

Test Booklet No. \_\_\_\_\_

This booklet consists of 100 questions and 12 printed pages.

RGUPET/\_\_\_\_/\_\_\_\_

Series

NIL
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**RGUPET 2023  
Ph.D. in MATHEMATICS**

**Full Marks: 100**

**Time: 3 Hours**

Roll No.

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Day and Date of Examination :

\_\_\_\_\_

Signature of Invigilator(s) :

\_\_\_\_\_

Signature of Candidate :

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*General Instructions:*

***PLEASE READ ALL THE INSTRUCTIONS CAREFULLY BEFORE MAKING ANY ENTRY.***

1. DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO.
2. Candidate must write his/her Roll Number on the space provided.
3. This Test Booklet contains 100 Multiple Choice Questions (MCQs) from the concerned subject. Each question carries 1 mark.
4. Please check the Test Booklet to verify that the total pages and total number of questions contained in the test booklet are the same as those printed on the top of the first page. Also check whether the questions are in sequential order or not.
5. Candidates are not permitted to enter into the examination hall 15 minutes after the commencement of the entrance test or leave the examination hall before 30 minutes of end of examination.
6. Making any identification mark in the OMR Answer Sheet or writing Roll Number anywhere other than the specified places will lead to disqualification of the candidate.
7. Candidates shall maintain silence inside and outside the examination hall. If candidate(s) is/are found violating the instructions mentioned herein or announced in the examination hall, they will be summarily disqualified from the entrance test.
8. In case of any dispute, the decision of the Entrance Test Committee, RGU shall be final and binding.
9. The OMR Answer Sheet consists of two copies, the Original copy and the Student's copy.

1	Which of the following is not a Research method?				c	Observation
	a) Historical	b) Survey	c) Observation	d) Philosophical		
2	Which of the following is not a plagiarism checking tool?				a	LaTeX
	a) LaTeX	b) Turnitin	c) iThenticate	d) Urkund		
3	Formulation of hypothesis may not be required in ____				b	Historical studies
	a) Survey method	b) Historical studies	c) Experimental studies	d) Normative studies		
4	Logic is the branch of philosophy that				a	refers to the study of reasoning.
	a) refers to the study of reasoning.	b) refers to the theory of knowledge.	c) refers to the study of morality.	d) study of everything related to beauty, art, and good taste.		
5	First step of an investigation is _____				b	collection of data
	a) presentation of data	b) collection of data	c) analysis of data	d) explanation of data		
6	Correlation Analysis is mainly important to understand				b	association among variables.
	a) difference among variables.	b) association among variables.	c) regression among variables	d) variations among variables.		
7	Abstract of a research report contains				d	A brief summary of findings of the report.
	a) a brief summary of research problem.	b) a brief analysis of data.	c) a brief interpretation of data	d) a brief summary of findings of the report.		
8	The group of individuals under study is known as				a	Sample
	a) Sample	b) Population	c) Data	d) Unit		
9	What is the main aim of interdisciplinary research?				c	To bring out the holistic approach
	a) To over simplify the problem of	b) To bring out the holistic approach to	c) To bring out the holistic approach to	d) To create a new trend in research		

	research.	research.	research.	methodology.		to research
10	Which of the following features are considered as critical in qualitative research?				d	Collecting data with bottom-up empirical evidence.
	a) Collecting data with the help of standardized research tools.	b) Gathering data with top-down schematic evidence.	c) Design sampling with probability sample techniques.	d) Collecting data with bottom-up empirical evidence.		
11	The quality of a research journal is indicated by its _____				a	impact factor
	a) impact factor	b) total number of publication in a year	c) total number of articles received by a journal	d) g-index		
12	Survey is a ____ study				c	Fact finding
	a) Descriptive	b) Analytical	c) Fact finding	d) Systematic		
13	Examining of the entire population instead of a subgroup of the population is called a _____				d	census
	a) Sampling	b) Population	c) Bias	d) census		
14	Which one is called non-probability sampling?				b	Quota sampling
	a) Cluster sampling	b) Quota sampling	c) Systematic sampling	d) Stratified random sampling		
15	Questionnaire is a ____				c	Tool for data collection
	a) Research method	b) Measurement technique	c) Tool for data collection	d) Data analysis technique		
16	<b>Data that have already been collected for some other purpose is termed as ____</b>				b	Secondary data.
	a) Primary data.	b) Secondary data.	c) Tertiary data.	d) Ready-made data.		

