APOLLO

FBISE Mathematics Class 9
Topical workbook - Volume 1 of 3

140 questions arranged by official framework topic.
National Curriculum 2022-23; supported examinations from 2027.

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Real Numbers

Domain A: Numbers and Algebra

FBISE model paper | Section A Q2 | 0.75 marks

2	The scientific notation of 150 million kilometres is:	1.5×10^{6}	1.5×10^{8}	1.5×10^{-6}	1.5×10^{-8}

FBISE model paper | Section A Q3 | 0.75 marks

3	The temperature in a freezer was $-\frac{9}{2}^{\circ}\ C$. It increased by $\frac{5}{2}^{\circ}\ C$. What is the new temperature?	$7°C$	$2°C$	$-2°C$	$-7°C$

FBISE model paper | Section B Q1 | 3 marks

1	Using the laws of exponents, simplify: $\left(\frac{2187 \times a^{5} \times b^{17}}{a^{12} \times b^{3}}\right)^{\frac{1}{7}}$	3

FBISE model paper | Section B Q5 OR | 3 marks

OR	The intensity of sound is measured by $L = 10 \log\left(\frac{I}{I_0}\right)$. A machine produces intensity $1000I_0$. Find the value of L.	3

A radioactive substance decays according to the formula $M=200x10^{-0.05t}$, where 'M' is mass in grams and 't' is time in years.

ایک تابکار مادہ $M=200x10^{-0.05t}$ کے مطابق خرچ ہو رہا ہے۔ **M** گرامز میں ماس ہے اور **t** سالوں میں وقت ہے۔

04

a Use logarithms to express 't' in terms of 'M'

بذریعہ لوگرتھم **t** کو **M** پر منحصر دکھائیں

b Find time 't' when mass 'M' reduces to 100 grams.

ٹائم **t** معلوم کریں جب **M≈100** گرام

Solve the equation and represent the solution on a

(iii)	The population of a colony is growing according to the formula $P = 2500 \times e^{0.09t}$, where P is the population and t is the time in years ایک کالونی کی آبادی $P = 2500 \times e^{0.09t}$ کے مطابق بڑھ رہی ہے۔ جبکہ P آبادی اور t سالوں میں وقت ہے۔ **a** Use logarithms to express t in terms of P. بذریعہ لوگرتھم t کو P پر منحصر دکھائیں **b** Calculate time t when population increases to 10,000. ٹائم t معلوم کریں جب آبادی 10000 ہو جائے	04

Second Annual 2025 | Section B Q2(i) | 4 marks

(i)	Simplify: مختصر کریں: $\frac{(2x^2)^{-4}}{(-4y^{-1}z^2)^{-2}}$	04

Second Annual 2025 | Section B Q2(iii) | 4 marks

(iii)	Energy magnitude of an earthquake can be calculated by $M = \frac{3}{2}log_{10}E + 94$ where E is the energy released. Calculate the magnitude of earthquake when $E = 10^4$. Round the answer to nearest whole number.	04

First Annual 2026 | Section A Q1(iv) | 1 mark

(iv) The characteristic of log 325 is:

A. 3 B. 2 C. 5 D. 10

First Annual 2026 | Section A Q1(vi) | 1 mark

(vi) In $-15a^3$ the exponent is:

A. –15 B. +15 C. a D. 3

First Annual 2026 | Section A Q1(viii) | 1 mark

(viii) $\sqrt{x} =$

A. $x^{\frac{1}{2}}$ B. $x^{\frac{1}{4}}$ C. $x^{\frac{2}{3}}$ D. $x^{\frac{1}{3}}$

First Annual 2026 | Section A Q1(x) | 1 mark

(x) If $x = 4 - \sqrt{17}$ then value of $\frac{1}{x}$ is:

A. $-4+\sqrt{17}$ B. $4+\sqrt{17}$ C. $-4-\sqrt{17}$ D. $\frac{1}{4-\sqrt{17}}$

First Annual 2026 | Section A Q1(xi) | 1 mark

(xi) $4 \times 5° =$

A. 20 B. 4 C. 5 D. 9

First Annual 2026 | Section A Q1(xiv) | 1 mark

(xiv) The simplest form of $(125)^{\frac{2}{3}}$ is:

A. 25 B. 5 C. $\frac{2}{3}$ D. 5^3

First Annual 2026 | Section B Q2(i) | 3 marks

(i) Simplify: $\sqrt{180}$

First Annual 2026 | Section B Q2(ii) | 3 marks

(ii) Write the following in exponential form: 5 P.P.P.P

First Annual 2026 | Section B Q2(iii) | 3 marks

(iii) Rationalize the denominator: $\frac{1}{4-\sqrt{5}}$

First Annual 2026 | Section B Q2(iv) | 3 marks

(iv) Write in scientific notation: 404.4

First Annual 2026 | Section B Q2(vi) | 3 marks

(vi) Simplify and write the answer in positive exponents: $\left(x^2y^3\right)^{-4}$

First Annual 2026 | Section B Q2(xv) | 3 marks

(xv) Simplify: $\sqrt{\frac{9}{100}}$

First Annual 2026 | Section C Q5 | 8 marks

5 simplify: $\sqrt[3]{\frac{64a^3b^6}{216c^6d^9}}$

6 Construct triangle ΔA

OR	calculate: **a.** The probability of selecting a white ball. **b.** The probability of selecting a black ball **c.** The sum of all the probability
OR	An earthquake that occurred in Pakistan in 2005, measured 7.6 on the Richter scale. In 1978, an earthquake in China measured 8.2 on the Richter scale. How many times, the China's earthquake was stronger than the Pakistan's earthquake? (Use $M = \log\left(\frac{I}{I_0}\right)$)

