FORM FOUR CLUSTER KCSE MODEL 7

MATHEMATICS PAPER 2 QUESTIONS

SECTION 1 (50 Marks)

Answer ALL questions in this section in the spaces provided.

1. **Use logarithms to evaluate the following to 4 decimal places.**

$$\frac{6.373x\log 4.948}{\sqrt{(0.004636)}}$$

2. In a certain bakery it is known that when the number of loaves of bread baked increases from 4000 to 6000, the total cost increases from Ksh.22,000 to Ksh.30,000. Find the relationship between the cost (y) and the number of loaves of bread (x) if the relationship is linear

3. Find the value of x given that

$$\log_4 x + \log_x 16 = 3$$

4. a) The ratio of the cost of commodity x to that of commodity y is 2:3 and the ratio of the cost of commodity y to that of commodity z is 6:1. If the total cost of three commodities is sh.1100, a) find the cost of commodity x.

b) Express the cost of commodity z as a percentage of the cost of commodity y

5. Brian deposited Ksh. 8,500 in a financial institution in which interest is compounded semi-annually. If at the end of the fourth year he received a total of Ksh.10, 356.40, calculate the annual rate of interest the institution gives on deposits?

6. Make x the subject of the formula

$$\sqrt{\frac{2\left(c - 3x^{\frac{1}{2}}\right)}{3k}} = 1$$

7. In the figure below, O is the centre of the circle which passes through the points T,C and D. Line TC is parallel to OD and the line ATB is tangent to the circle at T. Angle DOC=360.
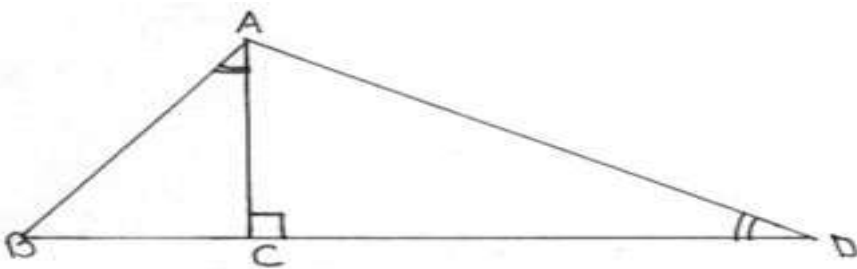
Calculate the size of the obtuse angle TOD.
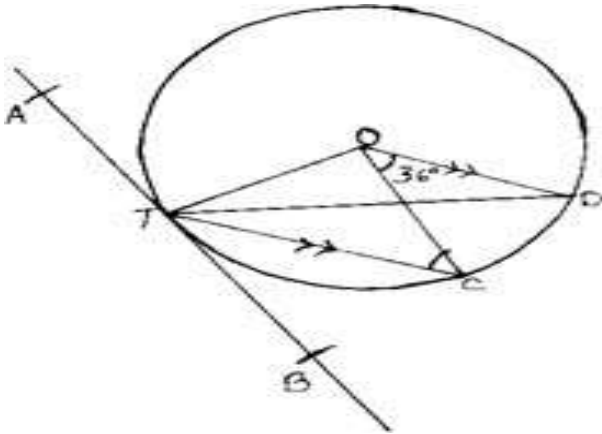
8. Given a spinner as shown below, the area of the dial (in form of a sector) is $\frac{1}{8}$ green, $\frac{1}{6}$ blue, $\frac{3}{7}$ red and $\frac{1}{3}$ white.

If the pointer is spun once, what is the probability that it stops on either green or white?
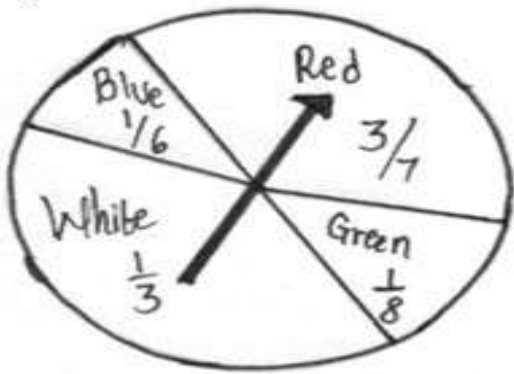
9. In the figure below, angles BAC and ADC are equal, angle ACD is a right angle. The ratio of the sides AC To BC is 4:3


Given that the area of triangle ABC is 24cm2, find the area of triangle ACD

10.   . Show that centres of the circles

$$x^2 + y^2 - 10x - 2y = 4, \quad x^2 + y^2 - 8x - 10y = -16 \quad and \quad x^2 + y^2 - 10x - 14y + 25 = 0$$

lie on a straight line.

