

NAME:.....INDEXDATE.....
 SCHOOL:.....SIGNATURE.....

122/1
 MATHEMATICS ALT B
 PAPER 1
 JULY / AUGUST, 2010
 2½ HOURS

KISUMU NORTH AND EAST DISTRICTS JOINT TEST Kenya Certificate of Secondary Education 2010

121/1
 MATHEMATICS
 PAPER 1
 JULY / AUGUST 2010

INSTRUCTIONS TO CANDIDATES

- ❖ Write your name and index number in the spaces provided above.
- ❖ Sign and write the date of examination and school in the spaces provided above.
- ❖ This paper consists of two sections: section I and section II.
- ❖ Answer all the questions in sections I and any five questions in section II.
- ❖ All answers and workings must be written on the question paper in the spaces provided below each question
- ❖ Show all the steps in your calculations, giving your answers at each stage in the spaces below each question
- ❖ Marks may be given for correct working even if the answer is wrong
- ❖ Non – programmable silent calculators and **KNEC** mathematical tables may be used, except where stated otherwise.
- ❖ This paper consists of **16** printed pages
- ❖ Candidates should check the question paper to ascertain all the pages are printed as indicated and that no questions are missing.

For Examiner's Use Only

SECTION I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total

SECTION II

17	18	19	20	21	22	23	24	Total

**Grand
Total**

SECTION I (50 MARKS) Answer all questions in this section

1. Use logarithm tables to evaluate $\left(\frac{28.73 \times \cos 65^{\circ} 16' }{\log 2}\right)^{08}$ (4 mks)

2. If $a = 5, b = -4, c = -3$, find the value of $\frac{b^2 - ac - bc}{3a^2 + c^2}$ (3 mks)

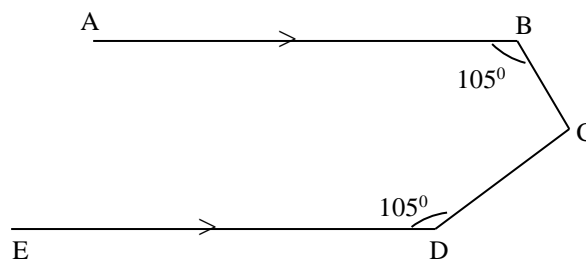
3. Simplify $\frac{1}{4 - 3x} - \frac{8}{16 - 9 \times 2}$ (3 mks)

4. Three shareholders Jane, Mark and Kelvin contributed ksh 920,000 to start a project. The ratio of contribution of Jane to Mark was 2:5 and of Mark to Kelvin was 3:5. How much did Mark contribute? (3 mks)

5. Given that $\cos (2x - 10)^\circ = \sin 30^\circ$ and x is an acute angle, find x . (3 mks)

6. Find the equation of a line perpendicular to the line $6x + 2y - 7 = 0$ and passing through the point $(2, -1)$. Give your answer in the form $y = mx + c$.

7. In the figure below, AB is parallel to ED , angle $ABC = 105^\circ$.



Find angle BCD (2 mks)

8. Without using tables or a calculator, evaluate.

$$\frac{\left(\frac{4}{11}\right)^2 \text{ of } \left(\frac{3}{5} - \frac{1}{20}\right)}{\left(3 + \frac{1}{5}\right) \div \left(1 + \frac{1}{10}\right)}$$

(3 mks)

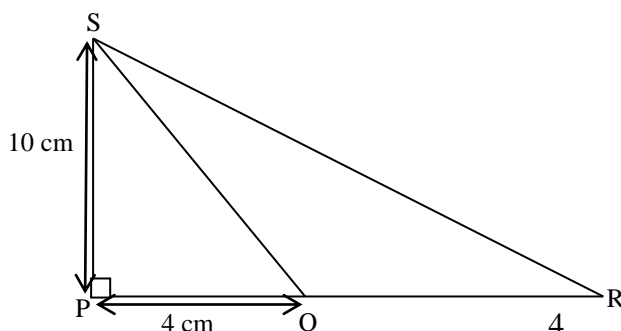
9. The following is a timetable for a train operating between stations P and U.