First Annual 2026 | Section B Q2(iii) | 4 marks

An earthquake of 1920 was measured about 8.5 on Richter scale and another earthquake of 1923 was measured 7.8 on that scale how many times stronger was the 1920 earthquake than 1923 earthquake? $(M = \log\left(\frac{I}{I_0}\right))$	04

First Annual 2026 | Section A Q2 | 1 mark

2. Scientific notation of 71000 is:	7.1×10^{2}	0.71×10^{2}	7.1×10^{3}	7.1×10^{4}

First Annual 2026 | Section B Q2(viii) OR | 4 marks

OR	Starting with 500 users, a startup experiences continuous growth at a rate of 8% per year. To determine the number of years it takes for the company to reach 3000 users, use the formula $N(t) = N_0 \times e^{rt}$ where $N(t)$ is the number of users after time t. N_0 is the initial number of users, r is the growth rate and t is the time in years.	**04**

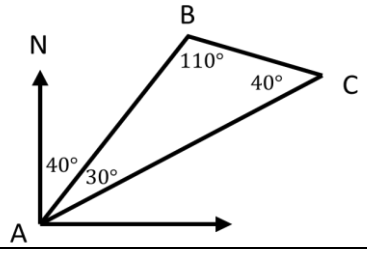
FBISE model paper | Section A Q1(i) | 1 mark

i.	The radical form of $x^{-\frac{3}{2}}$ is:	$\sqrt[3]{x^2}$	$\frac{1}{\sqrt{x^3}}$	$\sqrt{x^3}$	$\frac{1}{\sqrt[3]{x^2}}$

FBISE model paper | Section A Q1(ii) | 1 mark

ii.	Which of the given options represents the scientific notation of 0.25^2 ?	625×10^{-4}	62.5×10^{-3}	6.25×10^{-2}	0.625×10^{-1}

Q.2	Question	Mark
i.	Simplify the expression $\left[(125)^{\frac{1}{3}} \times (25)^{\frac{1}{2}} + (64)^{\frac{2}{3}} \times 6 + (8)^{\frac{2}{3}}\right]^{\frac{-2}{3}}$	4

Q.2	Question	Mark
i.	Simplify the expression $\left[(125)^{\frac{1}{3}} \times (25)^{\frac{1}{2}} + (64)^{\frac{2}{3}} \times 6 + (8)^{\frac{2}{3}}\right]^{\frac{-2}{3}}$	4
ii.	The attached figure shows the position of three points A, B, and C. State the bearing of: B from A; A from B; B from C, and C from B. 	4
iii.	Bani Gala had a population of 10,000 people in the year 2015. The population has been growing exponentially at a rate of 2.5% per year. Using the exponential growth formula $P(t) = P_0 e^{rt}$, apply laws of logarithm to determine the year when population reaches up to 25,000.	4

First Annual 2025 | Section B Q2(iv) | 4 marks

(iv)	If $x=\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$, then find	اگر $x=\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$ تو معلوم کریں۔	04	OR	Find the value of $\sqrt{s(s-a)(s-b)(s-c)}$
	a). $x+\frac{1}{x}$	b). $x^2+\frac{1}{x^2}$			$a=5, b=7, c=8, s=\frac{a+b+}{2}$
					$\sqrt{s(s-a)(s}$ کی قیمت معلوم کریں۔
	Prove that the bisectors of the angles of a triangle				Factorize:

Second Annual 2025 | Section B Q2(iii) OR | 4 marks

Use the logarithm law $log_a m \cdot log_m n = log_a n$ to prove that $log_2 4 . log_4 8 + log_2 8 . log_8 16 = 7$ لاگارتھم کا قانون $log_a m \cdot log_m n = log_a n$ استعمال کرکے ثابت کریں۔	04
Find HCF:	

Second Annual 2025 | Section B Q2(iii) | 4 marks

(iii)	Convert $\sqrt[5]{x^3}$ to exponent form and $x^{\frac{7}{3}}$ to radical form. $\sqrt[5]{x^3}$ کو قوت نمائی میں اور $x^{\frac{7}{3}}$ کو ریڈیکل کی شکل میں تبدیل کریں۔	04	OR
(iv)	Factorize		

First Annual 2026 | Section A Q4 | 1 mark

3.	matrix [2 4] is called: قالب [2 4] کس قسم کا قالب ہے؟	Square matrix مربعی قالب	Unit matrix واحد قالب	matrix مستطیلی قالب	matrix وتری قالب
4.	$\log\left(\frac{8}{2}\right) =$	log 4	log 6	log 10	log 16

First Annual 2026 | Section A Q8 | 1 mark

7.	Product of two algebraic expressions is: دو الجبری جملوں کا حاصل ضرب:	HCF×LCM	HCF+LCM	HCF	HCF
8.	$\|-5\| =$	-5	5	0	10

First Annual 2026 | Section B Q2(i) OR | 4 marks

Show that: ثابت کریں کہ :

$$\left(\frac{x^a}{b}\right)^{a+b} \times \left(\frac{x^b}{c}\right)^{b+c} \times \left(\frac{x^c}{a}\right)^{c+a} = 1$$

04

First Annual 2026 | Section B Q2(ii) OR | 4 marks

Find value of x : x کی قیمت معلوم کریں:

$$\log_{64} 8 = \frac{x}{2}$$

04

First Annual 2026 | Section B Q2(iii) | 4 marks

(iii)	Write the following in sum or difference: $\log\left(\frac{25\times 47}{29}\right)$ درج شدہ کو مجموعہ یا فرق کی صورت میں لکھیں:	04

