401-2-050-824

EXAMINATIONS COUNCIL OF ZAMBIA

JUNIOR SECONDARY EXTERNAL EXAMINATION (GRADE 9) – 2020

# 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

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 the Answer Booklet.

3 There are **eight (8)** questions in this paper. Answer any **five (5)** questions.

4 Answer all questions in the spaces provided on the question paper.

5 Write your answers clearly.

6 All essential working must be shown. Candidates will be penalised for omitting essential working.

7 Tick (✓) the question you have attempted in the grid provided below.

| Questions | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Total marks |
|---|---|---|---|---|---|---|---|---|---|
| Tick | | | | | | | | | |
| Mark | | | | | | | | | |

### Information for Candidates

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

**DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO**



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Examination Number

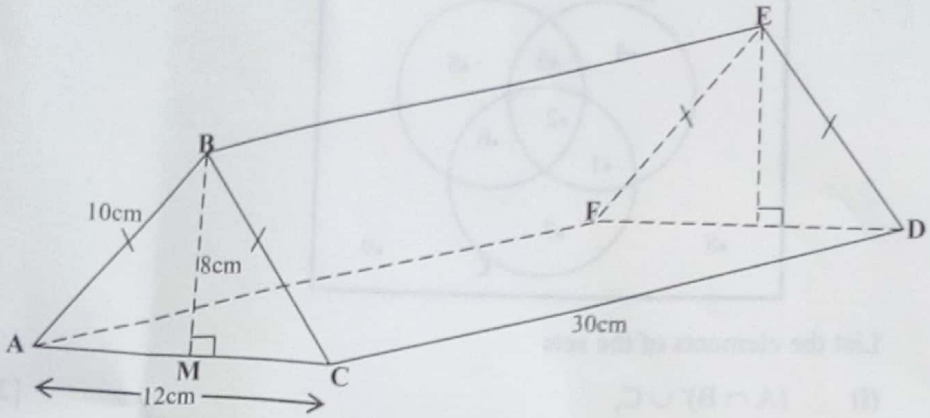
1 (a) Solve the equation $4x - 2 = 2(x + 3)$. [2]

(b) Write 123.851 in standard form correct to 3 significant figures. [2]

(c) Mapulamba worked 48 hours in a particular week. His basic rate is K20.00 per hour and the rate of overtime is "time and a half". If his normal working time is 40 hours per week, calculate his total wage for this week. [3]

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**(d)** The diagram below shows a triangular prism ABCDEF in which AB = BC = EF = DE = 10cm, AC = DF = 12cm, BE = AF = CD = 30cm and M is a point on AC such that AM = MC and BM = 8cm.




Calculate its volume. [3]

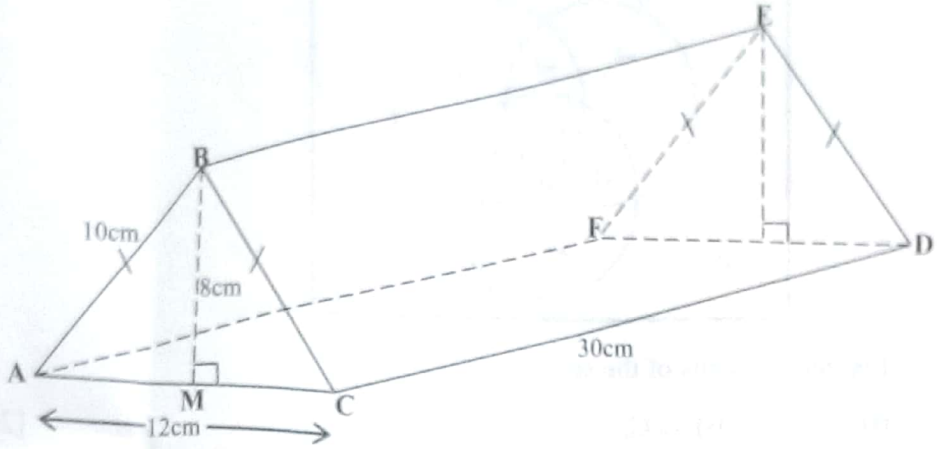
**[Total: 10]**



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Examination Number

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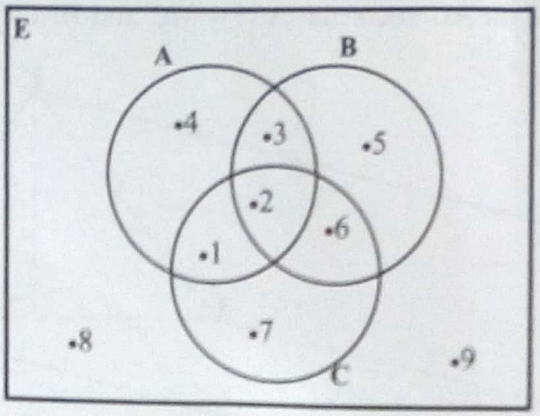
**[Total: 10]**



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Examination Number

2 (a) The Venn diagram below shows the universal set E with its subsets A, B and C.




