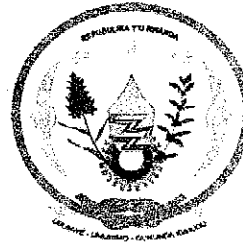


Mathematics I

009

02 Nov.2010 8.30am - 11.30am

REPUBLIC OF RWANDA



RWANDA EDUCATION BOARD (REB)
P.O.BOX 3817 KIGALI. TEL/FAX: 586871

ORDINARY LEVEL NATIONAL EXAMINATIONS 2011

SUBJECT: MATHEMATICS I

DURATION: 3 HOURS

INSTRUCTIONS :

This paper has **TWO** sections **A** and **B**.

SECTION A: Answer **ALL** questions. **(55marks)**

SECTION B : Answer any **THREE** questions. **(45 marks)**

Calculators and mathematical instruments may be
used where necessary .

Show clearly all the working. **No marks will be given for
answers which do not show all the steps.**

SECTION A: ATTEMPT ALL QUESTIONS (55marks)

1. In a school there is enough food to feed 200 students for 15 days.
For how long will the food last if 50 more students join the school? **(3 marks)**
2. Some money was invested at 15% per year simple interest for 3 years. If the interest is 7200frw, calculate the investment. **(3 marks)**
3. A(1, 4), B(1, 0) and C(3, -2) are three of the vertices of a quadrilateral ABCD. $\vec{AD} = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$ and X is the mid-point of $\overline{AC}$.
Find the coordinates of X and D. **(4 marks)**
4. 80 pupils had meals at a hotel. Of these 50 had a meal of rice(R) and 45 had a meal of potatoes (P).
 - (a) Represent this information in a Venn diagram. **(2 marks)**
 - (b) Find the number of people who had a meal of R and P. **(2 marks)**
5. If the gradient of a line is 4, find the equation of this line if it passes through points (5, 3) and (x, y). **(3 marks)**
6. Think of a number, multiply it by 30 and then add 32. The result is equal to twice the square of the number. Find the number if it is greater than 0. **(3 marks)**
7. Given $f(x) = \frac{8}{1-x^2}$ and $f(x) = -1$, find x. For which values of x is $f(x)$ not defined? **(4 marks)**
8. The diameters of two cylinders are in the ratio 3 : 4 The diameter of the smaller cylinder is 15cm.
 - (a) Find the circumference of the larger cylinder. $\pi = \frac{22}{7}$. **(2 marks)**
 - (b) What is the ratio of the area of the curved surfaces of the cylinders ? **(2 marks)**
9. Solve the following inequality and illustrate the solution on the number line : $\frac{1}{3}x - (x+1) \geq 3$. **(4 marks)**
10. In a triangle ABC, $\overline{AB} = 7.3\text{cm}$, $\overline{BC} = 6.0\text{cm}$ and $\overline{AC} = 5.0\text{cm}$.
Using a ruler and a pair of compasses only, draw accurately triangle ABC. Find the height of the triangle by construction and calculate its area. **(4 marks)**
11. Solve the following simultaneous equations:
$$4y - 3x = 2$$
$$2y + 1 = 2x$$
 (4 marks)

12. Three lights flash at intervals of 4, 6 and 10 seconds respectively.

They are started together. How soon after will they next flash together again ?

(3 marks)

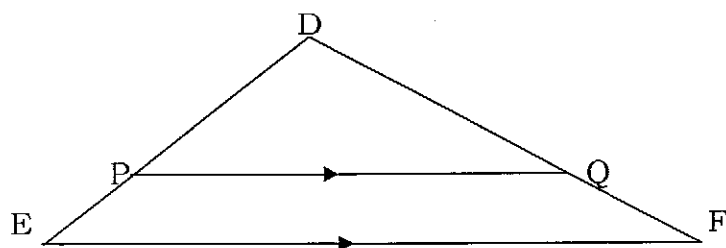
13. In the figure below $\overline{DE} = 6$ cm, $\overline{EF} = 12$ cm, $\overline{PE} = 2$ cm and $\overline{DQ} = 6$ cm.

Find: (a). $\overline{QF}$.

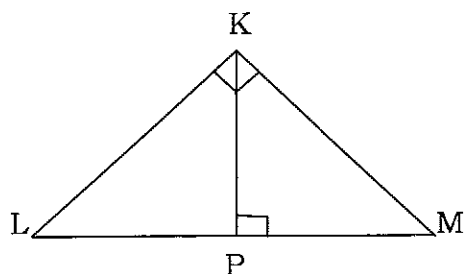
(2 marks)

(b) $\overline{PQ}$.

(2 marks)



14. In the figure below, $\overline{LM} = 9$ cm and $\overline{KM} = 6$ cm. Find $\overline{KL}$ and $\overline{LP}$. **(4 marks)**



15. The marks of 25 pupils on a test are :

6 8 4 5 7 9 7 5 8
4 2 6 2 5 7 1 3 6
7 4 3 7 3 5 3

Determine (a) the mean mark.

(2 marks)

(b) the median.

(1 mark)

(c) the mode mark.

(1 mark)

SECTION B: Answer Three questions only (45 marks)

16. The length of a rectangular block is 2 cm more than the width and the height is 1 cm more than two times the width. If the volume of the rectangular block is 624 cm^3 , find the value of x hence calculate the total surface area of the block.

(15 marks)

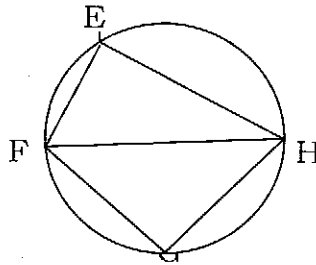
17. A helicopter flies from airport K due south for 200 km.

It then flies on a bearing of 255° for 250 km. From there it flies on a bearing of 027° for 300 km.

- (a) Draw an accurate diagram showing the journey of the helicopter using a scale of 1cm to represent 50 km. **(9 marks)**
- (b) From your diagram, find the distance and bearing of K from the final position of the helicopter. **(4 marks)**
- (c) Given that the helicopter flies at a steady speed of 200km/hr, find how long the whole journey took. **(2 marks)**
18. Draw on the same axes the following graphs: (a) $y = 2x + 6$ and (b) $y + x = 3$

From the graph determine the coordinates where the two lines intersect. **(15 marks)**

19. In the circle below $\overline{FH}$ is the diameter of the circle, $\overline{EF} = r$, $\overline{EH} = s$, $\overline{FG} = x$ and $\overline{GH} = y$.



- (a) Show that $y^2 = r^2 + s^2 - x^2$. State your reasons clearly. **(9 marks)**
- (b) Given that $r = 8\text{cm}$ and $s = 6\text{cm}$, find $\overline{FH}$. **(3 marks)**
- (c) Find the area of triangle FGH, if triangle FGH is an isosceles triangle. **(3 marks)**
20. Q(1, 3), R (4 , 3) and S(4 , -3) are vertices of triangle QRS.
- (a) Plot on a graph paper points Q, R and S. Join these points to form triangle QRS . **(5 marks)**
- (b) .Triangle QRS is translated by $T = \begin{pmatrix} -1 \\ -3 \end{pmatrix}$. Find the coordinates of Q', R', S', the images of Q, R and S under translation T. Plot these points on the same graph as (a) and join them to form triangle Q'R'S'. **(4 marks)**
- (c) Rotate Q'R' S' about the origin through -90° . Find points Q'', R' and S''. Plot these points on the same graph as (a) and join them. **(4 marks)**
- (d) Find two successive transformations that would map triangle Q'R'S' on to triangle QRS. **(2 marks)**