First Annual 2026 | Section B Q2(ix) | 4 marks

(ix)	If gross pay of a person is Rs. 45000, then calculate his net take home salary, after deduction of Rs. 400 as income tax, Rs. 1200 as benevolent fund, Rs. 1500 as G.P. fund and Rs. 400 as group insurance. اگر ایک شخص کی آمدنی میں کٹوتی کی شکل میں 400 روپے انکم ٹیکس، 1200 روپے ...	04	OR	Find $x+\frac{1}{x}$ and $x-\frac{1}{x}$ if: $x=\frac{15}{\sqrt{31-}}$

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Sets and Functions

Domain A: Numbers and Algebra

FBISE model paper | Section A Q4 | 0.75 marks

4	For what values of x and y, $(x + y, 4x + 1) = (3,9)$?	$x = 1$, $y = 2$	$x = 0.5$, $y = 8.5$	$x = 2$, $y = 1$	$x = 2$ $y = 7$

FBISE model paper | Section B Q7 | 3 marks

7	Consider the relation $R = \{(2,4), (3,9), (4,16), (5,25)\}$. (a) Find the domain and range of the relation. (b) Identify the rule connecting the elements.	3

8	Verify the Associative Laws of union for three sets A, B, C using the analytical method.	6

First Annual 2025 | Section B Q2(i) OR | 4 marks

Verify $A \cap (B \cap C) = (A \cap B) \cap C$ for given sets using Venn diagram. $A = \{2,3,5,7\}$, $B = \{1,2,3,5\}$ and $C = \{3,4,6\}$ $A \cap (B \cap C) = (A \cap B) \cap C$ درج سیٹوں سے بذریعہ وین اشکال ثابت کریں کہ	04

First Annual 2025 | Section B Q2(ii) OR | 4 marks

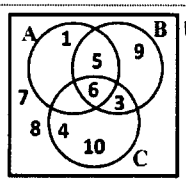
		$X = \{1,9\}$ $Y = \{2,4,6\}$		
		For the given sets:	دیے گئے سیٹوں کے لیے معلوم کریں:	
04	OR	**a** Find Cartesian Product $X \times Y$	کارتیسی حاصل ضرب $X \times Y$	04
		b List all the ordered pairs of the relation	درج شدہ ربط کے مترتب جوڑے	
		$R = \{(x, y) \mid x \in X, y \in Y, x > y\}$		

Q.4

$U = \{1,2,3,4,5,6,7,8,9,10\}$

$A = \{1,2,5,6\},\ B = \{3,5,6,9\}$

$C = \{3,4,6,10\}$



The Venn diagram shows universal set U and sets A, B and C. Find elements of the following sets using Venn diagram.

درج وین ڈائیگرام میں یونیورسل سیٹ **U** اور سیٹس **A,B** اور **C** دکھائے گئے ہیں۔ بذریعہ وین ڈائیگرام درج شدہ کے ارکان معلوم کریں:

a	A^c, B^c, C^c	**c**	$B^c \cap C^c$
b	$A \cup B,\ (A \cup B)^c$	**d**	$B \cap C, (B \cap C)^c$

08

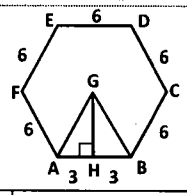
OR

a Slopes of sides AB, BC and AC — تینوں اطراف کی سلوپ

b Interior angles $\angle A, \angle B$ and $\angle C$ — اندرونی زاویے

For the given regular hexagonal roof ABCDEF of side measure 6m, find:

دی گئی متناسب مسدس **ABCDEF** کی ہر سائیڈ 6 سم ہے۔ درج شدہ معلوم کریں:



a	Angles $\angle AGB$ and $\angle AGH$	زاویے
b	Lengths $\overline{AH}$ and $\overline{GH}$	لمبائیاں $\overline{AH}$ اور $\overline{GH}$
c	The area of ΔAGB	مثلث ΔAGB کا رقبہ
d	Area of the hexagonal roof	مسدس کا رقبہ

08

First Annual 2025 | Section B Q2(i) OR | 4 marks

Verify $A\cup(B\cup C)=(A\cup B)\cup C$ For given sets using Venn diagram. $A=\{1,2,3,4,5\},\ B=\{2,5,7,9\}\ \ C=\{3,5,9,11\}$ $A\cup(B\cup C)=(A\cup B)\cup C$ درج سیٹوں سے بذریعہ وین اشکال ثابت کریں کہ	04

Second Annual 2025 | Section B Q2(i) OR | 4 marks

Let $A=\{1,2,3\}$ and $B=\{4,5\}$. Find $A\times B$ and write the elements of domain and range. اگر $A=\{1,2,3\}$ اور $B=\{4,5\}$ ہو، تو $A\times B$ معلوم کریں نیز اس کی ڈومین اور رینج	04

Second Annual 2025 | Section B Q2(ii) OR | 4 marks

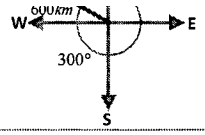
Use Venn diagram to verify that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ where A={1,2}, B={2,3}, C={1,3}	04

First Annual 2026 | Section B Q2(iii) | 4 marks

(iii)	If $A = \{1,3\}$ and $B = \{2,4\}$: **a.** Write the cartesian product $A \times B$. **b.** Find $R_1 = \{(x,y) \mid x \in A, y \in B \wedge x > y\}$	3+1	OR	Find the equation of a line through the point $(1,3)$ and the point of intersection of lines $2x-3y+4=0$ and $4x+y-1=0$.	04