List the elements of the sets

(i) $(A \cap B)' \cup C$, [2]

(ii) $(A \cup C)' \cap B$. [2]

(b) Mr Malandi bought a piece of land at K20 000.00. If it appreciated using the straight line method at 10% per year, calculate its value after 5 years. [3]

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(c) Solve the simultaneous equations
$x - 3y = 8$,
$3x + y = 4$.

[3]

[Total: 10]

3 (a) Multiply $141_{\text{five}}$ by $34_{\text{five}}$, giving your answer in base five. [3]



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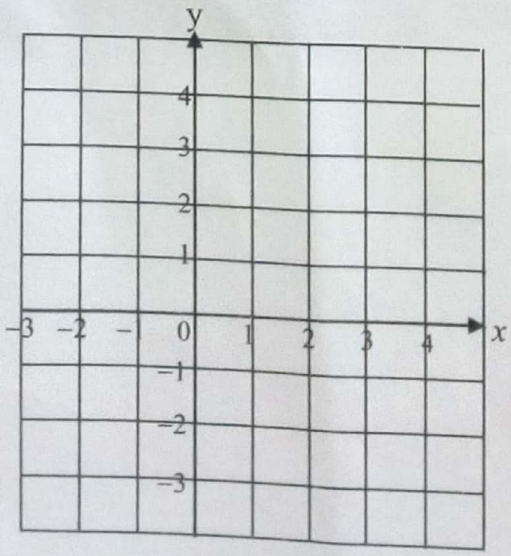
Examination Number

**(b)** Given that $y = \dfrac{x + 3}{x + 2}$, make $x$ the subject of the formula. [3]

**(c)** On the XOY plane shown below,

**(i)** plot the points A(−1, −1), B(1, 1) and C(3, 3), [3]

**(ii)** draw the graph of the straight line $y = x$. [1]




**[Total: 10]**

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Examination Number

4 (a) Simplify $4(e - 3f) - 2(2e - 8f)$. [2]

(b) The interior angles of a hexagon are $x°$, $(3x + 35)°$, $4x°$, $x°$, $(x + 10)°$ and $(x + 15)°$. Find the value of $x$. [2]



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(c) The following marks were obtained by 20 learners in a Mathematics test.

14 14 14 12 15 13 11 11 12 14

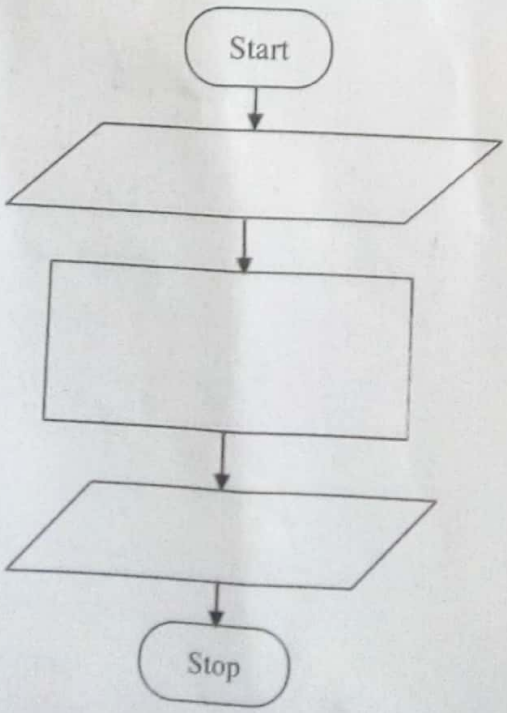
16 17 16 16 14 15 14 16 15 16

Complete the frequency table below.

| Mark | Tally Mark | Frequency |
|---|---|---|
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |
| 16 | | |
| 17 | | |
| | Total | |

[3]

(d) Given the mass (M), and the volume (V) of an object, complete the flow chart below for calculating and displaying the density (D). $D = \frac{M}{V}$ [3]




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5 (a) Twenty four identical cards are labelled 1 to 24. These cards are placed in a bag. If one card is picked at random from the bag, what is the probability that the card is labelled with a square number? [2]

(b) Muchelenje intends to buy goods worth K240.00 exclusive of Value Added Tax (VAT). Given that VAT is charged at 15%, how much would the goods cost inclusive of VAT? [3]



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Examination Number

(c) (i) Construct triangle PQR in which PQ = 10cm, QR = 8cm and PR = 6cm. [1]

(ii) Measure and write the size of angle PRQ. [1]

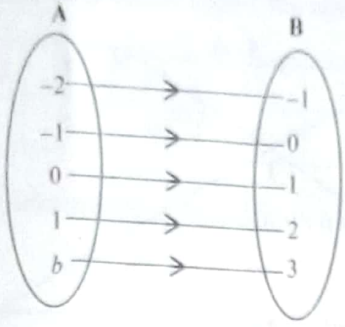
(iii) Bisect angles PQR and QPR and let the bisectors meet at O. [2]

(iv) With centre O, draw a circle which touches all the sides of the triangle PQR. [1]

[Total: 10]

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6 (a) The arrow diagram below represents a relation from set A to set B.




