AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX

MODEL EXAMINATION PAPER 2023 AND ONWARDS

General Mathematics Paper II

Time: 1 hour 40 minutes Marks: 30

INSTRUCTIONS

Please read the following instructions carefully.

1. Check your name and school information. Sign if it is accurate.

I agree that this is my name and school. **Candidate's Signature**

RUBRIC

2. There are NINE questions. Answer ALL questions. Choices are specified inside the paper

3. When answering the questions:

   Read each question carefully.
   Use a black pointer to write your answers. DO NOT write your answers in pencil.
   Use a black pencil for diagrams. DO NOT use colour pencils.
   DO NOT use staples, paper clips, glue or correcting fluid.
   Complete your answer in the allocated space only. DO NOT write outside the answer box.

4. The marks for the questions are shown in brackets ( ).

5. A formulae list is provided on page 2. You may refer to it during the paper, if you wish.

6. You may use a simple calculator if you wish.

Aga Khan University Examination Board

List of Formulae

General Mathematics IX

NOTE:

- The symbols have their usual meanings.
- The same formulae list will be provided in annual and re-sit examinations.

Business Mathematics

$$\text{Loss }\% = \left(\frac{\text{Loss}}{CP} \times 100\right) \qquad \text{Profit }\% = \left(\frac{\text{Profit}}{CP} \times 100\right) \qquad SP = CP \times \left(\frac{100 + \text{profit}\,\%}{100}\right)$$

$$SP = CP \times \left(\frac{100 - \text{loss}\%}{100}\right) \qquad \text{Discount }\% = \frac{\text{Discount}}{MP} \times 100$$

Sets and Functions

$$(A \cup B)^c = A^c \cap B^c \qquad (A \cap B)^c = A^c \cup B^c$$

Exponents and Logarithms

$$a^m \times a^n = a^{m+n} \qquad a^m \div a^n = a^{m-n} \qquad \frac{a^m}{b^m} = \left(\frac{a}{b}\right)^m$$

$$\left(a^m\right)^n = a^{mn} \qquad (a \times b)^m = a^m \times b^m \qquad a^{\frac{m}{n}} = \sqrt[n]{a^m}$$

$$\log_a (m)^n = n \log_a m \qquad \log_a (m \times n) = \log_a m + \log_a n \qquad \log_a \left(\frac{m}{n}\right) = \log_a m - \log_a n$$

$$\log_a n = \log_b n \times \log_a b \qquad \log_a b = n \Leftrightarrow a^n = b$$

Algebraic Formulae & Applications and Factorisation

$$(a-b)^2 = a^2 - 2ab + b^2 \qquad (a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \qquad a^2 - b^2 = (a+b)(a-b)$$

$$a^3 - b^3 = (a-b)\left(a^2 + ab + b^2\right) \qquad a^3 + b^3 = (a+b)\left(a^2 - ab + b^2\right)$$

$$(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca \qquad (a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

Conversion Graphs

$$1 \text{ mile} = \frac{8}{5} \text{km} \qquad 1 \text{ Hectare} = 2.471 \text{ Acres} \qquad {}^\circ F = \frac{9}{5} \times {}^\circ\text{C} + 32$$

Matrices and Determinants

$$A^{-1} = \frac{1}{|A|} AdjA$$

(ATTEMPT EITHER PART a OR PART b OF Q.1.)

Q.1.

(Total 3 Marks)

a. Salman pays a total of Rs 21,000 as school fees of his two children. The fee of the elder child is 10% more than the fee of the younger child. Find the fee of both the children separately. (3 Marks)

b. Saima has annual savings of Rs 600,000 and jewellery worth Rs 350,000. She paid her *Zakat* at the rate of 2.5%.

i. Calculate the amount of *Zakat* she paid. (2 Marks)

ii. She paid *Zakat* of Rs 13,000 to her needy relative. What percentage of *Zakat* did she pay to her relative? (1 Mark)

Q.2. (Total 4 Marks)

A fruit vendor bought 100 kg apples for Rs 9,000, 30 dozen bananas for Rs 1,800 and 50 kg grapes for Rs 6,000. He spent Rs 900 on transportation and sold all the fruits as per the given rates.

- Apples at Rs 140 per kg
- Bananas at Rs 75 per dozen
- Grapes at Rs 150 per kg

Based on the given situation, find his net profit on the sale of the fruits.

Q.3. (Total 3 Marks)

Two sets are defined as $S = \{1, 2, 3, 4\}$ and $T = \{2, 6, 8\}$.

From S to T, state

i. a binary relation which is NOT a function. (1 Mark)

ii. an into function. (1 Mark)

iii. an onto function. (1 Mark)

Q.4 (Total 3 Marks)

Apply the laws of exponents to simplify $\sqrt[3]{125\times\frac{1}{x^6}}\times\left(\frac{x^4}{25}\right)^{\frac{1}{2}}$ into the simplest form.

Q.5. (Total 4 Marks)

Simplify the following expression into the lowest term.

$$\frac{a^2x^2+2abx+b^2}{(ax-b)\times(ax+b)}\div\frac{ax+b}{ax-b}$$

(ATTEMPT EITHER PART a OR PART b OF Q.6.)

