

Candidate Name

Centre Number

Candidate Number



For Performance Measurement

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL
General Certificate of Education Ordinary Level

MATHEMATICS

4004/1

PAPER 1

NOVEMBER 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 25 printed pages and 3 blank pages.

Copyright: Zimbabwe School Examinations Council, N2023.



Candidate Name	Centre Number	Candidate Number

2

Answer all questions.

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

1 Express

(a) 4,695 to 2 decimal places,

Answer (a) [1]

(b) 794,3 to 1 significant figure,

Answer (b) [1]

(c) 0,002 31 in standard form.

Answer (c) [1]



Candidate Name

Centre Number

Candidate Number

3

- 2 (a) Write down the number $7 \times 8^3 + 8 + 6$ as a number in base 8.

Answer (a)

[1]

- (b) Convert 57_{10} to a number in base 6.

Answer (b)

[1]

- (c) Evaluate $111_2 + 1_2$ giving the answer in base 2.

Answer (c)

[1]



Candidate Name

Centre Number

Candidate Number

4

3 (a) Express 0217 as time in 12 hour notation.

Answer (a)

.....
[1]

(b) For a general parallelogram, state the

(i) number of lines of symmetry,

Answer (b)(i)

.....
[1]

(ii) order of rotational symmetry.

Answer (b)(ii)

.....
[1]



Candidate Name

Centre Number

Candidate Number

5

4 Given that $f(x) = 3x - 1$,
find

(a) $f(-2)$.

Answer (a)

[1]

(b) x if $f(x) = 5$.

Answer (b)

[2]

5 (a) Simplify $(-3m)^4$.

Answer (a)

[1]



Candidate Name

Centre Number

Candidate Number

6

(b) Evaluate

(i) $49^{\frac{3}{2}}$,

Answer (b)(i)

[1]

(ii) 2^{-3} .

Answer (b)(ii)

[1]

6 Solve the simultaneous equations :

$$3x + 2y = 8$$

$$5x + 3y = 4, 5$$

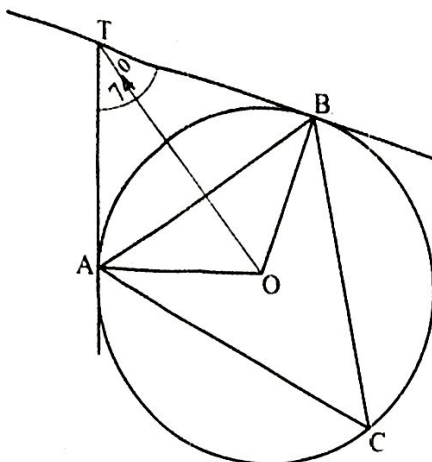
Answer

[3]



7

7



In the diagram, AT and BT are tangents to the circle, centre O. C is a point on the circumference of the circle. $\hat{ATB} = 74^\circ$.

Calculate

(a) \hat{AOT} ,

Answer (a)

[1]

(b) \hat{BAT} ,

Answer (b)

[1]



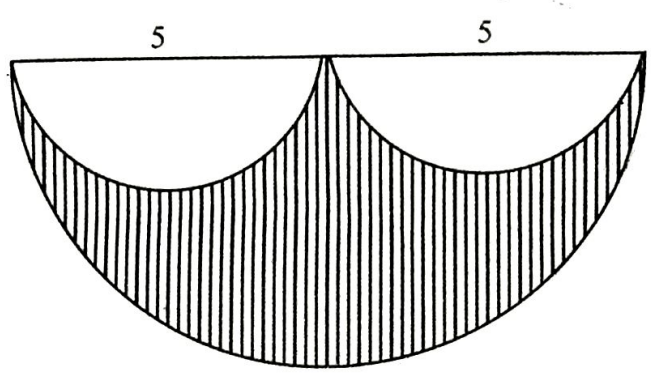
Candidate Name	Centre Number	Candidate Number
----------------	---------------	------------------

8

(c) \hat{ACB} .

Answer (c) [1]

8



In the diagram, each of the small semi-circles have a diameter of 5 cm.
 The bigger semi-circle has a diameter if 10cm.

Calculate the perimeter of the shaded part in terms of π .