(i) If $x \in A$ and $y \in B$, write the formula for the relation. [2]

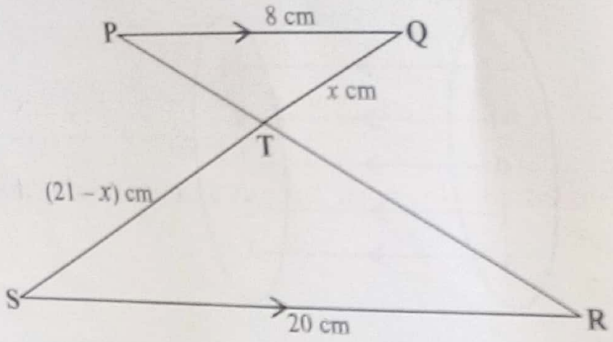
(ii) Find the value of $b$. [2]



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(b) In the diagram below, triangle PQT is similar to triangle RST.




Given that PQ = 8 cm, RS = 20 cm, QT = $x$ cm and ST = $(21 - x)$ cm, calculate the value of $x$. [3]



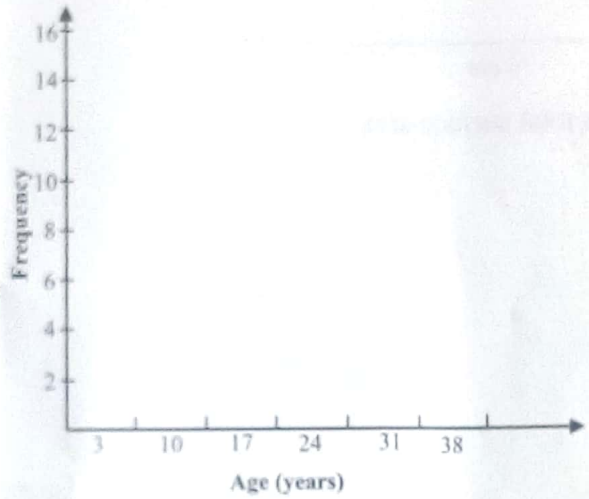
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Examination Number

(c) The frequency table below shows the ages of people in a village.

| Age (years) | 3 | 10 | 17 | 24 | 31 | 38 |
|---|---|---|---|---|---|---|
| Frequency | 5 | 9 | 15 | 5 | 4 | 2 |

Present the information in the table on a bar chart using the axes below. [3]




**[Total: 10]**

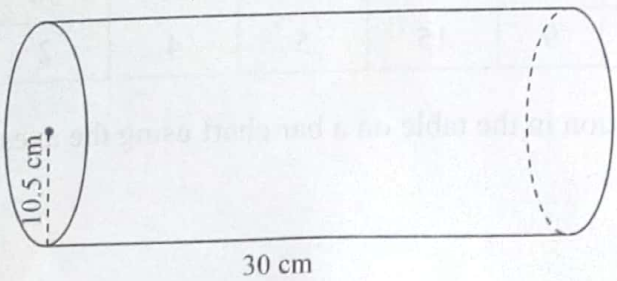
7 (a) Calculate $10100_{two} \div 100_{two}$, giving your answer in base two. [2]



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Examination Number

(b) The diagram below shows a cylinder of radius 10.5 cm and length 30 cm. [Take $\pi$ as $\frac{22}{7}$].




Calculate its total surface area. [3]

(c) Find the sum of the interior angles of a polygon with nine sides. [2]

(d) Mrs Mane bought a second hand car for K29 700.00 in 2016. How much is this amount in dollars, given that the exchange rate was \$1 to K9.90? [3]

**[Total: 10]**

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8 (a) Kamfwa gets an annual salary of K42 000.00. Calculate her monthly gross salary if her transport allowance is K350.00 per month. [3]

(b) Solve the inequation $2x + 1 \geq 3(x + 4)$. [3]

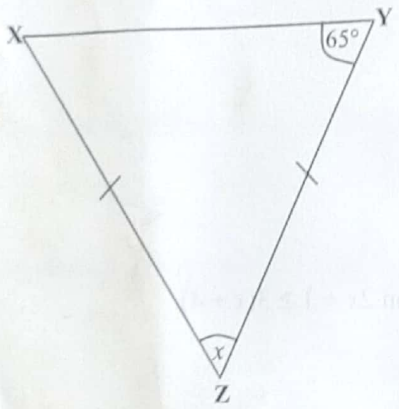


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(c) Given that $P = \begin{pmatrix} 4 & 2 \\ 1 & 3 \end{pmatrix}$ and $Q = \begin{pmatrix} 1 & 0 \\ 1 & 5 \end{pmatrix}$, find the matrix $P - 2A$. [2]

(d) In the diagram below, XZ = YZ, angle XYZ = 65° and angle XZY = $x$.




Find the value of $x$. [2]

[Total: 10]



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