NANDI NORTH AND NANDI CENTRAL SUB-COUNTIES JOINT EXAMINATIONS 2016
121/1
MATHEMATICS ALT. A
PAPER 1
JULY / AUGUST 2016
TIME: 2½ HOURS

SECTION 1: (50 MARKS)
Answer ALL Questions in this section

1. Solve for x

   $$3x^2 + 5x - 12 = 0$$ (3mks)

2. Use reciprocal tables to evaluate y if:

   $$\frac{1}{15.4} + \frac{1}{25} = \frac{1}{y}$$

3. The GCD and the LCM of three numbers are 12 and 120 respectively. If two of the numbers are 24 and 36, find the third number. (3mks)

4. It takes 40 road construction workers 8 days working 10 hours a day to complete a section of a road. How many days would 60 Road Construction Workers working 8 hours a day take to complete the same section of the road working at the same rate? (3mks)

5. Solve for x in the equation: (3mks)

   $$8^{x-1} \times 2^{x+2} = 4^{3-x}$$

6. A Kenyan athlete left the USA for Japan with 1000 US dollars. While in Japan he bought a watch worth 300 US dollars. He later left Japan for Kenya where he converted the remaining amount in US dollars to Kenyan Shillings. Using the table below, find:-

1 US Dollar	= 116 Japanese Yen
1 US Dollar	= 80 Kenyan shillings

   (i) The cost of the watch in Japanese Yen. (1mk)
   (ii) How much he got in Kenyan shillings after converting the remaining amount at the end of the journey. (2mks)

7. Solve the simultaneous equations using substitution method if $z = 2$. (4mks)

   $$z + x + y = 9$$
   $$z + 2x - y = 7$$

8. Given the inequalities:
   $$x + 1 \le 2x + 3 < x + 5$$
   (a) Solve the inequalities. (2mks)
   (b) Use the integral values of x that satisfy the inequalities of the combined solution. (1mk)

9. If Q is (x,y), P is (-2,5) and B is (4,-3) and that PQ = 3QB, find the value of x and y. (3mks)

10. A rectangular lawn measures 50m by 40m. There is a path of width 1m all around it. What is the area of the path in hectares? (Give your answer correct to 2d.p). (3mks)

11. A cylindrical water tank has a diameter of 2.1m. To begin with, it is three quarters full of water. A leak starts at the bottom so that it loses 30 litres of water in 1¼ hours. How long will it take for the water level to fall by 0.5m? (Give your answer in days). (3mks)

12. Without using a calculator, evaluate:- (3mks)

    $$\frac{2\frac{2}{5} + \frac{1}{3} \, of \, 3\frac{3}{5} - 4\frac{5}{6}}{1\frac{3}{4} - 2\frac{1}{5} \div 1\frac{2}{3} + 3\frac{1}{4}}$$

13. On the surface of a square box A B C D E F G H of side 2cm a continuous path A E G C is drawn as shown y the arrows below.
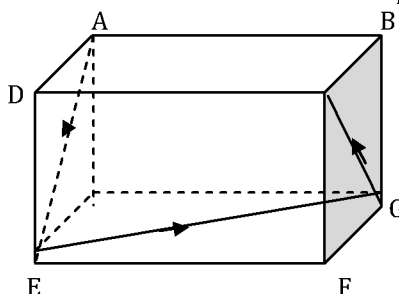
(a) Draw and label a net of the square box. (2mks)
(b) On the net, show the path. (2mks)
14. A regular polygon with 3x sides has interior angle 40^0 greater than of one with x sides. What is x? (3mks)
15. A line makes an angle of 68.2^0 with the $x-axis$. Given that the line passes through (-2,3), find the equation of the line in the form $y = mx + c$. (3mks)
16. The sides of a triangular plot of land are 170m, 190m and 210m. find the angles of the plot. (3mks)

SECTION II (50 MARKS)
Answer any five questions in this section

17. The table below shows marks scored by 40 students in a test.

Marks	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
Frequency	1	5	8	12	7	4	2	1
Cumulative Frequency	1	6	14	26	33	37	39	40

(a) Calculate the lower and upper quartiles. (4mks)
(b) If 30% of the students failed the test, find the pass mark. (3mks)
(c) The pass mark was set at 25 marks. How many students passed the test? (3mks)
18. Measurements of a maize field using a baseline XY were recorded as shown below in metres.

