EXAMINATIONS COUNCIL OF SWAZILAND

JUNIOR CERTIFICATE EXAMINATION

MATHEMATICS **309/02**
PAPER 2 **November 2012**
2 hours 30 minutes

Additional materials: Answer booklet
Geometrical instruments
2 sheets of graph paper

READ THESE INSTRUCTIONS FIRST

1. Write your name and examination number on each answer sheet used.
2. Answer **all** questions.
3. Write in dark blue or black pen.
4. You may use soft pencil for diagrams or graphs.
5. Do not use staples, paper clips, highlighters or correction fluid.
6. If you have been given an Answer Booklet, follow the instructions on the cover of the booklet.
7. Number each question and parts of a question clearly.
8. All necessary working must be shown beside the question being answered.
   SCRAP PAPER IS NOT ALLOWED. FAILURE TO SHOW NECESSARY WORKING WILL RESULT IN LOSS OF MARKS.
9. If graph paper, plain paper or tracing paper is used, it must be handed in with your answer booklet.
10. 3-figure tables may be used in any question where necessary.
    Calculators are **NOT** allowed in this paper.
11. Use 3.14 for π.
12. **FAILURE TO FOLLOW THE ABOVE INSTRUCTIONS WILL RESULT IN THE LOSS OF MARKS.**
13. The total of the marks for this paper is 100.

This paper contains **8** printed pages.

1 **(a)** If $x = 3$ and $y = 4$, work out the values of the following

(i) $2xy + 2$ [1]

(ii) $x^2y - \frac{y}{2}$ [2]

(b) **(i)** Mr Dlamini rented a car from company A which charged him E500 plus E6 for every km travelled. He travelled x km.
Express in terms of x the amount he paid. [1]

(ii) Sipho rented a car from company B which charged E20 for every km travelled. He travelled twice the distance Mr Dlamini travelled and paid a total of E6000.
Form an equation in x and solve it to find the distance travelled by Sipho. [3]

(iii) How much did Mr Dlamini pay for his journey? [2]

(iv) Which company would prove to be cheaper for a 100 km journey? [2]

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2 **(a)** The monthly charge for electricity in Swaziland was as follows:

All units were 72c per unit.

Standing charge was E55.

Mr Kunene's meter reading at the end of January was 01253. At the end of February his meter reading was 01473.

(i) How many units of electricity did he use in February? [1]

(ii) Calculate his bill for the month. [3]

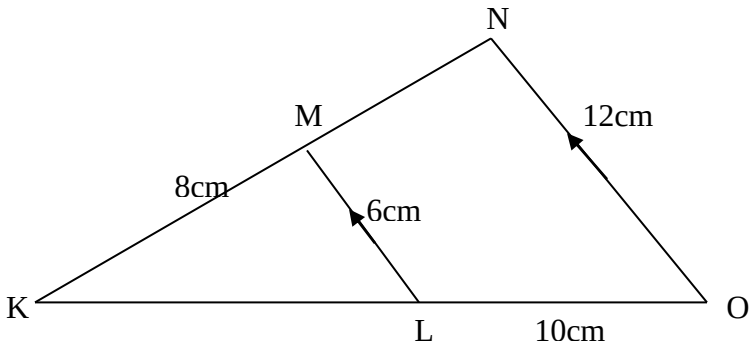
(b) Mr Kunene also has to buy food for E600 per month.

If his food money is 40% of his salary, how much does Mr Kunene earn? [3]

(c) Mr Kunene gave his brother a loan of E100 and was to pay it back with an interest of 20% per month (compound interest). How much will his brother pay him after the three months? [3]

3

NOT TO SCALE



In the figure, KLO and KMN are straight lines with LM parallel to ON.
LM = 6 cm, ON = 12 cm, KM = 8 cm and LO = 10 cm.

(a) Name two similar triangles in the figure. [2]

(b) What is the scale factor of the enlargement which maps the smaller triangle to the bigger triangle? [2]

(c) Calculate sides:

(i) KN [1]

(ii) KL [2]

(d) Calculate the perimeter of the figure. [2]

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4 **(a)** Solve the equations:

(i) $18 - 6x = 12x$ [2]

(ii) $\frac{3n+5}{2} = 10$ [2]

(iii) $g - \frac{7g}{2} = 15$ [3]

(b) A straight line passes through the points (2, 4) and (– 4, 1).

(i) Calculate the gradient of the line. [2]

(ii) What is the y-intercept of the line? [2]

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5 **Plain paper must be used for this question.**

(a) Construct the quadrilateral PQRS, where PQ = RS = 8 cm , SP = QR = 5 cm and angle SPQ = 50°. [3]

(b) Measure and write down the sizes of angles $P\hat{Q}R$ *and* $Q\hat{R}S$ [2]

(c) What is the name of the quadrilateral? [1]

(d) What is the order of rotational symmetry for this figure? [1]

(e) The height of the quadrilateral is 3.8cm.
Calculate the area of the figure . [1]

(f) The figure forms the end face of a prism whose length is 12cm.
Calculate the volume of the prism. [2]

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6 Simplify:

(a) $\sqrt{64m^2n^4}$ [2]

(b) $\dfrac{3ab-9ac}{3a}$ [3]

(c) $\dfrac{2p^2q}{3n}\times\dfrac{5pq^3}{mn}$ [2]

(d) $3(2axy+3by)-5\,(axy-by)$ [3]