OR	calculate: **a.** The probability of selecting a white ball. **b.** The probability of selecting a black ball **c.** The sum of all the probability	**04**
OR	An earthquake that occurred in Pakistan in 2005, measured 7.6 on the Richter scale. In 1978, an earthquake in China measured 8.2 on the Richter scale. How many times, the China's earthquake was stronger than the Pakistan's earthquake? (Use $M = \log\left(\frac{I}{I_o}\right)$)	**04**
OR	Find the equation of a line through the point $(1,3)$ and the point of intersection of lines $2x-3y+4=0$ and $4x+y-1=0$.	**04**
OR	Factorize the quadratic expression: $3x^2+16x-12$	**04**
OR	Verify that $\sin^2\theta+\cos^2\theta=1$	**04**
OR	Prove by using Venn diagram $(P\cup Q)\cup R=P\cup(Q\cup R)$. $P=\{0,1,2,3\}, Q=\{2,3,4,5,6\}, R\{5,6,7,8,9\}$	**2+2**

First Annual 2026 | Section C Q2(iii) | 4 marks

	واقعے کا زلزلہ کے لیے شدید تھا؟ (مساوات $M = \log\left(\frac{I}{I_o}\right)$ کا استعمال کریں)	OR	04		(ii)
	ایسی لائن کی مساوات اخذ کریں جو نقطہ $(1,3)$ سے اور	OR	3+1	اگر $A = \{1,3\}$ اور $B = \{2,4\}$ ہوں تو معلوم کریں: الف۔ کارتیسی حاصل ضرب $A \times B$	(iii)

First Annual 2026 | Section C Q2(v) OR | 4 marks

04	ثابت کریں کہ: $\sin^2\theta + \cos^2\theta = 1$	OR	04	درج قائمۃ الزاویہ مثلث حل کریں: $\Delta ABC,\ m\angle C = 90°,\ a = 4cm,\ c = 4\sqrt{2}cm$	(v)
2+2	بذریعہ وین ڈائیگرام ثابت کریں: جبکہ $(P \cup Q) \cup R = P \cup (Q \cup R)$. $P = \{0,1,2,3\}, Q = \{2,3,4,5,6\}, R\{5,6,7,8,9\}$	OR	04	نقاط $A(2,3)$ اور $B(6,11)$ سے گزرنے والی لائن کی ڈھلوان معلوم کریں۔	(vi)

First Annual 2026 | Section B Q2(i) OR | 4 marks

OR	$U=\{1,2,3,4,5,6\}, A=\{2,5,6\}, B=\{1,2,3\}$, then use Venn diagrams to show that: $(A\cup B)'=A'\cap B'$	**2+2**

First Annual 2026 | Section B Q2(viii) | 4 marks

(viii)	If $A=\{1,3\}$ and $B=\{2,4\}$:	
	a. Write the cartesian product $A\times B$.	**2+2**
	b. Find $R_1=\{(x,y)\mid x\in A, y\in B\wedge x>y\}$	

First Annual 2026 | Section A Q3 | 1 mark

3. Range of $\{(1,3),(2,5)\}$ is:	$\{1,2\}$	$\{3,5\}$	$\{1,3\}$	$\{2,5\}$

First Annual 2026 | Section B Q2(i) OR | 4 marks

$\frac{(25)^{\frac{1}{2}}}{(0.04)^{\frac{-1}{2}}}$	**04**	**OR**	then show that using Venn diagram $(A \cup B)' = A' \cap B'$.	**2+2**

First Annual 2026 | Section B Q2(ii) OR | 4 marks

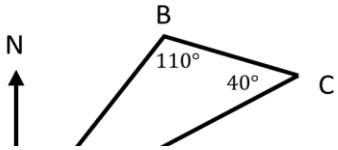
Let $A = \{1,4,8\}, B = \{1,0\}$, find Cartesian product $A \times B$. Find $R_1 = \{(x,y) \mid x \in A \; y \in B \wedge x \geq y\}$	**3+1**

FBISE model paper | Section A Q1(iii) | 1 mark

iii.	If $A = \{2,4,6\}$ and $B = \{0,1\}$, then find number of elements in $A \times B$.	5	6	8	9

FBISE model paper | Section B Q2(i) OR | 4 marks

Q.2	Question	Marks	Question		Mark
i.	Simplify the expression $\left[(125)^{\frac{1}{3}} \times (25)^{\frac{1}{2}} + (64)^{\frac{2}{3}} \times 6 + (8)^{\frac{2}{3}}\right]^{\frac{-2}{3}}$	4	***OR***	If $X = \{1,3,9\}, Y = \{3,5,7\}$ and $Z = \{3,5,7,9,11\}$ then using Venn diagram, prove that $X \cup (Y \cap Z) = (X \cup Y) \cap (X \cup Z)$	4

Q.2	Question	Marks	Question		Mark
i.	Simplify the expression $\left[(125)^{\frac{1}{3}} \times (25)^{\frac{1}{2}} + (64)^{\frac{2}{3}} \times 6 + (8)^{\frac{2}{3}}\right]^{\frac{-2}{3}}$	4	***OR***	If $X = \{1,3,9\}, Y = \{3,5,7\}$ and $Z = \{3,5,7,9,11\}$ then using Venn diagram, prove that $X \cup (Y \cap Z) = (X \cup Y) \cap (X \cup Z)$	4
ii.	The attached figure shows the position of three points A, B, and C. State the bearing of: B from A; A from B; B from C, and C from B. 	4	***OR***	For $A = \{1,2,3\}, B = \{3,4\}$ (a) List all the ordered pairs of the Cartesian Product $A \times B$, (b) List all the ordered pairs of a relation $R = \{(x,y) \mid x \epsilon A, y \epsilon B \wedge x < y\}$, (c) Find domain and range of the relation R.	4

