angles of $x°$, $2x°$, $(x + 10)°$ and $(x + 50)°$. Calculate the value of x,

Answer (b) .....

[2]

7 P varies directly as the cube of r. Given that $P = 2$ and $r = 4$, Find the

(a) formula connecting P and r,

Answer (a) .....

[2]

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(b) value of P when $r = 8$.

Answer (b) .....

[1]

8 Given that:

$$m + 3n = 5$$
$$m^2 - 9n^2 = -15$$

find the numerical

(a) value of $m - 3n$,

Answer (a) .....

[1]

(b) values of m and n.

Answer (b) .....

[2]

9 Given that $p = \frac{q}{q+m}$,

(a) make m the subject of the formula,

Answer (a)

[2]

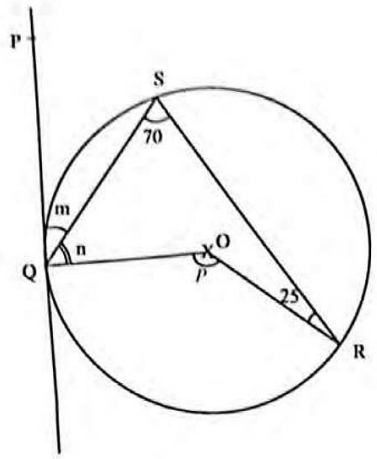
(b) Find m given that $q = 3$ and $p = 2$.

Answer (b) .....

[1]

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10



In the diagram points Q, S and R are on the circumference of a circle centre O. Line PQT is a tangent to the circle at Q.

$P\hat{Q}S = m°$, $O\hat{Q}S = n°$, $Q\hat{O}R = p°$, $Q\hat{S}R = 70°$ and $O\hat{R}S = 25°$.

Calculate the value of

(a) m,

Answer (a) .....

[1]

(b) n,

Answer (b) .....

[1]

(c) p.

Answer (c) .....

[1]

11 (a) Evaluate $766_9 + 143_9$ giving the answer in base 9.

Answer (a) .....

[1]

(b) Convert 35_6 to a number in base 2.

Answer (b) .....

[2]

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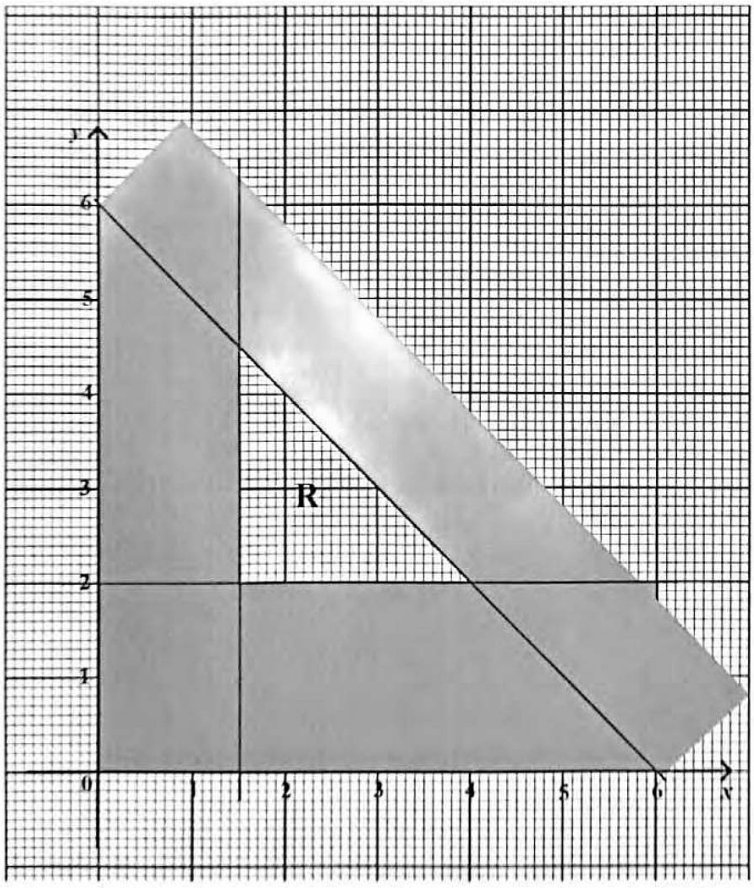
(c) Given that $f(x) = (4 - x)(x - 0.5)$,
find $f(0)$.

