

401-2-081-942



EXAMINATIONS COUNCIL OF ZAMBIA
JUNIOR SECONDARY EXTERNAL EXAMINATION (GRADE 9) 2021
Mathematics 401/2
Paper 2

(EXTERNAL CANDIDATES)

Reading Time: 10 minutes **Marks: 50**

Working Time: 2 hours

Examination Number:

School/Centre Name:

School/Centre Code:

Instructions to Candidates

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- 1 Write your **examination number, school/centre name** and **code** in the spaces provided on the question paper.
- 2 Ensure that you **write your examination number** on **every page** of this Question Paper.
- 3 There are **two** sections in this paper, **A** and **B**.
 Section **A**: There are **two** questions in this section, answer both.
 Section **B**: Answer any **three** questions.
- 4 Write all your answers in the spaces provided on the question paper.
- 5 All essential working must be shown. Candidates will be penalised for omitting essential working.
- 6 Tick (✓) the questions you have attempted in Section **B** in the grid provided below.

Section	A				B				Total marks
Questions	1	2	3	4	5	6	7	8	
Tick	✓	✓							
Mark									

Information for Candidates

Cell phones and calculators are **not allowed** in the examination room.

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Section A [20 marks]

There are two questions in this section, answer **both**. Each question carries 10 marks.

1 (a) Solve the equation $\frac{y}{4} = 3 - \frac{3y}{4}$. [2]

- (b) A bag contains 6 black balls and 9 green balls of the same size. A ball is picked from the bag at random. Find the probability that it is a green ball. [2]

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(c) Given that $4w - ef = aw - 8$, make w the subject of the formula. [3]

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- (d) A woman works for 40 hours normal weekly time. Her basic rate is K10.00 per hour and the rate for overtime is 'time and a half'. Calculate her total wage for a week in which she works for 59 hours. [3]

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[Total: 10]

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- 2 (a) Three angles of a quadrilateral are x° , $2x^\circ$ and y° . Express the size of the fourth angle in terms of x and y , in its simplest form. [2]

- (b) Solve the simultaneous equations

$$2x - y = 5,$$

$$5x + y = 16.$$

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- (c) (i) Using geometrical instruments, construct triangle ABC in which $AB = 8\text{cm}$, $BC = 7\text{cm}$ and $AC = 6\text{cm}$. [1]
- (ii) Measure and write angle ABC. [1]
- (iii) Construct the bisectors of AB and BC and let them meet at O. [2]
- (iv) With centre O and radius OA, draw a circle which touches A, B and C. [1]

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[Total: 10]

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Section B [30 marks]

There are six questions in this section, answer **any three**. Each question carries 10 marks.

3 (a) Given that $C = \begin{pmatrix} 9 & -5 \\ 7 & 8 \end{pmatrix}$ and $D = \begin{pmatrix} 0 & -1 \\ 3 & 4 \end{pmatrix}$, find $C - 3D$. [3]

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- (b) A radio costs K230.00 inclusive of Value Added Tax (VAT) at 15%. Calculate the cost of the radio before VAT is included. [3]

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- (c) Given the following set of ordered pairs; $(6, 4)$, $(4, 2)$, $(2, 0)$, $(0, -2)$ and $(-2, -4)$, find

(i) the function representing this mapping, [2]

(ii) the value of x when $y = -10$. [2]

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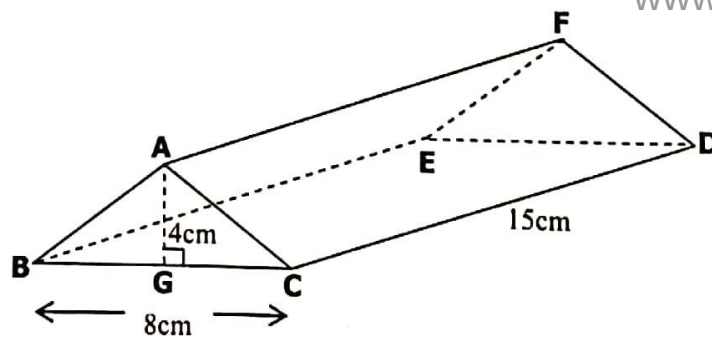
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- 4 (a) Express 216 400 in standard form correct to 3 significant figures. [2]

- (b) Simplify $1 - 2(3x - 5) + 5x$. [2]

- (c) The diagram ABCDEFG below is a triangular prism.

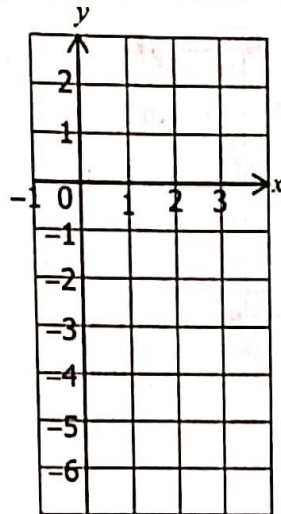


Given that $AG = 4\text{cm}$, $BC = 8\text{cm}$ and $CD = 15\text{cm}$, calculate its volume.

[3]

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- (d) Illustrate the inequation $y \geq -2x$ on the XOY-plane below, by shading the wanted region, for the domain $-1 \leq x \leq 3$. [3]



[Total: 10]

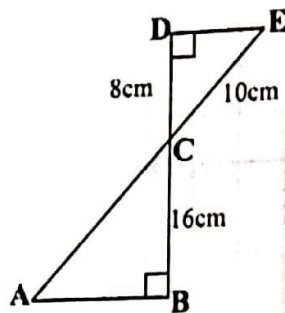
- 5 (a) Calculate the sum of interior angles of a polygon with 20 sides. [2]

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- (b) Evaluate $10110_{\text{two}} \div 10_{\text{two}}$, giving your answer in base two. [2]



- (c) In the diagram below, AE and BD are straight lines, angle $EDC = \text{angle } ABC = 90^\circ$, $BC = 16\text{cm}$, $CD = 8\text{cm}$ and $CE = 10\text{cm}$.