(vii)	Make a table of four pairs of value for $y = 2x + 1$. (Graph is **NOT** required) $y = 2x + 1$ کے لیے 4 مرتب جوڑوں پر مشتمل جدول بنائیے۔	04

APOLLO

Factorization

Domain A: Numbers and Algebra

FBISE model paper | Section A Q5 | 0.75 marks

5	If $(x-1)$ is a factor of x^3-5x^2+ax+6, the value of a is:	-2	-1	0	2

FBISE model paper | Section A Q6 | 0.75 marks

6	If $x^2-11x+30=(x-a)(x-b)$, then value of $a+b$ is:	-30	-11	11	30

FBISE model paper | Section A Q7 | 0.75 marks

7	The HCF of $6x^2y$ and $9xy^2$ is:	$3x^2y$	$3x^2y^2$	$3xy$	$18x^2y^2$

FBISE model paper | Section A Q8 | 0.75 marks

8	If $\sqrt{x^2+6x+9}=x+k^2$, the value of k is:	-3	$\pm\sqrt{9}$	3	$\pm\sqrt{3}$

FBISE model paper | Section A Q9 | 0.75 marks

9	The profit of a small business is modelled by $x^2-9x+20$. For a breakeven point the factorized expression is:	$(x-4)(x-5)$	$(x-4)(x+5)$	$(x+4)(x-5)$	$(x+4)(x+5)$

FBISE model paper | Section B Q2 | 3 marks

2	Solve the equation $\lvert 2x-3\rvert=\lvert x+5\rvert$	3

4	The volume of a rectangular box is given by $x^3 + 6x^2 + 11x + 6$ cubic cm. If its height is $(x+1)$ cm, find the product of its length and width.	3

9	If $A = 12x^3y^2(x^2 - 9)$, $B = 18x^2y^3(2x^2 + 5x - 3)$ Factorize both expressions completely, then determine their HCF and LCM. Also verify that $A \times B = HCF \times LCM$	6

First Annual 2025 | Section B Q2(iii) OR | 4 marks

Find the square root of

$$4x^4 + 12x^3 + 29x^2 + 30x + 25$$

درج فقرے کا جذر المربع معلوم کریں:

04

First Annual 2025 | Section B Q2(iv) OR | 4 marks

Factorize:

$$\left(x^2 - 7x + 4\right)\left(x^2 - 7x + 5\right) - 2$$

تجزی کریں:

04

Q.3	Find HCF and LCM in simplified form using factorization method. $x^6 - 1, x^4 + x^2 + 1$ درج الجبری جملوں کے عاد اعظم اور ذو اضعاف اقل معلوم کریں۔	**08**

First Annual 2025 | Section B Q2(iii) OR | 4 marks

y is growing according to $e^{0.09t}$, where P is the e in years $2500 \times e^{0.09t}$ ایک کالونی کی آبادی t سالوں میں وقت ہے۔	04	OR	Find the square root of: $81x^4 - 90x^3 + 61x^2 - 20x + 4$ درج فقرے کا جذر المربع معلوم کریں:	04

First Annual 2025 | Section B Q2(iv) OR | 4 marks

Factorize: $(x^2 - 5x + 3)(x^2 - 5x + 7) - 5$ تجزی کریں:	04

Q.3	Find HCF and LCM in simplified form using factorization method. $2x^3 - x^2 - 8x + 4 \quad , \quad 2x^3 + 3x^2 - 8x + 3$ درج الجبری جملوں کے عاد اعظم اور ذو اضعاف اقل معلوم کریں۔	**08**

Second Annual 2025 | Section B Q2(iv) OR | 4 marks

Factorize: $x^3 + x^2 - 4x - 4$	تجزی کریں:	04

Second Annual 2025 | Section B Q2(ix) | 4 marks

(ix)	Find the HCF and LCM of $x^2 - 9$ and $x^2 - x - 6$. $x^2 - 9$ اور $x^2 - x - 6$ کا HCF اور LCM معلوم کریں۔	04

Second Annual 2025 | Section C Q3 | 8 marks

Q.3	Find the square root of: جذرالمربع معلوم کریں۔ $x^4 - 4x^3 + 14x^2 - 20x + 25$	08

First Annual 2026 | Section A Q1(i) | 1 mark

(i) Degree of the expression x^3yz^2 is:

A. 5 B. 6 C. 3 D. 2

First Annual 2026 | Section A Q1(ii) | 1 mark

(ii) $(7-2)(7+2) =$

A. 48 B. 36 C. 25 D. 45

First Annual 2026 | Section A Q1(iii) | 1 mark

(iii) $(x+y)^2 =$

A. $x^2 - 2xy + y^2$ B. $x^2 + 2xy + y^2$ C. $(x+y)(x-y)$ D. $x^2 - y^2$

First Annual 2026 | Section A Q1(vii) | 1 mark

A. -15 B. C. D.

(vii) What will be added to $4x^2+25y^2$ to make it a complete square?