Answer [3]



Candidate Name

Centre Number

Candidate Number

--	--	--

9

9 A student scored the following marks in 6 tests.

14; x ; 15; 19; 15; 13.

Find the

(a) value of x if the mean of the marks is 13,

Answer (a)

.....

[2]

(b) mode,

Answer (b)

.....

[1]



Candidate Name

Centre Number

Candidate Number

10

(c) median.

Answer (c)

.....
[1]

10 A map is drawn to a scale of 1 cm to 10 km.

(a) Express the scale in the form 1 : n .

Answer (a)

.....
[1]

(b) Find the

(i) actual distance represented by 2,7 cm on the map,

Answer (b)(i)

.....
[1]



Candidate Name

Centre Number

Candidate Number

11

- (ii) area on the map that represents an actual area of 120 km^2 .

Answer (b)(ii)

.....
[2]

11

A, B and C are points on level ground such that the bearing of A from C is 205° , and the bearing of B from C is 347° .

- (a) Calculate \hat{ACB}

Answer (a)

.....
[2]

- (b) Find the bearing of C from B.

Answer (b)

.....
[2]



Candidate Name

Centre Number

Candidate Number

12

12 It is given that $f = \{11 - d - 2d\}$, d is an integer, with subsets A , B and C such that

$A = \{d : d \text{ is a prime number}\}$

$B = \{d : d \text{ is an odd number}\}$

$C = \{d : d \text{ is a multiple of } 5\}$

(a) Illustrate this information on a clearly labelled Venn diagram.

Answer (a)

(b) List the elements of A .

Answer (b)

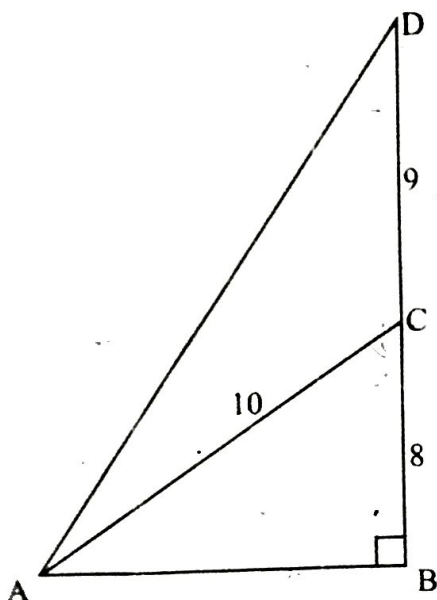
13

(c) Find $n(A \cap C)$

Answer (c)

[1]

13



In the diagram, ABC , ACD and ABD are triangles such that $BC = 8\text{cm}$, $AC = 10\text{cm}$, $CD = 9\text{cm}$ and $\hat{ABC} = 90^\circ$.

Calculate

(a) $\cos \hat{ACD}$, giving the answer as a decimal

Answer (a)

[1]



Candidate Name

Centre Number

Candidate Number

--	--	--

14

(b) the area of triangle ACD

Answer (b)

[3]

14 Given the formula $\frac{1}{c} = \sqrt{b - a}$,

(a) find c if $a = -4$ and $b = 21$.

Answer (a)

[2]

(b) make a the subject of the formula.

Answer (b)

[2]



Candidate Name

Centre Number

Candidate Number

--	--	--

. 15

15 Solve the following equations:

(a) $(5m - 3)(2m + 1) = 0$

Answer (a)

.....
[2]

(b) $\frac{2}{3n - 1} = \frac{3}{n + 2}$

Answer (b)

.....
[3]



Candidate Name

Centre Number

Candidate Number

--	--	--

16

16 Given that matrix $A = \begin{pmatrix} 2 & 1 \\ -3 & 0 \end{pmatrix}$ and matrix $B = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$, find

(a) AB

Answer (a)

.....
[2]

(b) A^{-1} , the inverse of matrix A.

Answer (b)

.....
[3]

17 Given that $\vec{OP} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$, where O is the origin and Q is the point (1 ; 5),

(a) find $|\vec{OP}|$. Leave the answer in surd form.