Answer (c)

.....

[1]

12



In the diagram the unshaded region R is defined by three inequalities.

Find the three inequalities

Answer .....

.....

.....

[4]

13 Two similar cylinders have heights of 16cm and 48cm.

(a) Write down, in its simplest form, the ratio of

(i) heights,

Answer (a)(i) .....

[1]

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(ii) volumes

Answer (a)(ii) .....

[1]

(b) The curved surface area of the larger cylinder is 500 cm^2.
Calculate the curved surface area of the smaller cylinder.

Answer (b) .....

[2]

14 **(a)** A sum of money is shared in the ratio 2: 3: 4. The smallest share is \$160, 00.
Calculate the total amount of money shared.

Answer (a) .....

[2]

(b) Find the time taken for \$4000, 00 to earn a simple interest of \$400, 00 at a rate of 5% per annum.

Answer (b) .....

[2]

15 Solve the following equations:

(a) $3(x-2) = 5x + 3$

Answer (a) .....

[2]

(b) $\left(q - \frac{2}{9}\right)^2 = \frac{49}{81}$

Answer (b) .....

[2]

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16 (a) Evaluate $\dfrac{0,0469 \times 2,13}{2,28 + 3,83 \times 2,06}$ by first estimating each number to one significant figure.

Answer (a)

[3]

(b) Solve the equation $27 = 3^{2d+1}$.

Answer (b)

[2]

17 Points E, F, and G have coordinates at $(4\ ;\ 8), (-4\ ;\ 0)$ and $(-6\ ;\ 4)$ respectively. O is the origin.

(a) Express as column vectors

(i) $\vec{EF}$,

Answer (a)(i) .....

[1]

(ii) $-\frac{1}{2}\vec{GF}$

Answer (a)(ii) .....

[1]

(iii) $\vec{EF} + \vec{FG}$

Answer (a)(iii) .....

[1]

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(b) Find $|\vec{OE}|$ leaving the answer in surd form.

Answer (b)

[2]

18 **(a)** Convert 2g/ cm^3 to kg/ m^3.

Answer (a)

[2]

(b) A map of a town is drawn to a scale of 1cm to 9,5 km
Calculate the

(i) actual length of the road in km that is 3cm long on the map

Answer (b)(i)

[1]

(ii) area of a town on the map in cm^2 that has an actual area of 361 km^2.

Answer (b)(ii) .....

[2]

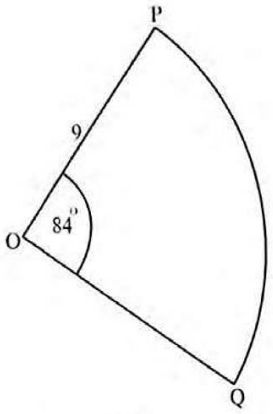
19 **(a)** Village A is on a bearing of 092 ° from a village B.
Calculate the 3 figure bearing of village B from village A.

Answer (a) .....

[1]

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(b)



In the diagram, OPQ is a sector with centre O and radius 9 cm.

$P\hat{O}Q = 84°$. Take π *to be* $\frac{22}{7}$.

Calculate the

(i) length of arc PQ,

Answer (b)(i)

[2]

(ii) area of the sector OPQ.

Answer (b)(ii)

[2]

20

Form	Enrollment
1	128
2	127
3	125
4	120

The table above shows enrollment at a certain school

(a) State the modal form.

Answer (a) .....

[1]

(b) Calculate the mean number of learners per form.

Answer (b) .....

[2]

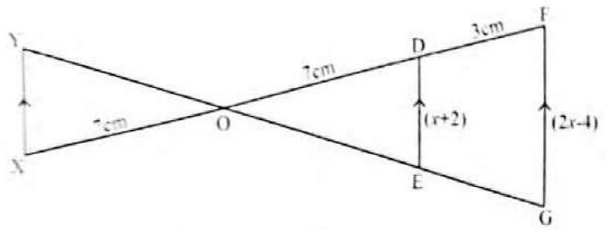
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(c) Two learners are chosen at random from the school.
Calculate the probability that both learners are in form 3.