17	The method of reasoning in which a conclusion is drawn from two statements is known as				d	Syllogism
	a) hypothesis	b) Inductive method	c) Empiricism	d) Syllogism		
18	Which type of research is also called as decisional research?				c)	Applied research
	a) Action research	b) Pure research	c) Applied research	d) Explanatory research		
19	The term ‘ethno’ refers to				c)	People or culture
	a) Geographical area	b) Social life	c) People culture	d) Cultural group		
20	The primary goal of applied research is to?				a)	Solve or provide answers to practical problems
	a) Solve or provide answers to practical problems.	b) Testing theories and hypotheses.	c) Addressing research issues in partnership with local people.	d) Primary goal is gaining knowledge, with no aim of using it.		
21	Pure research is also known as				a)	Fundamental research
	a) Fundamental research	b) Exploratory research	c) Action research	d) Explanatory research		
22	What is meant by the term “grounded theory”?				b)	Theoretical ideas and concepts should emerge from the data
	a) Theories should be tested by rigorous scientific experiments	b) Theoretical ideas and concepts should emerge from the data	c) Theories should be grounded in political values and biases	d) As a social researcher, it is important to keep your feet on the ground.		
23	LaTeX software is used for....					

	a)Typesetting technical documents	b)computational	c)plotting	d)none of these	a)	Typesetting technical documents
24	Which of the following is a final stage of a research				a)	Preparation of the report
	a)Preparation of the report	b)Analysis of data	c)Hypothesis testing	d)Generalization and interpretation		
25	The abstract of the report:				b)	provides a snapshot of the major section of the entire report
	a) is usually written before the rest of the report	b)provides a snapshot of the major section of the entire report	c)serves as the introduction to the report, with a focus on the background for the research	d) is usually several pages in length.		
26	The conclusion of a research report:				b)	must be based only on material presented in the report
	a)can introduce new information	b)must be based only on material presented in the report	c)is the same as the abstract except that it is presented at the end of the report	d)should focus only on the findings of the research		
27	Bibliography means				d)	List of Books referred
	a)Foot note	b) Quotations	c) Biography	d) List of Books referred		
28	A result is called “statistically significant” whenever				d)	The $p$ – value is
	a)The null hypothesis is true	b)The alternative hypothesis is	c)The $p$ – value is larger than the	d)The $p$ – value is less or equal to the		

		true	significance level	significance level		less or equal to the significance level
29	Word Research is derived from the language				a	French
	a) French	b) Sanskrit	c) German	d) Latin		
30	The theory of knowledge is called				d	Epistemology
	a) Aesthetics	b) Metaphysics	c) Logic	d) Epistemology		
31	Changing or omission of research results to support claims is				a	Falsification
	a) Falsification	b) Fabrication	c) Plagiarism	d) Publication		
32	A quality of good hypothesis is				b	Conceptual clarity
	a) small in size	b) conceptual clarity	c) durability	d) applicability		
33	In research methodology, interpretation is a search for				a	Research finding
	a) Research findings	b) Research problem	c) Research Plan	d) statistical data		
34	The final stage of a research process is				c	Report writing
	a) Data collection	b) Analysis of data	c) Report writing	d) Review of literature		
35	A quantitative research is a				b	Number based research
	a) text based research	b) number based research	c) subjective research	d) semi-structured question based research.		
36	A hypothesis that expresses no relationship between two variables is				d	Null hypothesis
	a) Causal hypothesis	b) Relational hypothesis	c) Descriptive	d) Null hypothesis		