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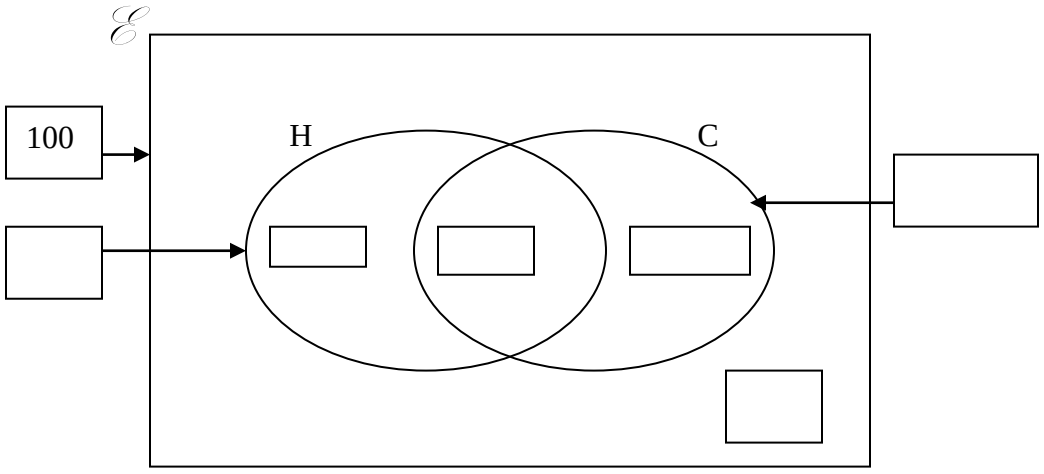
7 (**a**) In a survey carried out for a TV company, the viewer's choices of 100 families on a particular evening were recorded.

46 families said they had watched 'Heros'(H)

62 families said they had watched 'Casualty'(C)

13 families said they had not watched either programmes.

(i) Copy and complete the Venn diagram below.



[4]

(ii) How many families watched 'Casualty' only? [1]

(iii) What percentage of the viewers did not watch the `Heros' [2]

(**b**) Given $\mathscr{E}$ = { 2, 3, 4, 6, 8, 9 ,10}

A = { prime numbers }

B = { Even numbers }

C = { multiples of 3 }

List elements of the sets:

(i) $A \cap B$ [1]

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

8 **(a)** Temperatures were recorded from 0800hrs to 1600hrs on a particular day and the results were as follows:

Time	0800	1000	1200	1400	1600
Temperature	19.5°	21.7°	27.3°	28.0°	25.2°

(i) Using a scale of 2cm to represent 1 hour on the horizontal axis and 2cm to represent 1° on the vertical axis draw both axes. Number the horizontal axis from 0800 to 1600hrs and the vertical axis from 19° to 29°.
Draw a line graph to represent this information. . [3]

(ii) At what time was the maximum temperature obtained? [1]

(b) At a school 20 boys registered for circumcision. The table below shows the ages of the boys.

Age	13	14	15	16	17	18
Number of boys	1	2	5	6	4	2

(i) What is the modal age of the boys? [1]

(ii) Find the median age. [2]

(iii) Calculate the mean age of the boys. [3]

9 **(a)** A box contains 20 pieces of chalk of the same size. There are 5 green, 9 orange and 6 yellow pieces of chalk. A teacher picks up a chalk at random.
What is the probability that the teacher picks:

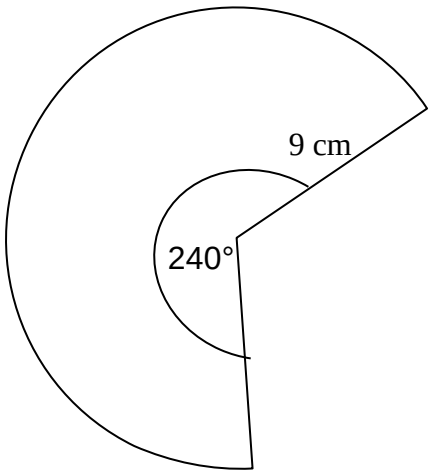
(i) a yellow chalk. [1]

(ii) a white chalk. [1]

(iii) a green chalk or an orange chalk. [2]

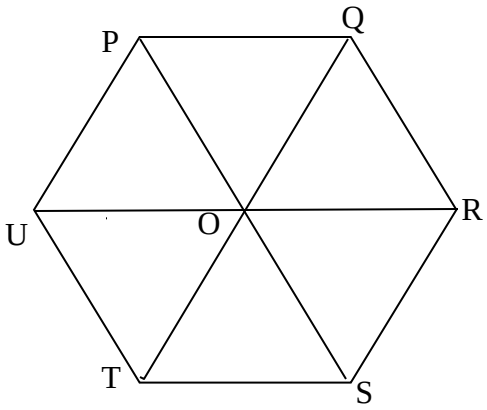
(b) A triangle EFG has sides EF = 13 cm, EG = 12 cm and FG = 5 cm.
Show clearly, by calculation, that triangle EFG is a right angled triangle.
[2]

(c) The sector below, radius 9cm, was curved to form a cone.
[Use $\pi = 3.14$]



Find the circumference of the base of the cone. [3]

10 **(a)** PQRSTU is a **regular** hexagon.



NOT TO SCALE

(i) Calculate the size of angle TOS. [2]

(ii) Describe fully the transformation which maps triangle POQ to triangle ROS. [3]

(ii) Describe the transformation which maps triangle UOP to triangle SOR. [2]

(b) What is the size of each interior angle of a regular octagon? [3]