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                Y
                240
    TO  R   160 190
                180    75     TO    Q
                150    50     TO    P
    TO  S   100 120
                100   100     TO    N
    TO  T   30  50
                20    20      TO    M
                X
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(a) Show the map of the maize field by scale drawing. (4mks)
(b) Find the area of the field in hectares. (4mks)
(c) If the cost of one hectare is Ksh. 65,000, find the cost of the maize field. (2mks)
19. The fences AB, BC, CD and DA of a game reserve are straight lines such that B is 16km on a bearing of $N40^0E$ from A; C is directly South of B and East of A and D is 12km on a bearing of $S60^0E$ from C.
(a) Using a scale of 1cm to represent 2km, show the above information in a scale drawing. (3mks)
(b) From the scale drawing, determine:-
(i) The distance, in kilomeres of A from D. (2mks)
(ii) The bearing of A from D. (2mks)
(c) Calculate the area of the game reserve A B C D in square kilometres. (3mks)
20. Mr. Tirop made a journey of 800km partly by bus and partly by car. He started his journey at 6.00a.m. by bus which traveled at 60km/h. After alighting from the bus, he took a lunch break of 25 minutes. He then continued his journey by car which traveled at 80km/h. The whole journey took 10½ hours.
(a) Determine:-
(i) The distance traveled by car. (4mks)
(ii) The time Mr. Tirop started traveling by car. (3mks)
(b) The car developed a mechanical problem after travelling 180km. It took 10 minutes to rectify the problem. Find the time taken to complete the remaining part of the journey. (3mks)
21. A number of school staff in a certain school in Nandi County formed a welfare society with an intention of purchasing a 250 acre farm going at a Ksh. 120,000 per acre but after some time, the committed realized that they could not raise the required amount in time and so they decided to recruit 20 more members and this reduced the contribution of each member by Shs. 250,000. Find:-
(a) The original number of welfare society members. (6mks)
(b) The new contribution per member when new members joined the Sacco. (2mks)
(c) After buying the farm, it was subdivided equally among all members. Determine how much land each member got. (2mks)

22. In the figure below, AOE is the diameter of the circle. $\angle$ BAE = 72⁰ and $\angle$ AEF = 53⁰, while $\angle$ CBE = 40⁰.
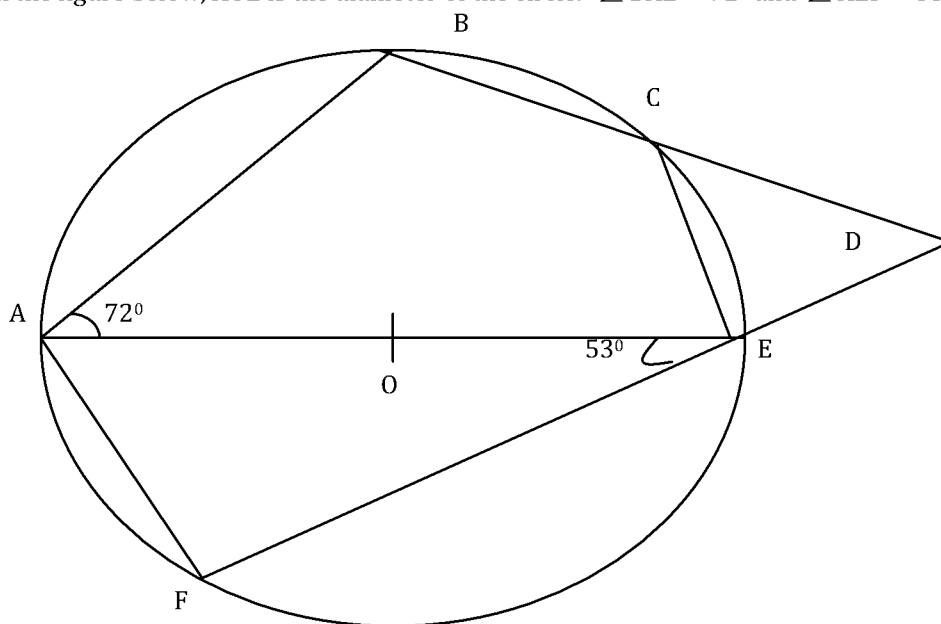
Giving reasons, calculate angle:-
(i) BCE   (2mks)
(ii) EDC   (2mks)
(iii) BEC   (2mks)
(iv) BOE   (2mks)
(v) FCE   (2mks)

23. Using a ruler and compasses only:-
(a) Construct a triangle ABC such that AB = 5cm AC = 6cm, angle BAC = 67.5⁰ measure BC.   (4mks)
(b) On the same diagram construct a circle which passes through the vertices of the triangle ABC. Measure the radius.   (3mks)
(c) Calculate the area of the part that is outside the triangle but within the circle.   (3mks)

24. The height of a model cylindrical tank is 5cm while the height of the actual tank is 4 metres. Find:-
(a) Linear scale factor.   (2mks)
(b) Diameter of the model tank given the diameter of the actual tank is 560cm.   (2mks)
(c) Capacity of the actual tank in litres.   (3mks)
(d) If the above water tank belongs to three families which uses the drinking water in the ratio 2:3:5 per day, find the amount of water used by each family per day.   (3mks)