			e hypothesis			
37	Research based on experiments and observations is called				a	Empirical Research
	a) Empirical Research	b) Clinical Research	c) Laboratory Research	d) Experimental Research		
38	Statements: All dogs are mammals. All mammals have lungs. Conclusions: I. All dogs have lungs. II. All dogs are animals.				a	Only conclusion I follows
	a) Only conclusion I follows	b) Only conclusion II follows	c) Both I and II follow	d) Neither I nor II follows		
39	In the artificial language, “mogingor” means “table lamp” and “daximog” means “reading lamp.” What would “daxigor” mean?				b	Desk lamp
	a) Bedside table	b) Desk lamp	c) Ceiling light	d) Bedside lamp		
40	The 3Rs considered for the care and use of animals for scientific purposes and teaching activities are Replacement, Reduction and ....				b	Refinement
	a) Retirement	b) Refinement	c) Rotation	d) Rational		
41	Unstructured or semi structured techniques and non-statistical analysis is a part of				a	Qualitative Research
	a) Qualitative research	b) Quantitative research	c) Action Research	d) Applied Research		
42	Which of the following is against the research ethics?				b	Fabrication of data
	a) Protection of confidential communications	b) Fabrication of data	c) Respect for intellectual property	d) Responsible Publication		
43	Schedules are filled by					Enumeration

					d	or
	a) Researcher	b) Respondent	c) Supervisor	d) Enumerator		
44	Sampling that involves grouping the population and then selecting the groups for inclusion in the sample is				c	Cluster Sampling
	a) Chance sampling	b) Systematic sampling	c) Cluster sampling	d) Sequential sampling		
45	Which of the following is an example of primary data?					
	a) Book	b) Journal	c) News Paper	d) Census Report		c
46	ICSSR stands for					
	a) Indian Council for Survey and Research	b) Indian Council for strategic Research	c) Indian Council for Social Science Research	d) Inter National Council for Social Science Research		c
47	..... is the first step of Research process					
	a) Formulation of a problem	b) Collection of Data	c) Editing and Coding	d) Selection of a problem		d
48	Converting a question into a Researchable problem is called .....					
	a) Solution	b) Examination	c) Problem formulation	d) Problem Solving		c
49	<b>The aim of national council for teacher education is _____</b>					
	a) To	b) To maintain	c) To open	d) To provide grant		b



	promote research in education	standards in colleges of education	college of education	to colleges of education			
<b>50</b>	The purpose of new education policy is _____						
	a) To improve the whole education system	b) To provide equal opportunity of education to all	c) To delink the degree with education	d) To link the education with employment		a	
<b>51</b>	Newton's law of viscosity states that						
	a) shear stress $\propto$ velocity gradient	b) resistance $\propto$ strain	c) shear stress $\propto$ acceleration due to gravity	d) viscosity $\propto$ velocity gradient	a	shear stress $\propto$ velocity gradient	
<b>52</b>	The dimensional formula of a force is						
	a) $[M^0L^0T^0]$	b) $[MLT^{-2}]$	c) $[M^0L^0T^{-1}]$	d) $[M^0L^0T^2]$	b	$[MLT^{-2}]$	
<b>53</b>	A fluid flow is said to be possible if it satisfies the						
	a) conservation of mass	b) NS equations	c) Euler's equation	d) D'Almebert's equation	a	conservation of mass	
<b>54</b>	A flow is said to be potential kind if						
	a) $\nabla \cdot \vec{q} = 0$	b) $\text{curl } \vec{q} \neq 0$	c) $\nabla \cdot \vec{q} \neq 0$	d) $\text{curl } \vec{q} = 0$	d	$\text{curl } \vec{q} = 0$	
<b>55</b>	The iteration formulation $x_{n+1} = x_n - f(x_n)/f'(x_n), n = 0,1,2 \dots$ assigns with the numerical method of						
	a)	b) Bisection	c) Quadrature	d) Gauss Seidal	a	Newton-	