Station	P	Q	R	S	T	U
Arrival time	–	9.50 am	11.05 am	12.50 pm	1.45 pm	4.05 pm
Departure	9.05 am	9.55 am	11.10 am	1.05 pm	1.50 pm	–

How long does the train take to travel from station R to station T? (2 mks)

10. A metallic solid measuring 18cm by 11cm by 4cm was melted and the material cast into spheres of equal size. If the radius of each sphere was 3cm, calculate the number of spheres formed (3 mks)

11. In the figure below the area of triangle PGS is equal to the area of triangle QRS.

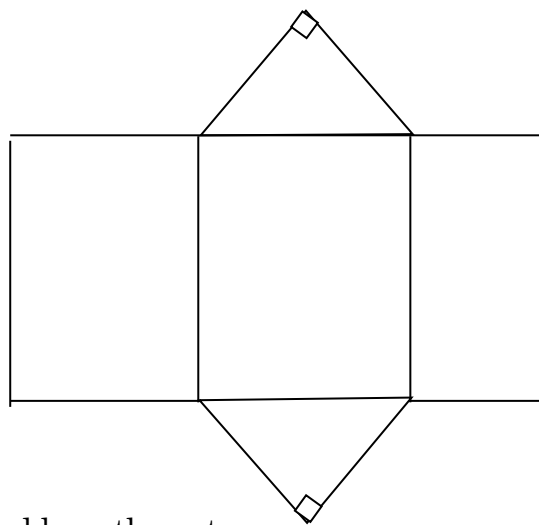
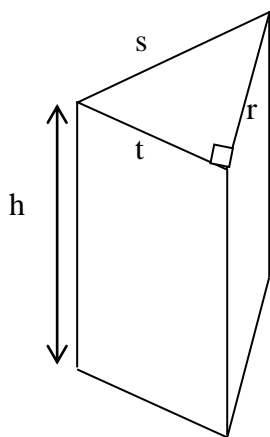


Calculate the length of SR

(4 mks)

12. A circular lawn is surrounded by a pattern of uniform width of 7m. The area of the path is 242m^2 . Calculate the radius of the lawn $\left(\text{Take } \pi = \frac{22}{7}\right)$ (4 mks)

13. The figure below represents a right-angled triangular prism and its net.



a) Indicate the lengths t, r, s and h on the net (1 mk)

b) If $t = 12\text{cm}$, $r = 5\text{cm}$ and $h = 20\text{cm}$

(i) Calculate the length S (1 mk)

(ii) Find the total surface area of the prism

(2 mks)

14. A town A is 240km from a town B. A motorist left town A at 1000hrs and travelled at an average speed of 60km/h towards town B. a cyclist left town B at 0900hrs and travelled at a constant speed towards town A. if they met at 1300hrs, calculate the speed of the cyclist. (3 mks)

15. A Kenyan bank buys and sells US dollars as shown below

	Buying (Ksh)	Selling (Ksh)
1 US dollar (\$)	78.4133	78.4744

Nelly bought US \$5,000. She paid US \$1,000 for her return ticket and spent US \$1,750 while in the USA for a visit. Upon her return to Kenya, she exchanged the remaining dollars to Kenya shillings. How much in Kenya shillings did she get after exchanging the remaining US dollars at the bank? (Give your answer to the nearest shillings).

(3 mks)

16. In the figure (on the graph paper), triangle ABC with vertices A (5,-2), B (3,-4) and C (7,-4) is mapped onto triangle A'B'C' with vertices A' (5,-12), B'(7,-10) and C'(3,-10) by an enlargement.