A. $20xy$ B. $24xy$ C. $12xy$ D. $16xy$

First Annual 2026 | Section A Q1(xv) | 1 mark

(xv) $(a-b)(a+b)=$

A. $a^2+2ab+b^2$ B. $a^2-2ab+b^2$ C. a^2-b^2 D. a^2+b^2

First Annual 2026 | Section B Q2(v) | 3 marks

(v) Factorize: $9l^2+12lm+4m^2$

First Annual 2026 | Section B Q2(viii) | 3 marks

(viii) Find the value of a^2+b^2 when $a+b=4$, $ab=3$.

First Annual 2026 | Section B Q2(x) | 3 marks

(x) Write the algebraic expression in ascending and descending order $2y^3 - 5 + 4y^4 + y^5 + 3y^2$

First Annual 2026 | Section B Q2(xi) | 3 marks

(xi) Use formula to find the product: $(2a + 2b)(2a - 2b)(4a^2 + 4b^2)$

First Annual 2026 | Section B Q2(xiii) | 3 marks

(xiii) Factorize x^4+64y^4.

First Annual 2026 | Section B Q2(xiv) | 3 marks

(xiv) Use remainder theorem to find the remainder $x^3+6x^2-11x+8$ is divided by $x+1$

(xv) Simplify: $\sqrt{\frac{9}{\square}}$

First Annual 2026 | Section B Q2(xvi) | 3 marks

(xvi) Factorize: z^3+125

(xvii) If $A=\begin{bmatrix}5 & 5\end{bmatrix}$, $B=\begin{bmatrix}2$

First Annual 2026 | Section B Q2(xviii) | 3 marks

(xviii) Find the product of: $(x+3)(x^2-3x+9)$

OR	calculate: **a.** The probability of selecting a white ball. **b.** The probability of selecting a black ball **c.** The sum of all the probability
OR	An earthquake that occurred in Pakistan in 2005 measured 7.6 on the Richter scale. In 1978, ar earthquake in China measured 8.2 on the Richte scale. How many times, the China's earthquake wa stronger than the Pakistan's earthquake? (Use $M = \log\left(\frac{I}{I_o}\right)$)
OR	Find the equation of a line through the point $(1,3)$ and the point of intersection of lines $2x-3y+4=0$ and $4x+y-1=0$.
OR	Factorize the quadratic expression: $3x^2+16x-12$

First Annual 2026 | Section B Q2(ix) | 4 marks

				better represents the income level? Give reason.	
(ix)	For algebraic expressions $P = 6x^2y$ and $Q = 9xy^2$ show that $P \times Q = LCM \times HCF$	**1x4**	**OR**	In a coin toss experiment, Head is obtained 15 times in 50 trials. Calculate the relative frequencies of Head and Tails.	**2+2**

First Annual 2026 | Section C Q2(iv) OR | 4 marks

درج عدم مساوات کو حل کریں اور حل کو نمبر لائن پر ظاہر کریں: $-3x+11 \geq 5(x+7)-32 \geq 3x-1 \quad \forall x \in \Re$	**(iv)**	**OR**	**3+1**	درج شدہ کی تجزی کریں: $3x^2+16x-12$

First Annual 2026 | Section C Q2(ix) | 4 marks

(ix)	اجبری جملوں $P = 6x^2y$ اور $Q = 9xy^2$ کے لیے پڑتال کریں کہ: $P \times Q = LCM \times HCF$	1x4	OR	سکہ اچھالنے فریکوئنسی م

حصہ سوئم (کُل نمبر 24)

First Annual 2026 | Section C Q2(viii) | 4 marks

(viii)	قاعدے کا رقبہ $240\ cm^2$ ہے۔ بڑے سلنڈر کے قاعدے کا رداس، قطر اور کریں۔
(ix)	الجبری جملوں $P = 6x^2y$ اور $Q = 9xy^2$ کے لیے پڑتال کریں کہ: $P \times Q = LCM \times HCF$

Q.3	Find the values of p and q if $x^4 - 12x^3 + px + q$ is a complete square.	08	OR
Q.4	From the eye level of a 6 feet tall person standing on		

First Annual 2026 | Section B Q2(iv) OR | 4 marks

OR	Factorize: $(x^2+5x+4)(x^2+5x+6)-3$	**04**

First Annual 2026 | Section B Q2(ix) | 4 marks

(ix)	If $A=4a^2b$ and $B=6ab^2$ then show that $A\times B=LCM\times HCF$	**2+2**	**OR**	The number of items sold by a shop on different days are; 6, 8, 6, 5, 7, 6, 9. **a.** Find mode **b.** Find median **c.** Find mean	**1+1 +2**

Q.5	For what value of k, the expression $y^4+4y^2+k+\frac{8}{y^2}+\frac{4}{y^4}$ becomes a perfect square, where $y \neq 0$.	**08**	**OR**	The given table shows distribution of marks obtained by 50 students in a mathematics test: **Calculate the median marks.**	**08**

CI	01–10	11–20	21–30	31–40	41–50
f	5	10	15	12	8

For two polynomials A and B, $HCF \times LCM =$ | $A+B$ | $A-B$ | $(HCF)^2$ | $A \times B$

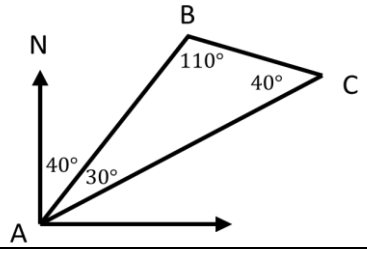
If $A = 4a^2b$ and $B = 6ab^2$ then verify that $A \times B = LCM \times HCF$	**2+2**