	Newton-Raphson					Raphson
56	A force field $\vec{F}$ is said to be conservative if					
	a) $\text{curl}\vec{F} \neq 0$	b) $\text{grad}\vec{F} = 0$	c) $\text{div}\vec{F} = 0$	d) $\text{curl}(\text{grad}\vec{F}) = 0$	d	$\text{curl}(\text{grad}\vec{F}) = 0$
57	The shortest curve between two points in a plane is					
	a) a straight line	b) a circle	c) an ellipse	d) a hyperbola	a	a straight line
58	By the transformations $u = x - ct, v = x + ct$ , the equation $\frac{\partial^2 z}{\partial t^2} = c^2 \frac{\partial^2 z}{\partial x^2}$ reduces to					
	a) $\frac{\partial^2 y}{\partial t^2} = c \frac{\partial^2 y}{\partial x^2}$	b) $\frac{\partial^2 y}{\partial t^2} \frac{\partial^2 y}{\partial x^2} = 0$	c) $\frac{\partial^2 z}{\partial u \partial v} = 0$	d) $\frac{\partial^3 y}{\partial t^3} = c \frac{\partial^3 y}{\partial x^3}$	c	$\frac{\partial^2 z}{\partial u \partial v} = 0$
59	The velocity vector $\vec{q}$ in a three-dimensional flow field for an incompressible fluid is given by $\vec{q} = 2x\hat{i} - y\hat{j} - z\hat{k}$ . The equations of the streamlines passing through the point (1,1,1) are					
	a) $xy = 1, xy^2 = 2$	b) $xy^2 = 1, xz^2 = 1$	c) $y^2z = 1, xyz^2 = 1$	d) $yz = 1, xz^2 = 1$		b
60	Which one of the following is derived from Newton's second law of motion					
	a) Euler's equation of motion	b) Navier-Stokes equations of motion	c) Hamilton's equations	d) Lagrange's equations	b	Navier-Stokes equations of motion
61	The number of generalized co-ordinates required to describe motion of a rigid body with one of its points fixed is					
	a) 9	b) 6	c) 3	d) 1	c	3

62	The two types of errors that are related to differentials are					
	a) Human, Absolute	b) Absolute, Relative	c) Relative, Controllable	d) Controllable, Natural	b	Absolute, Relative
63	In which numerical method is associated with forward or backward substitutions by row reduction to solve a system of linear equations					
	a) Power method	b) Gauss elimination	c) QR method	d) LU decomposition	b	Gauss elimination
64	The set of all linearly independent solutions of the differential equation $\frac{d^4y}{dx^4} - \frac{d^2y}{dx^2} = 0$ is					
	a) $\{1, x, e^x, e^{-x}\}$	b) $\{1, x, e^{-x}, xe^{-x}\}$	c) $\{1, x, e^x, xe^x\}$	d) $\{1, x, e^x, xe^{-x}\}$	a	$\{1, x, e^x, e^{-x}\}$
65	In a parallel channel flow, one plate is at rest and other is set in motion without fluid pressure, the model is called					
	a) Poiseuille flow	b) Plane Couette flow	c) Generalised Couette flow	d) Hagen-Poiseuille flow	b	Plane Couette flow
66	The radius of convergence of the power series is $\sum_{n=0}^{\infty} (1 + 1/n)^{n^2} z^n$ is					1/e
	a) $\infty$	b) 1	c) 1/e	d) e	c	
67	The bilinear transformation that maps the points $z_1 = \infty, z_2 = i, z_3 = 0$ of z-plane into the points $w_1 = 0, w_2 = i, w_3 = \infty$ of w-plane, respectively, is					$w = -1/z$
	a) $w = 1/z$	b) $w = -1/z$	c) $w = i/z$	d) $w = -i/z$	b	
68	If $R_1$ and $R_2$ are radii of convergence of the power series $\sum a_n z^n$ and $\sum n a_n z^{n-1}$ , respectively, then					

	a) $R_1 = nR_2$	b) $R_1 = R_2$	c) $R_1 = 1/R_2$	d) $R_1 = n/R_2$	b	$R_1 = R_2$
69	The change in the argument of $f(z) = 2z/(z^2 + 1)$ as $z$ moves once around the circle centered at origin and unit radius is				a	$-2\pi$
	a) $-2\pi$	b) $2\pi$	c) $4\pi$	d) $\pi/2$		
70	A function which is analytic in the entire complex plane except at finite number of poles is called				c	a meromorphic function
	a) an analytic function	b) an entire function	c) a meromorphic function	d) an isogonal function		
71	In the usual metric space $(\mathbb{R}, U)$ , which of the following statement is incorrect?				c	the set of all rational numbers is an open set.
	a) $[0, 1[$ is not an open set.	b) $\{1, \frac{1}{2}, \frac{1}{3}, \dots\}$ is not an open set.	c) the set of all rational numbers is an open set.	d) the set of all irrational numbers is not an open set.		
72	Let $X = \{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \dots, \frac{1}{n}, \dots\}$ and $d$ be the usual metric defined on $X$ . If $A = \{1, \frac{1}{3}, \frac{1}{5}, \dots, \frac{1}{2n-1}, \dots\}$ and $B = \{\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \dots, \frac{1}{2n}, \dots\}$ , then				d	$d(A, B) = 0$
	a) $d(A, B) = 1$	b) $d(A, B) = 1/2$	c) $d(A, B) = 1/2n$	d) $d(A, B) = 0$		
73	Let $X$ be a topological space and $Y$ be a subset of $X$ . A point $y \in Y$ is such that there exists a neighbourhood of $y$ which contains no other point of $Y$ . Then $y$ is called				a	an isolated point
	a) an isolated point	b) a limit point	c) a singular point	d) an exterior point		

