



TANZANIA HEADS OF ISLAMIC SCHOOLS COUNCIL
FORM SIX INTER ISLAMIC MOCK EXAMINATION
BASIC APPLIED MATHEMATICS

141

(For Both School and Private Candidates)

TIME: 3 HOURS

Tuesday, 4th March 2025 a.m.

Instructions

1. This paper consists of ten (10) compulsory questions.
2. All work done in answering each question must be shown clearly.
3. Mathematical tables and Non-programmable calculators may be used.
4. Cellular phones and any unauthorized materials are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).

1. (a) Use non-programmable calculator to:

- (i) Compute the value of $\left(\frac{{}^7C_2 \times \ln 5.4}{\sqrt[3]{54}} \div \frac{{}^7P_5 \log 5.4}{\sqrt[3]{34}}\right)^2$ correct to four decimal places
- (ii) Evaluate $\int_0^2 (2x^2 - e^{2x}) dx$

(b) Use a non-programmable calculator to compute $\sqrt[3]{\frac{\log 122 \times \ln 315}{e^{0.9} + \tan^{-1}\left(\frac{\sqrt{5}}{3}\right)}}$ to five significant figures.

(c) Evaluate the value of θ given that $\tan \theta = \frac{14.32 \times \tan 16^\circ 31'}{67.8}$ by using a non-programmable calculator.

2. (a) (i) Sketch the graph of $h(x) = \frac{x^2}{x-2} + \frac{1}{x+2}$

(ii) State the value(s) of x to which $f(x)$ is undefined.

(b) Given $f(x) = 2(x-1)^2 + 3$.

- (i) Find the turning point of the function
- (ii) Identify whether the turning point is maximum or minimum
- (iii) Find the line of symmetry.
- (iv) Find Domain and Range

3. (a) The ratio of the number of girls to that of boys in a school is 7:12. If the number of boys in the school is 1380, find the number of girls.

(b) If 6, x , y and 15 are four consecutive terms of an A.P calculate the value of x and y and hence find the n^{th} term.

(c) If 2 typists in a typing pool can type 210 pages in 3 days, how many typists working at the same speed will be needed to type 700 pages in 2 days?

4. (a) (i) Differentiate $f(x) = \frac{x^2}{x-1}$ from the first principle.

(ii) Find the first derivative of $g(x) = x \cos x$

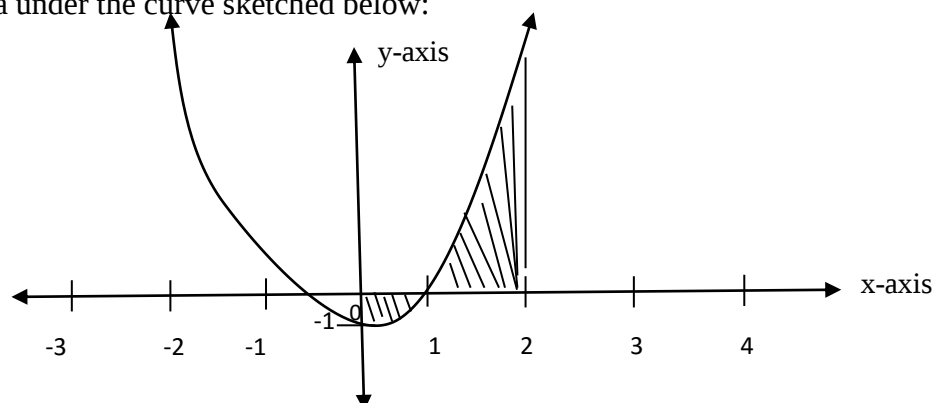
(b) The surface area of a sphere is $4\pi r^2$, where r is radius of the sphere. If the radius increases at the rate of 0.1cm/s, find the rate of change of the area in cm^2/s when the radius of the sphere is 40cm.

5. (a) Find each of the following:

(i) $\int_1^2 (9x^3 - 4x) dx$

(ii) $\int \frac{\sqrt{x^3-4}}{x^2} dx$

(b) Find the area under the curve sketched below:



6. The score of 30 students in General knowledge test were recorded as follows:
 25 26 31 42 19 81 36 51 45 44 54 34 61 70 86 45 27 78 39 47
 90 88 78 41 42 50 52 45 60 43

(a) Construct the frequency distribution table with classes 11-20, 21-30 etc.

(b) Use the frequency distribution table in (a) above to

- Calculate the standard deviation by assumed mean ($A = 60$) method.
- Find the median

7. (a) Verify that $\frac{3}{7}(8C_3 + 8C_2) = 9C_2$

(b) Two events A and B are such that $P(A) = \frac{1}{3}$ and $P(B) = \frac{2}{7}$

- Find $P(A \cup B)$ where A and B are mutually exclusive events.
- Find $P(A \cup B)$ where A and B are independent events

(c) A family has three children. Find the probability that there is one boy and 2 girls in the family.

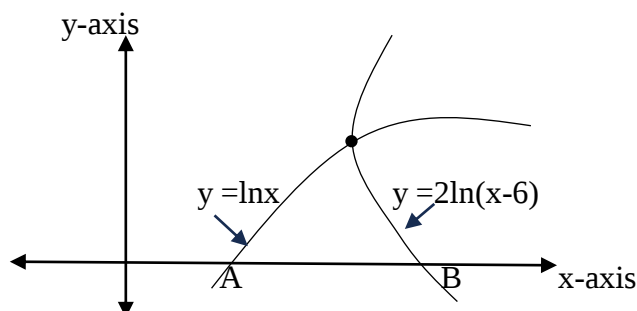
8. (a) Prove that for any value of θ $\sec 2\theta = \frac{\cos \theta + \sin \theta}{\cos \theta - \sin \theta}$

(b) Solve for the θ from, $\tan 2\theta = 1$; $-\pi \leq \theta \leq \pi$

(c) In the triangular ABC, $a = 4\text{cm}$, $b = 6\text{cm}$ and $\hat{A} = 60^\circ$. Find the value of $\hat{B}$

9. (a) The figure given below shown the curves with equation. The curves cross the x-axis at the point A and B respectively and intersect each other at point C.

- Write down the coordinates of A and B.
- Determine the exact coordinate of C.



- (b) Determine the value of x in the following equation $9^x - 3^x - 6 = 0$.

10. (a) A concert audience of 400 people consists of adult, student and children. The ticket price \$ 40 for adult, \$ 20 for student and \$ 10 for children. The total amount taken in is \$ 10600. The number of children tickets sold is 200 less than number of adult and student tickets in total. How many adult, student and children are in attendance (use crammer's rule).
- (b) A special take away fast lunch of food and drinks contain 2 units of vitamin B and 5 units of iron in serving food and in each glass of drinks there are 4 units of vitamin B and 10 units of iron. A minimum of 8 units of vitamin B and 60 units of iron are served each day. If each serving of food cost 2000 Tshs and that of drinks cost 1600 Tsh, how much of the food and drinks to be consumed in order to meet the daily needs at minimum cost?

Wabillah Tawfiq