11. A cuboid is hung on a horizontal beam AB=6m (as shown below) using two strings. The longer string makes an angle of 53⁰ with the horizontal and is 4.8m long. If the shorter string makes an angle of 79⁰ with the horizontal. Calculate its length
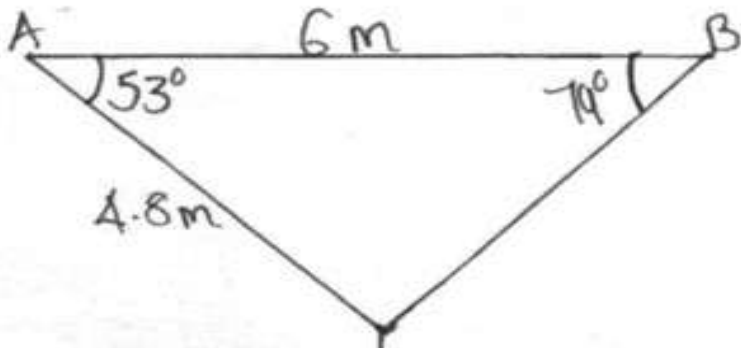
12. a) Expand and simplify the binomial expression

$$\left(3x + \frac{1}{3x}\right)^4$$

13. Simplify as far as possible, leaving your answer in surd form:

$$\frac{1+\sqrt{2}}{2+3\sqrt{3}} - \frac{1-\sqrt{2}}{2-3\sqrt{3}}$$

14. A quantity A varies directly as x and another quantity B varies inversely as x. When x=2, the sum of A and B is 7 and when x=3, the sum is 8; Find the value of A+B when x=4.

15. Points A (2,2) and B(4,3) are mapped onto A1(2,8) and B1 (4,15) respectively by a certain transformation T. Find the matrix T.

16. Water flows from a tap of diameter 7cm at a speed of 5m/s in a tank with a rectangular base measuring 5.5m by 3m and a height of 4.2m. If the tank was half full by 6:00am, at what time will the tank be full if no water leaks from the tank.

SECTION II (50 Marks)

Answer ONLY FIVE questions in this section in the spaces provided.

17. A trader deals in two types of rice; type A and type B. Type A costs Ksh.400 per bag and type B costs Ksh. 350 per bag.

a) The trader mixes 30bags of type A with 50bags of type B. If he sells the mixture at a profit of 20%, calculate the selling price of one bag of the mixture. (4mks)

b) The traders now mixes type A with type B in the ratio x:y respectively. If the cost of the mixture is Ksh.383.50 per bag. Find the ratio x:y. (3mks)

c) A tea broker bought Kenyan tea at sh.150 per kg Ugandan tea at sh.120 per kg and Zairean tea at sh.82.50. He mixed them in the ratio 2:3:4 by mass to make a blend which he sold at a profit of 50%. Determine the price at which he sold one kilogram of the blend. (3mks)

18. If the 1st ,5th and 7th terms of an arithmetic progression (AP) corresponds to the first three consecutive terms of a decreasing geometric progression (GP). The first term of each progression is 64, and the common difference of the AP is d and the common ratio of the G.P is r.

a) Write two equations involving d and r. (2mks)

b) Find the value of d and r. (4mks)

c) Find the sum of

(i) the first 10 terms of the arithmetic progression (AP). (2mks)

ii) the geometric progression (G.P) (2mks)

19. Dr. Nanjala recorded the marks of her political science students in the table as follows:

Marks	21-30	31-40	41-50	51-60	61-70	71-80
Cumulative frequency	4	10	22	25	35	40

a) Prepare a frequency distribution table for this data. (2mks

b) Modify your, table and use it to evaluate

i) the median mark. (4mks)

ii) the mean mark (2mks)

20. Three businessmen Onyango, Wekesa and Cheptai decided to buy a bus. The marked price of the bus was sh.2,800,000. The dealer agreed that the 3 men could pay a deposit of 60% of the marked price and the rest to be paid within a year. Onyango, Wekesa and Cheptai raised the deposit in the ratio 3:2:5 respectively. The balance was to be paid in the same ratio as the deposit. During the year the bus realized Ksh 2,080,000 which was shared in the ratio of their contributions.

a) How much of the deposit did Wekesa contribute? (2mks)

b) How much of the remaining amount did Cheptai pay the end of the year? (2mks)

c) After paying the remaining amount at the end of the year, how much money was Onyango left with? (6mks)