	point					
74	The smallest positive value of $x$ satisfying $3^{56} \equiv x \pmod{7}$ is				b	2
	a) 1	(b) 2	(c) 3	(d) 4		
75	For any odd integer $\lambda$ , the congruence $x^2 \equiv \lambda \pmod{4}$ has a solution if and only if				c	$\lambda \equiv 1 \pmod{4}$
	a) $\lambda \equiv 1 \pmod{4}$	b) $\lambda \equiv 2 \pmod{4}$	c) $\lambda \equiv 1 \pmod{4}$	d) $\lambda \equiv 3 \pmod{8}$		
76	The system of congruences $x \equiv a \pmod{P}$ and $x \equiv b \pmod{Q}$ has a solution if and only if				c	$a \equiv b \pmod{\gcd(P, Q)}$
	a) $a \equiv b \pmod{PQ}$	b) $a \equiv -b \pmod{PQ}$	c) $a \equiv b \pmod{\gcd(P, Q)}$	d) $a \equiv -b \pmod{\gcd(P, Q)}$		
77	Let $a$ and $b$ are two integers such that $ax + by = \gcd(a, b)$ , then				b	$\gcd(x, y) = 1$
	a) $\gcd(x, y) > \gcd(a, b) > 1$	b) $\gcd(x, y) = 1$	c) $\gcd(x, y) > 1$	d) $\gcd(x, y) \neq 1$		
78	If $u$ and $v$ are orthonormal vectors in an inner product space, then distance between $u$ and $v$ is				d	$\sqrt{2}$
	a) $1/\sqrt{2}$	b) 1	c) 2	d) $\sqrt{2}$		
79	Let $H \neq \{0\}$ be a Hilbert space and $U: H \rightarrow H$ be a unitary operator. Which of the following statement is incorrect?				b	$\ U\  \neq 1$
	a) $\ Ux\  = \ x\ $ for all $x \in H$	b) $\ U\  \neq 1$	c) $U$ is normal	d) $U^{-1} = U^*$ , ( $U^*$ is adjoint of $U$ )		
80	Let $T$ be an idempotent operator on a Hilbert space. Then eigen values of $T$ are given by				a	$\{0, 1\}$
	a) $\{0, 1\}$	b) $\{0, -1\}$	c) $\{-1, 1\}$	d) $\{1\}$		
81	The solution of the integral equation $y(x) = \frac{1}{1+x^2} - \int_0^x \frac{t}{1+x^2} y(t) dt$ is:				b)	$y(x) = (1 + x^2)^{-3/2}$
	a) $y(x) =$	b) $y(x) =$	c) $y(x) =$	d) $y(x) =$		