Answer (a)

.....
[2]



Candidate Name

Centre Number

Candidate Number

17

(b) Given also that $\vec{QR} = \begin{pmatrix} -2 \\ -3 \end{pmatrix}$, find

(i) the coordinates of R,

Answer (b)(i)

[2]

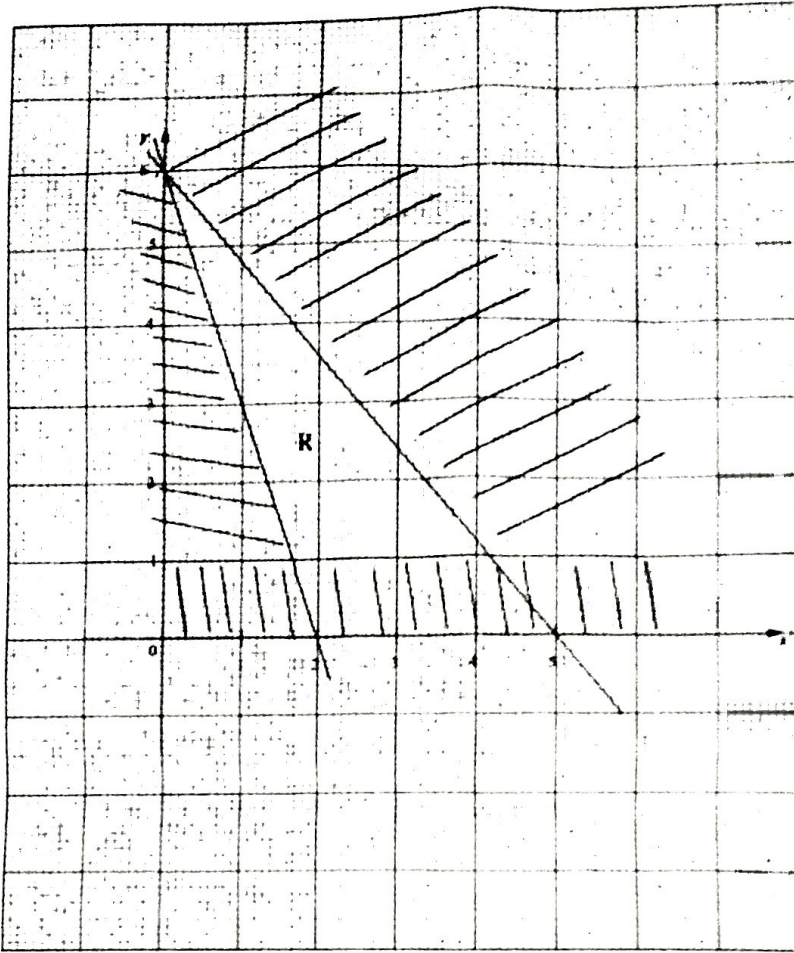
(ii) \vec{PR} .

Answer (b)(ii)

[1]



8



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

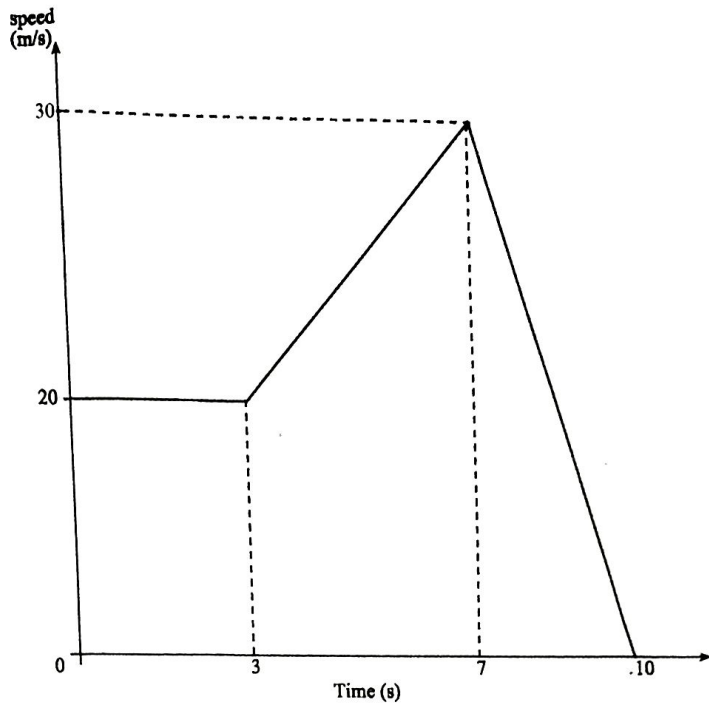
Answers:

.....