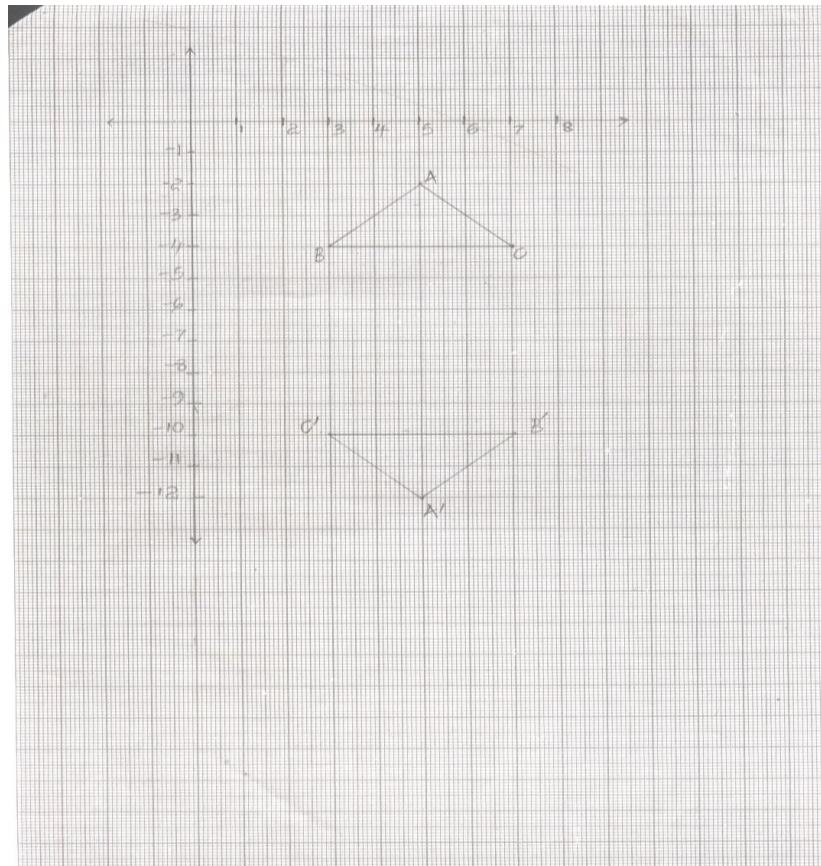
Determine

a) The centre of enlargement and state its coordinates

(2 mks)

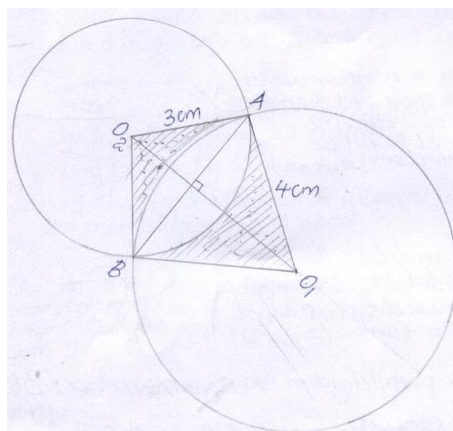
b) The scale factor of the enlargement

(1 mk)

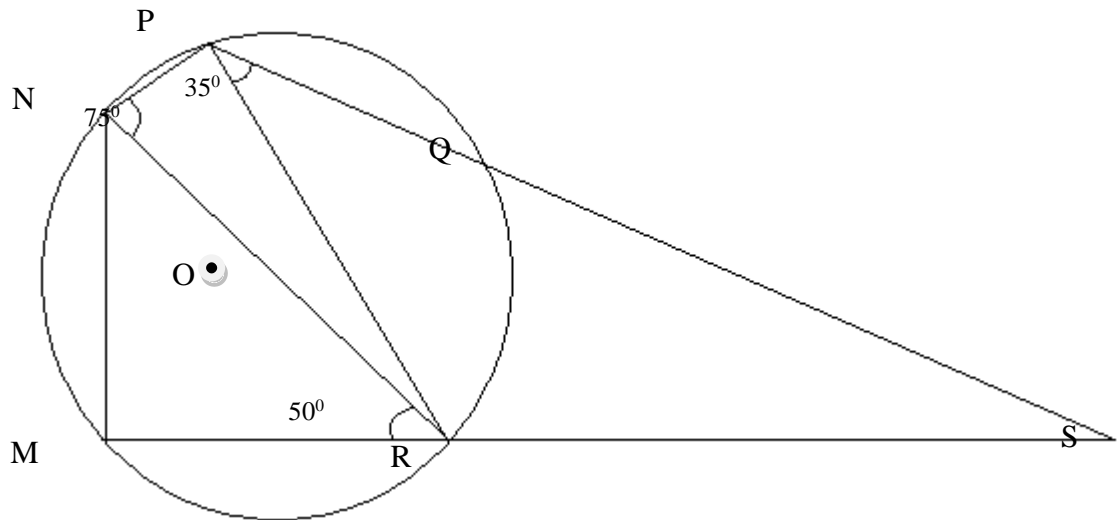


SECTION II (50 MARKS) Answer any FIVE questions from this section

17. Given that O_1 and O_2 are the centres of the circles, find the area shaded in the figure given that $\angle AO_1B = 60^\circ$ and $\angle AO_2B = 80^\circ$. Line O_1O_2 is a perpendicular bisector of AB .
(Give your answer correct to 4s.f and use $\pi = 3.142$ (10 mks)



18. In the figure below NR is a diameter of a circle centre O. angle $\angle PNR = 75^\circ$,
 $\angle NRM = 50^\circ$ AND $\angle RPQ = 35^\circ$. MRS and PQS are straight lines.