Calculate the length of AC.

[3]

- (d) The table below shows the time taken for learners to walk to school.

Time (minutes)	6 – 10	11 – 15	16 – 20	21 – 25	26 – 30
Number of learners	1	2	4	2	1

Calculate the mean time taken.

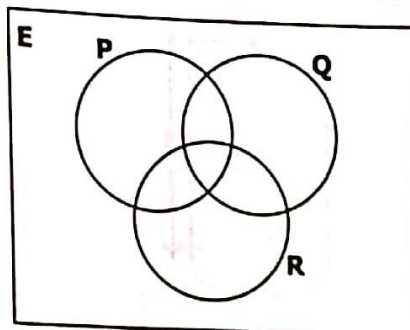
[3]

[Total: 10]

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- 6 (a) Given that $E = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $P = \{4, 5, 6, 7\}$,
 $Q = \{x: 1 < x < 6, x \in \mathbb{N}\}$ and $R = \{3, 5, 7, 9\}$,

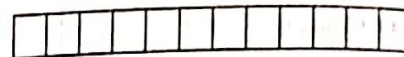
- (i) illustrate this information in the Venn diagram below, [2]



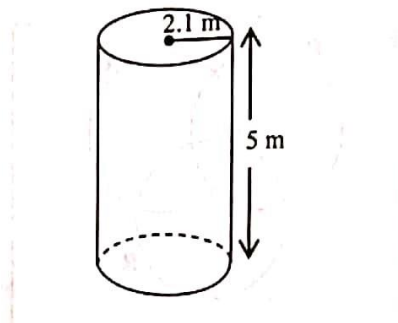
- (ii) list the set $P \cup (Q' \cap R')$. [2]

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- (b) Given that matrix $R = \begin{pmatrix} 1 & 2 \\ -3 & -4 \end{pmatrix}$ and matrix $T = \begin{pmatrix} 2 & 0 \\ 6 & 1 \end{pmatrix}$, find the matrix RT . [3]



- (c) The diagram below shows a closed cylindrical tank of radius 2.1 m and height 5 m. [Take π as $\frac{22}{7}$].



Calculate its total surface area.

[3]

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[Total: 10]

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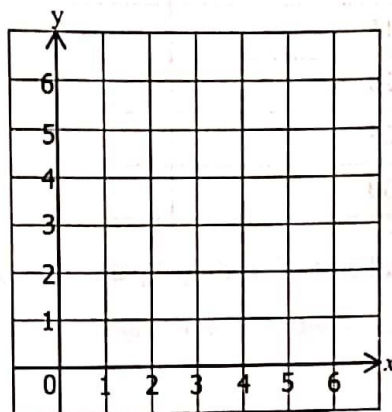
7 (a) On the XOY-Plane below,

(i) plot the points A(2, 6), B(4, 2), C(6, 6) and D(4, 4),

[3]

(ii) join the points A, B, C and D to form a polygon.

[1]



(b) Evaluate $143_{\text{five}} \times 13_{\text{five}}$, giving your answer in base five.

[3]

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- (c) On a particular day, the postal charges for delivery of parcels within Zambia were as shown in the table below.

Weight not exceeding (Kg)	Charge (Kwacha)
5	32.50
10	59.50
15	88.75
20	125.50
25	153.85
30	187.75

Calculate the total cost of sending 3 parcels weighing 7kg, 13.5kg and 21kg.

[3]

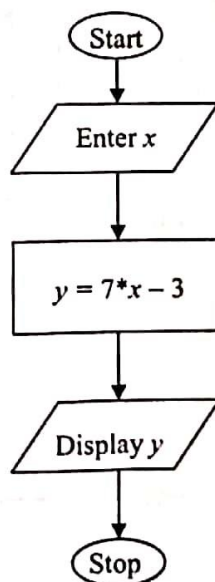
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[Total: 10]

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- 8 (a) On a particular day, the exchange rate between the Zambian Kwacha and American dollar was \$1 = K9.50. How many dollars could be exchanged for K2 850.00? [3]

- (b) Study the flowchart below to answer the question that follows.



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Using the programme above, complete the table below.

x	y
2	
	32

[1]

[2]

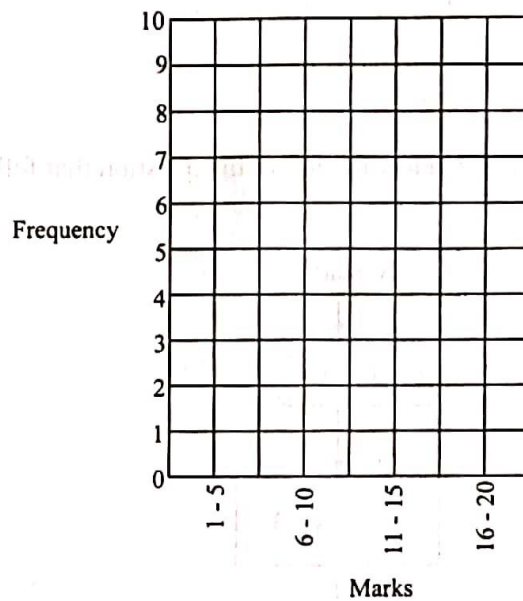
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- (c) The table below shows the marks obtained by learners in a Computer Studies test.

Marks	1 – 5	6 – 10	11 – 15	16 – 20
Number of learners	3	8	10	9

Complete the frequency polygon below.

[4]



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[Total: 10]