.....

.....

[5]



The diagram shows the speed - time graph of a moving object during a period of 10 seconds.

Calculate the

- (a) acceleration of the object from $t = 3$ to $t = 7$,

Answer (a)

.....
[1]



Candidate Name

Centre Number

Candidate Number

20

(b) distance covered by the object at constant speed ,

Answer (b)

[1]

(c) average speed for the 10 seconds.

Answer (c)

[3]

20 Factorise completely



Candidate Name

Centre Number

Candidate Number

--	--	--

21

(a) $11x^2 - 2x$

Answer (a)

[2]

(b) $3x^2 - 1x - 6x^2$

Answer (b)

[3]

- 21 The cost \$C of registering for an examination is partly constant and partly varies as the number of subjects N that the candidate wants to enter. It costs \$70 to register for 2 subjects and costs \$85 to register for 3 subjects.

(a) Find an equation connecting C and N.

Answer (a)

[3]



Candidate Name

Centre Number

Candidate Number

22

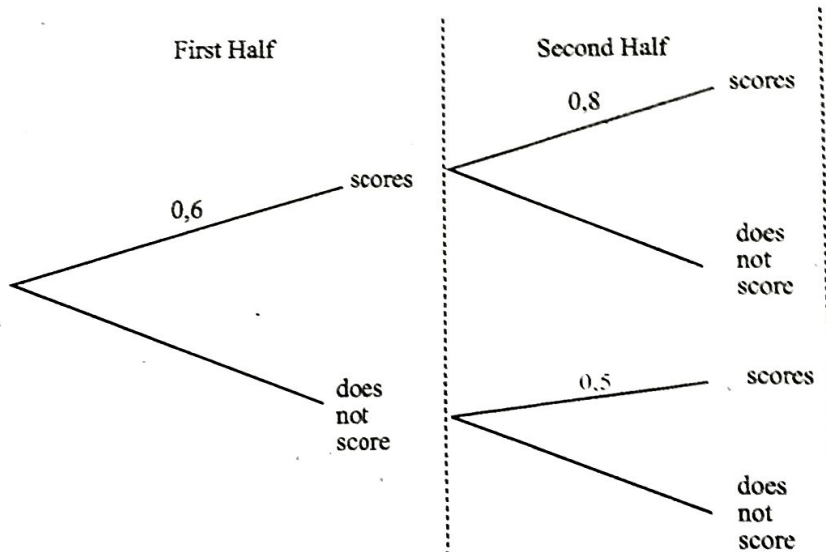
- (b) Find the total cost of registering for 5 subjects.

Answer (b)

[2]

- 22 Den is a striker for the under 17 boys soccer team at his school. The probability that he scores during the first half of a match is 0,6. If he scores during the first half, the probability of scoring a second goal in the second half is 0,8. If he does not score during the first half, the probability that he scores in the second half is 0,5.

(a)



Complete the tree diagram by inserting the probabilities not given.

Answer (a) on the diagram

[3]



Candidate Name

Centre Number

Candidate Number

23

(b) Use the tree diagram to find the probability that he scores,

(i) in both halves.

Answer (b)(i)

[1]

(ii) only once.

Answer (b)(ii)

[2]

23 Given that $\log 8 = 0,9031$.

Evaluate

(a) $\log 0,8$.

Answer (a)

[1]



Candidate Name

Centre Number

Candidate Number

24

(b) $\log 512$

Answer (b)

[2]

(c) $\log 2$

Answer (c)

[2]

24 (a) Evaluate giving each answer as a common fraction in its simplest form,

(i) $\frac{3}{4} - \frac{2}{7}$

Answer (a)(i)

[2]



Candidate Name

Centre Number

Candidate Number

25

(ii) $2\frac{1}{4} + 3$.

Answer (a)(ii)

[2]

(b) Express 0, 135 as a common fraction in its simplest form.

Answer (b)

[2]