First Annual 2026 | Section C Q3 | 8 marks

To convert $x^4+4x^3+10x^2+10x+5$ into a perfect square: **a.** What should be added to it? **b.** What should be subtracted from it?	**08**
Two men on opposite sides of a tree are in line with it. They observe that angles of elevation of top of tree are $30°$ and $60°$. The height of tree is 15 m, find distance between the men.	**08**

FBISE model paper | Section A Q1(iv) | 1 mark

iv.	What is the least common multiple of $7x-6xy$ and $5xy^3-3x^2$?	$(7-6y)\times(5x^3-3x)$	$(7x-6xy)\times(5y^3x-3x^2)$	$x(7-6y)$	$x(7-6y)\times(5y^3-3x)$

Q.2	Question	Marks	Question		Mark
i.	Simplify the expression $\left[(125)^{\frac{1}{3}} \times (25)^{\frac{1}{2}} + (64)^{\frac{2}{3}} \times 6 + (8)^{\frac{2}{3}}\right]^{\frac{-2}{3}}$	4	***OR***	If $X = \{1,3,9\}, Y = \{3,5,7\}$ and $Z = \{3,5,7,9,11\}$ then using Venn diagram, prove that $X \cup (Y \cap Z) = (X \cup Y) \cap (X \cup Z)$	4
ii.	The attached figure shows the position of three points A, B, and C. State the bearing of: B from A; A from B; B from C, and C from B.  	4	***OR***	For $A = \{1,2,3\}, B = \{3,4\}$ (a) List all the ordered pairs of the Cartesian Product $A \times B$, (b) List all the ordered pairs of a relation $R = \{(x,y) \mid x \epsilon A, y \epsilon B \wedge x < y\}$, (c) Find domain and range of the relation R.	4
iii.	Bani Gala had a population of 10,000 people in the year 2015. The population has been growing exponentially at a rate of 2.5% per year. Using the exponential growth formula $P(t) = P_0 e^{rt}$, apply laws of logarithm to determine the year when population reaches up to 25,000.	4	***OR***	Find equation of the family of lines passing through a point $(5,2)$ and through the intersection of lines $x + 2y - 10 = 0$ and $2x + y - 2 = 0$.	4
iv.	Solve the linear equation $\frac{1}{3}(x-2) + \frac{2-3x}{2} = \frac{x+5}{6}$	4	***OR***	Simplify $\frac{5}{5+p-18p^2} - \frac{2}{2+5p+2p^2}$	4

ix.	Find the HCF of the polynomials $x^3 + 2x^2 - 4x - 8$ and $2x^3 + 7x^2 + 4x - 4$	4

No.		
Q3	For what value of k, the expression $y^4 + 4y^2 + k + \frac{8}{y^2} + \frac{4}{y^4}$ becomes a perfect square.	8

First Annual 2025 | Section B Q2(v) OR | 4 marks

Factorize: $(3x^2+11x+2)(3x^2+11x+3)-12$	04

First Annual 2025 | Section B Q2(vii) OR | 4 marks

Find the LCM of: $x^2+4x+4,\ 2x^2+x-6$ درج شدہ کا ذواضعاف اقل معلوم کریں۔	04

Simplify: $\frac{y}{y^2-y-2} - \frac{1}{y^2+5y-14} - \frac{2}{y^2+8y+7}$	08

Second Annual 2025 | Section B Q2(iv) OR | 4 marks

OR	Find HCF: $x^2 + 3x + 2\ , x^3 + x^2 - 4x - 4\ , x^3 + x^2 + 7x + 7$ بڑا عظم معلوم کریں۔	04

Second Annual 2025 | Section B Q2(iv) | 4 marks

(iv)	Factorize $2x^3 - 5x^2 - 8x + 20$ تجزیہ کریں۔	04	OR

First Annual 2026 | Section A Q7 | 1 mark

جب f(x) کو (x−a) سے تقسیم کیا جائے تو باقی کیا ہوگا؟	$f(x)$	a	$f(a)$	0
Product of two algebraic expressions is: دو الجبری جملوں کا حاصل ضرب:	HCF×LCM	HCF+LCM	HCF	HCF=LCM

First Annual 2026 | Section B Q2(iii) OR | 4 marks

	Find product using formulas: کلیات (فارمولوں) کی مدد سے حاصل ضرب معلوم کریں: $\left(x^2+y^2\right)\left(x^4-x^2y^2+y^4\right)$	04

First Annual 2026 | Section B Q2(iv) | 4 marks

(iv)	Solve: حل کریں: $(x+4)^3$	04

First Annual 2026 | Section B Q2(v) OR | 4 marks

Find H.C.F by factorization: تجزی کے ذریعے عادِ اعظم معلوم کریں: $x^2+5x+6,\ x^2-4x-12$	04

First Annual 2026 | Section B Q2(v) | 4 marks

(v)	Find value of k if expression x^3+kx^2+3x-4 leaves a remainder of -2 when divided by $x+2$. اگر جملہ x^3+kx^2+3x-4 کو $x+2$ پر تقسیم کرنے سے، باقی -2 بچے تو کی	04

(vi)	Find square root of:	درج شدہ کا جذر مربع معلوم کریں:	04
	$4a^2 - 12ab + 9b^2$		

Factorize the polynomial, by using Factor theorem. مسئلہ تجزی کی مدد سے درج ذیل تین درجہ کثیر رقمی جملوں کی تجزی کیجیے۔ $x^3 - 4x^2 + x + 6$	08

