

FORM 4

NAME:**ADM:**.....**DATE:**.....

1. Use logarithms to 4 decimal places to evaluate: (4 marks)

$$\left(\frac{0.7841 \times \sqrt{0.1356}}{\text{Log } 84.92} \right)^{\frac{1}{3}}$$

2. A globe representing the earth has a radius of 0.5m. point A(0°, 10°W), B (0°, 35°E), P(60°N, 110°E) and Q(60°N, 120°W) are marked on the globe.

- a) Find the length of arc AB, leaving your answer in term of π (3mks)

3. A circle centre is the point C(2,3) passes through a point P(a,b). A point M(-2, $\frac{-5}{2}$) is the mid-point of the line CP.

- a) Calculate the coordinates of P. (1mk)

- b) Determine the equation of the circle in the form $x^2 + y^2 + ax + by + c = 0$ (3mks)

4. Make **a** the subject of the formula:

$$x = y + \sqrt{x^2 + a^2} \qquad (3\text{marks})$$

5. Given that $\sin\left(\frac{2}{3}x + 20^\circ\right) - \cos\left(\frac{5}{6}x + 10^\circ\right) = 0$. Without using a mathematical table or a calculator, determine $\tan(x + 20^\circ)$. (3 marks)

6. Two fair dice one a regular tetrahedron (4 faces) and the other a cube are thrown. The scores are added together. Complete the table below to show all possible outcomes. (2 mark)

		CUBE					
		1	2	3	4	5	6
TETRAHEDRON	1						
	2						
	3						
	4						

a) Find the probability that:

i) The sum is 6.

(1 mark)

iii) The sum is 6 or 9.

(2 marks)

7. A particle moves along a straight line such that its displacement s metres from a given point is $s = t^3 - 5t^2 + 3t + 4$ where t is time in seconds. Find:

(a) The displacement of the particle at $t = 8$.

(2 marks)

(b) The velocity of the particle when $t = 10$.

(3 marks)

8. A classroom measures $(x + 2)$ m by $(x - 5)$ m. If the area of the classroom is 60m^2 .

Find its length.

(3 marks)

SECTION B

Lengths of 100 mango leaves from a certain mango tree were measured to the nearest centimeter and recorded as per the table below,

Length in cm	No. of leaves
10 to 12	3
13 to 15	16
16 to 18	36
19 to 21	31
22 to 24	14

- a) On the grid provided draw a cumulative frequency graph to represent this data. (5mks)

- b) Use your graph to estimate
 - i) The median length of the leaves (2mks)

 - ii) The number of leaves whose lengths lie between 13cm and 17cm. (3mks)

(a) Draw ΔPQR whose vertices are P (1, 1), Q (-3, 2) and R (0, 3) on the grid provided. (1mk)

(b) Find and draw the image of ΔPQR under the transformation whose matrix is $\begin{pmatrix} 3 & 0 \\ 1 & 1 \end{pmatrix}$ and label the image $P^1Q^1R^1$. (2 marks)

(c) $P^1Q^1R^1$ is then transformed into $P^{11}Q^{11}R^{11}$ by the transformation with the matrix $\begin{pmatrix} -1 & 0 \\ 1 & 3 \end{pmatrix}$. Find the co-ordinates of $P^{11}Q^{11}R^{11}$ and draw $P^{11}Q^{11}R^{11}$. (3 marks)

(d) Describe fully the single transformation which maps PQR onto $P^{11}Q^{11}R^{11}$ find the matrix of this transformation. (3 marks)

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