Q.6. (Total 4 Marks)

a. The algebraic expression x^3+3x^2+ax-b is divided by x and $x+2$ and the remainders are 3 and -12 respectively. Find the value of a. (4 Marks)

b. Factorise the following expressions completely.

i. $ax+2y+2x+ay$ (3 Marks)

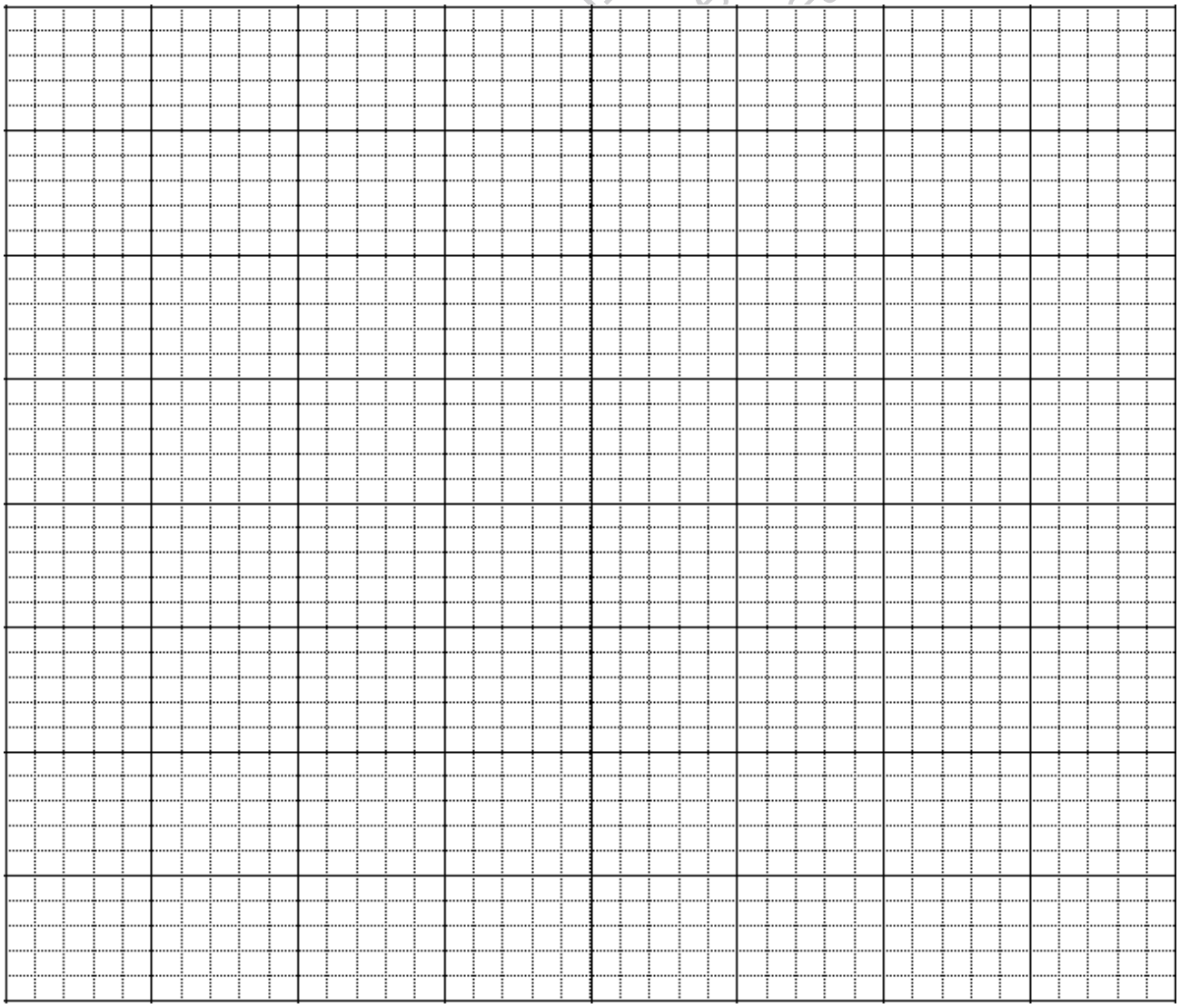
ii. $(x+b)^2-4$ (1 Mark)

Q.7. (Total 3 Marks)

i. For the linear equation $2x + 3y = 12$, find the missing value of x in the given table. (1 Mark)

x	– 3	?
y	6	8

ii. Use the values in the table to draw the line $2x + 3y = 12$ on the given graph. (2 Marks)



(ATTEMPT EITHER PART a OR PART b OF Q.8.)

Q.8. (Total 3 Marks)

a. Find the matrix X from the following equation.

$$X+\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}\times\begin{bmatrix}0 & 1\\ 2 & 3\end{bmatrix}=\begin{bmatrix}20 & 16\\ 12 & 8\end{bmatrix}$$

b. For the matrices $A=\begin{bmatrix}3 & 2\\ 1 & 4\end{bmatrix}$ and $B=\begin{bmatrix}4 & 2\\ 6 & 4\end{bmatrix}$, find $A\times B^{-1}$.

Q.9. (Total 3 Marks)

i. Draw a triangle whose sides are of measurements 9 cm, 6 cm and 7 cm. (2 Marks)

ii. Construct one of the altitudes of the triangle drawn in part i. (1 Mark)

Space for diagram

END OF PAPER

Please use this page for rough work

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