Answer (c)

[2]

21



In the diagram above XDF and YEG are two straight lines which intersect at O.
XY, ED and GF are parallel lines. $OX = OD = 7cm$,
$DF = 3cm, ED = (x + 2)\,cm$ *and* $GF = (2x - 4)\ cm$.

(a) Name the triangle in correct order which is

(i) similar but not congruent to triangle XOY.

Answer (a)(i)

[1]

(ii) congruent to triangle XOY.

Answer (a)(ii) .....

[1]

(b) Calculate length of FG.

Answer (b) .....

[3]

22 Matrix $M = \begin{pmatrix} 5 & -3 \\ -2 & 2 \end{pmatrix}$ and matrix $N = \begin{pmatrix} y^2 & 6 \\ 3 & 2 \end{pmatrix}$.

(a) Find M^{-1} the inverse of matrix M.

Answer (a) .....

[3]

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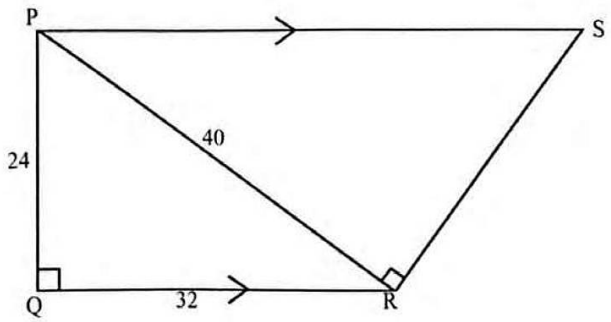
(b) Matrix N is singular.
Find the possible values of y.

Answer (b) .....

.....

[3]

23



In the diagram PQRS is a trapezium, PS and QR are parallel lines.
$P\hat{Q}R = P\hat{R}S = 90°, PQ = 24cm, QR = 32cm \text{ and } PR = 40cm$

(a) Express tan $R\hat{P}S$ as a fraction its lowest terms.

Answer (a)(i) .....

[1]

(b) Calculate the

(i) length of RS,

Answer (b)(i) .....

[2]

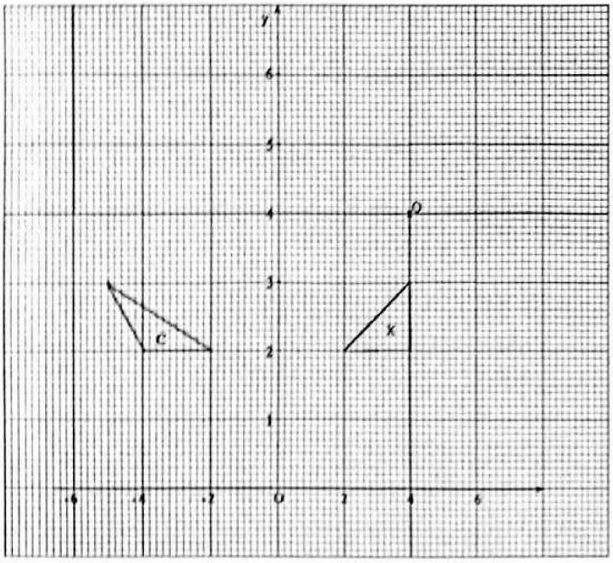
(ii) area of trapezium PQRS.

Answer (b)(ii) .....

[2]

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24



The graph shows triangles X and C and a point Q.

(a) Draw and label on the graph

(i) triangle A the image of Triangle X under a translation of $\begin{pmatrix} -2 \\ 3 \end{pmatrix}$.

Answer (a)(i) .....

[3]

(ii) triangle B the image of triangle X under a rotation of 180 ° with centre Q.

Answer (a)(ii) .....

[3]

(b) Describe fully the single transformation which maps triangle X onto triangle C.

Answer **(b)** .....

.....

..... [3]

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