

Mathematics VI

012

31 Oct. 2007

8h30-11h30

RWANDA NATIONAL EXAMINATIONS COUNCIL



P.O.BOX 3817 KIGALI-TEL/FAX : 586871

ORDINARY LEVEL NATIONAL EXAMINATION 2007

SUBJECT : MATHEMATICS VI

TIME : 3 HOURS

INSTRUCTIONS :

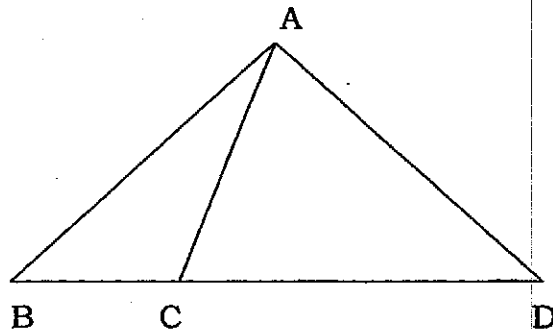
This paper has two sections A and B.

- Answer ALL questions in section A and THREE questions in section B.
- Show ALL the working clearly.
- **Calculators and mathematical instruments may be used except where otherwise stated.**
- Diagrams are not drawn to scale.

Section A : Answer ALL questions. (55 marks)

$$3.45^2 - 0.55^2$$

1. Calculate **without** using a calculator : $\frac{\quad}{4}$. (3marks)
2. Find the equation of the line through the points (0,2) and (2,10). (3marks)
3. Solve the quadratic equation : $2x^2 + 8x = -6$. (3marks)
4. In a class of 40 pupils, 30 play football and 23 play basketball. If 20 pupils play both games, how many pupils play neither ? (3marks)
5. Given $f(x) = mx+n$, where m and n are integers and $f(0) = 2$, $f(-1) = -1$, find m and n. (3marks)
6. In the triangle ABD, angle ABD = x° , angle BAC = 40° , angle CAD = $2x^\circ$ and $\overline{AB} = \overline{AD}$. Find the size of angle ACD.



7. Solve the simultaneous equations :

$$2a + 3b = 16$$

$$4a + 5b = 28$$

- (4marks)
8. Three pupils share 36 sweets in the ratio m : 3m : 5m. How many sweets does each pupil get ? (4marks)
 9. Solve the following inequality and illustrate the solution set on a number line : $0.25y - (y+1) \geq 3$. (4marks)

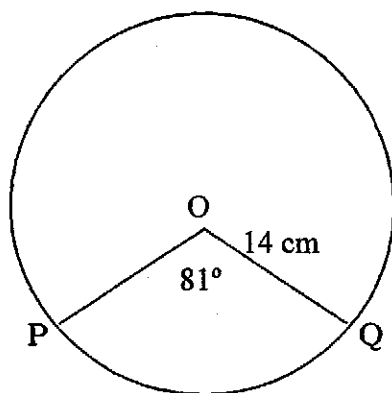
10. In the figure below, O is the centre of the circle.

Calculate : (a) the length of the major arc PQ.

(2marks)

(b) the area of the minor sector OPQ. ($\pi = \frac{22}{7}$).

(2marks)



11. 2,000,000frw is invested at 12% per year compound interest.

Find (a) the amount of investment after 3 years.

(2marks)

(b) the interest after 4 months.

(2marks)

12. Under enlargement the volume of a cube is 216 cm^3 . If the volume of the object cube is 27 cm^3 , find :

(a) Enlargement linear scale factor.

(2marks)

(b) The total surface area of the enlarged cube

(2marks)

13. Given vectors $\vec{a} = \begin{pmatrix} 7 \\ -3 \end{pmatrix}$, $\vec{b} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$ and $\vec{c} = \begin{pmatrix} -2 \\ 4 \end{pmatrix}$,

find (a) the column vector for $\vec{a} + \vec{b} + \vec{c}$.

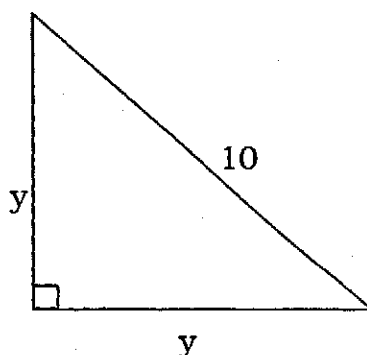
(1mark)

(b) the length of $\vec{a} + \vec{b} + \vec{c}$.

(3marks)

14. The figure below is a right angled triangle. Show that $y = 5\sqrt{2}$.

(4mark)



15. Find the image of the point (2,5) under :

(a) A reflection in $y = 2$.

(1mark)

(b) -90° rotation about (0,0).

(2marks)

(c) A translation $\begin{pmatrix} -3 \\ -1 \end{pmatrix}$.

(2marks)

SECTION B : Answer THREE questions only. (45 marks)

16. (a) Given the equation $2y + x = 6$

(i) complete the table below

x	-2		2	4
y		3		

(4marks)

(ii) Plot these points on the graph paper provided in your answer booklet and join them with a line.

(6marks)

(iii) Use letter A to indicate where you read the value of x when $y = 0$.

(1mark)

(iv) Write the value of x when $y = 0$.

(1mark)

(b) On the same graph as that of 16 (a) (ii) draw the graph of $y = 2$.

Find the coordinates of intersection of $y = 2$ and $2y + x = 6$.

(3marks)

17. (a) Simplify : $\frac{2x+1}{3} - \frac{x+3}{2} + \frac{x+1}{6}$.

(5marks)

(b) Simplify completely : $\frac{3x^3 - 4x^2 - x + 2}{3x^2 - 6x + 3}$.

(10marks)

18. (a) Solve : $2x^4 + 4x^3 - 10x^2 - 12x = 0$.

(9marks)

(b) One of the roots of $ax^2 + 5x + 2 = 0$ is -2 , find the other root.

(6marks)

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