Giving reasons for every statement you write, find the following angles:

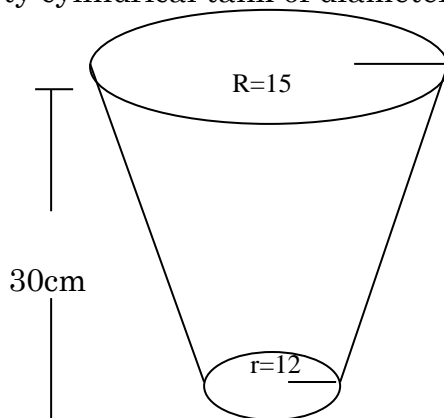
- a) $\angle PQR$ (2 mks)
- b) $\angle QSR$ (2 mks)
- c) Reflex $\angle POR$ (2 mks)
- d) $\angle MQR$ (2 mks)
- e) $\angle PON$ (2 mks)

19. Without using a protractor or set square:

- a) Construct triangle PQR such that $PQ = 10\text{cm}$, $PR = 8.3\text{cm}$ and angle $\angle RPQ = 37.5^\circ$.
 Measure the length of QR. (5 mks)

- b) Drop a perpendicular from R to cut PQ at M. measure the length of RM (2 mks)
 c) Using your result in (b), calculate the area of triangle PMR. (3 mks)

20. The diagram below shows a frustrum which represents a bucket with an open end diameter of 30cm and bottom diameter of 24cm. the bucket is 30cm deep and is used to fill an empty cylindrical tank of diameter 1.4m and height 1.2m.



- a) Leaving π in your answer,

Calculate

- (i) The capacity of the bucket in litres (4 mks)

- (ii) The capacity of the tank in litres (3 mks)

- b) Determine the number of buckets that must be drawn in order to fill the tank (3 mks)

21. a) On the grid provided, draw a parallelogram OABC, with vertices O(0,0), A(4,0), B(8,-2) and C(4,2).

b) Draw O'A'B'C' the image of OABC under a reflection in the line $y = x$. State the coordinates of the vertices O'A'B' and C' (3 mks)

c) Draw O''A''B''C'' the image of O'A'B'C' under a reflection in the line $y = x + 4$

d) State the type of congruence between: (2mks)

(i) OABC and O'A'B'C'

(ii) OABC and O''A''B''C''

e) Describe fully a single transformation that maps OABC onto O''A''B''C'' (1 mk)

22. Juliet and Jane are each to supply 189kg of Ugali flour to Kata Mission Hospital. The Ugali flour is a mixture of maize and millet. Juliet mixed maize and millet in the ratio 4:3 while Jane mixed maize and millet in the ratio 5:4

a) How many more kilograms of maize did Juliet use than Jane? (5 mks)

- b) On receiving the flour from Juliet and Jane, the cateress of the hospital decided to mix it. She realized that there was more maize than millet in the mixture and decided to add more millet flour to make the ratio 1:1
Determine the percentage increase in the millet flour (5 mks)

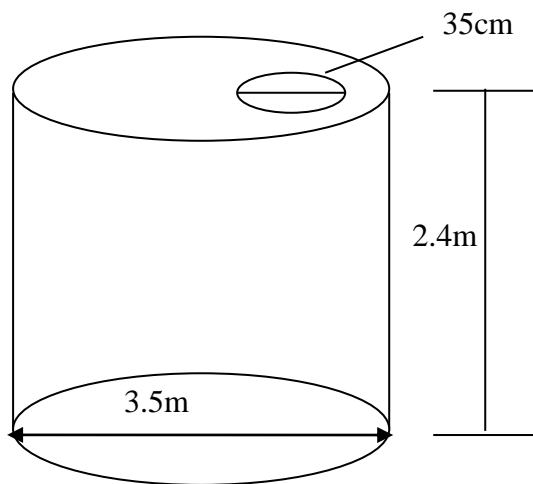
23. a) Find the equation of the line passing through points A(-2,1) and B(4,-4) giving your answer in the form $y = mx + c$ (1 mk)

b) Determine:

(i) The equation of the perpendicular bisector of the line AB in (a) in the form $y = mx + c$ (1 mk)

(ii) The coordinates of the point of intersection of the perpendicular bisector of line AB and the line list the coordinates with integral values of x and y which satisfy the inequalities in b (i) above

24. The diagram below represents a cylindrical metal water tank. The diameter of the tank is 3.5 metres and the height is 2.4 metres. A circular opening of diameter 35 cm is made on the top surface of the tank.



a) Calculate the surface of the tank. (take $\pi = 22/7$) (5mks)

b) The tank is to be painted and one tin of paint can be used to paint an area of 15cm^2

i) Calculate the number of tins of paint required (3mks)

ii) If one tin of paint costs ksh 120.00, find the amount of money required to buy paint.