APOLLO

Linear Equations and Inequalities in one variable

Domain A: Numbers and Algebra

FBISE model paper | Section A Q10 | 0.75 marks

10	On solving $\frac{x}{2} - \frac{3}{2} \geq 2$, the value of x is:	$x \leq 5$	$x \geq 5$	$x \geq 7$	$x \leq 7$

FBISE model paper | Section A Q11 | 0.75 marks

11	Which value of y satisfies the equation $0.6y + 1.2 = 3$?	0.3	1.08	3	7

FBISE model paper | Section B Q4 OR | 3 marks

OR	Solve the inequality $-5 < \frac{2x+7}{3} \leq 1$ and represent the solution set on the real line.	3

First Annual 2025 | Section B Q2(iv) | 4 marks

Solve the equation and represent the solution on a real number line: $\frac{3x-5}{4}=\frac{2x+1}{3}$	04

First Annual 2025 | Section B Q2(ix) | 4 marks

Solve the inequality, and plot the solution on real number line. $3x+5\leq 5-3(x+2)\leq 6x-10 \quad \forall x\in\mathcal{R}$	04

First Annual 2025 | Section B Q2(iv) | 4 marks

	10,000.	
(iv)	Solve the given linear equation and represent the solution on a real number line: $\frac{5}{6}x-\frac{7}{2}=\frac{3}{4}x+\frac{5}{2}$	**04**

First Annual 2025 | Section B Q2(ix) | 4 marks

(ix)	Solve the inequality, and plot the solution on real number line. $-3x+11\geq 5(x+7)-32\geq 3x-1 \qquad \forall x\in\mathcal{R}$	**04**

Second Annual 2025 | Section B Q2(iv) | 4 marks

(iv)	Solve the inequality: دی گئی عدم مساوات حل کریں: $2x - 3 < x + 1$ and $3x - 1 \geq 2x + 8$.	04

First Annual 2026 | Section C Q2(iv) | 4 marks

(iv)	درج عدم مساوات کو حل کریں اور حل کو نمبر لائن پر ظاہر کریں: $-3x+11 \geq 5(x+7)-32 \geq 3x-1 \quad \forall x \in \Re$	

First Annual 2026 | Section B Q2(iv) | 4 marks

Solve the inequality, and plot the solution on real number line. $3x+5 \le 5-3(x+2) \le 6x-10 \qquad \forall x \in \Re$	**3+1**	**OR**	Factorize: $(x^2+5x+4)(x^2+5x+6)-3$	**04**

First Annual 2026 | Section A Q5 | 1 mark

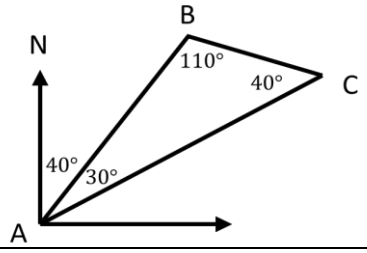
$-2x \le 4$ gives:

$x \le -2$	$x \ge -2$	$x \le -1$	$x = -1$

First Annual 2026 | Section B Q2(iv) | 4 marks

Solve the inequality: $2x-3 < x+1$ and $3x-3 \ge 2x+8$	**04**

v.	Solution of inequality $-2x - \frac{1}{2} \leq \frac{3}{2}$ is:	$x > -1$	$x < -1$	$x \geq -1$	$x \leq -1$

Q.2	Question	Mark
i.	Simplify the expression $\left[(125)^{\frac{1}{3}} \times (25)^{\frac{1}{2}} + (64)^{\frac{2}{3}} \times 6 + (8)^{\frac{2}{3}}\right]^{\frac{-2}{3}}$	4
ii.	The attached figure shows the position of three points A, B, and C. State the bearing of: B from A; A from B; B from C, and C from B. 	4
iii.	Bani Gala had a population of 10,000 people in the year 2015. The population has been growing exponentially at a rate of 2.5% per year. Using the exponential growth formula $P(t) = P_0 e^{rt}$, apply laws of logarithm to determine the year when population reaches up to 25,000.	4
iv.	Solve the linear equation $\frac{1}{3}(x-2) + \frac{2-3x}{2} = \frac{x+5}{6}$	4

First Annual 2025 | Section B Q2(vi) OR | 4 marks

Solve the double inequality:

درج شدہ مرکب غیر مساوات کو حل کریں۔

$$-5 \leq \frac{4+3x}{2} < 1 \text{ where } x \in R$$

04

First Annual 2025 | Section B Q2(viii) | 4 marks

(viii) Solve:

$$|3x-5|+7=11$$

04

Second Annual 2025 | Section B Q2(v) OR | 4 marks

OR	Solve the inequality $-3 < \frac{5z-7}{2} < 4, \quad z \in \mathbb{R}$	04

Second Annual 2025 | Section B Q2(v) | 4 marks

(v)	Solve: $\lvert 4y + 1 \rvert = 9$ حل کریں:	04	OR

APOLLO

Coordinate Geometry

Domain B: Geometry

FBISE model paper | Section A Q12 | 0.75 marks

12	What is the midpoint of the line segment joining A (2, 4) and B (6, 10)?	(2,3)	(4,7)	(6,5)	(8,14)

FBISE model paper | Section A Q13 | 0.75 marks

13	What is the gradient of a line passing through points (3, 7) and (3, –5)?	0	-2	$\frac{1}{3}$	undefined

FBISE model paper | Section A Q14 | 0.75 marks

14	If $y = 2x + c$ passes through the point (3, 10), what is the numerical value of c?	-17	4	16	23

FBISE model paper | Section A Q15 | 0.75 marks

15	The line $y = 5x + 1$ is perpendicular to another line. What is the gradient of the other line?	5	-5	$\frac{1}{5}$	$-\frac{1}{5}$