	$(1 + x^2)^{3/2}$	$(1 + x^2)^{-3/2}$	$(1 + x^2)^{1/2}$	$(1 + x^2)^{-1/2}$		
82	Let $y(x) = \sum_{m=0}^{\infty} c_m x^{k-m}$ , $c_0 \neq 0$ be the series solution of the differential equation $(1 - x^2) \frac{d^2 y}{dx^2} - 2x \frac{dy}{dx} + n(n+1)y = 0$ , then the indicial equation is:				b)	$(k - n)(k + n + 1) = 0$
	a) $(k + n)(k + n + 1) = 0$	b) $(k - n)(k + n + 1) = 0$	c) $k(k + n + 1) = 0$	d) $(k - n)(k - n - 1) = 0$		
83	Let $P_n(x)$ is a Legendre's polynomial of degree $n$ , then the value of $\int_{-1}^1 P_n(x) P_n(x) dx$ is:				c)	$\frac{2}{2n + 1}$
	a) 0	b) $\frac{2}{n+2}$	c) $\frac{2}{2n+1}$	d) $\frac{2}{2n+3}$		
84	The value of $\int_0^1 x d(e^{2x})$ is				c	$\frac{1 + e^2}{2}$
	a) $\frac{1+e}{2}$	b) $\frac{e}{2}$	c) $\frac{1+e^2}{2}$	d) $\frac{e^2}{2}$		
85	The function $f_n(x) = e^{-nx}$ is				b	pointwise convergent but not uniformly convergent in $[0, \infty]$ .
	a) Not pointwise convergent in $[0, \infty]$ .	b) pointwise convergent but not uniformly convergent in $[0, \infty]$ .	c) uniformly convergent in $[0, \infty]$ .	d) pointwise convergent but not uniformly convergent in $(0, \infty]$ .		
86	The integral $\int_0^{\pi/2} \frac{\sin^m x}{x^n} dx$ exists if and only if				a	$n < m + 1$
	a) $n < m + 1$	b) $n > m + 1$	c) $n \leq m + 1$	d) $n \geq m + 1$		
87	Cantor set is					equivalent to $[0,1]$ .
	a) Countable.	b) Dense in $[0,1]$ .	c) neighbourhood of $1/2$ .	d) equivalent to $[0,1]$ .		

88	The function $f$ defined by $f(x) = \begin{cases} x, & \text{if } x \text{ is rational} \\ 0, & \text{if } x \text{ is irrational} \end{cases}$ is				a	Continuous only at $x = 0$ .
	a) Continuous only at $x = 0$ .	b) Discontinuous only at $x = 0$ .	c) Continuous everywhere.	d) Discontinuous everywhere.		
89	The radius of convergence of the series $\sum_{n=0}^{\infty} \frac{(n!)^2}{(2n)!} x^{2n}$ is				b	2
	a) 1	b) 2	c) 3	d) 4		
90	The function $f(x, y) = x^3 + y^3 - 3x - 12y + 20$ has				c	a maximum at $(-1, -2)$ .
	a) a minimum at $(-1, -2)$ .	b) Neither minimum nor maximum at $(-1, -2)$ .	c) a maximum at $(-1, -2)$ .	d) a minimum at $(1, 2)$ .		
91	$\int_0^{\infty} \frac{\sin mx}{a^2+x^2} dx$ is				b	Absolutely convergent.
	a) Converges but not absolutely.	b) Absolutely convergent.	c) Divergent.	d) Oscillatory.		
92	The sequence $\langle S_n \rangle$ , where $S_n = (1 + 2/n)^{n+3}$ converges to				b	$e^2$
	a) $e$	b) $e^2$	c) $e + 3$	d) $e^2 + 3$		
93	Characteristic of an integral domain with unity is				d	either zero or a prime number.
	a) either zero or a positive integer.	b) always zero.	c) either zero or 1.	d) either zero or a prime number.		
94	For $n \in \mathbb{N}$ and $n \geq 3$ , let $D_{2n}$ be the Dihedral group. If $c$ denotes the center of $D_{2n}$ , then					

	a) $ c  = 1, \forall n \geq 3$	b) $ c  \leq 2, \forall n \geq 3$	c) $ c  > 2, \forall n \geq 3$	d) $ c  = 2, \forall n \geq 3$	b	$ c  \leq 2, \forall n \geq 3$
95	In the group of all invertible $4 \times 4$ matrices with entries in the field of 3 elements, any 3 – Sylow subgroup has cardinality				d	729
	a) 3	b) 81	c) 243	d) 729		
96	The number of group homomorphism from $\mathbb{Z}_{10}$ to $\mathbb{Z}_{20}$ is				c	ten
	a) Zero	b) five	c) ten	d) one		
97	Let $S$ denotes the set of all the prime numbers $p$ with the property that the matrix $\begin{bmatrix} 91 & 31 & 0 \\ 29 & 31 & 0 \\ 79 & 23 & 59 \end{bmatrix}$ has the inverse in the field $\mathbb{Z}_p$ . Then				a	$S$ is infinite
	a) $S$ is infinite	b) $S = \{31\}$	c) $S = \{7, 13, 59\}$	d) $S = \{31, 59\}$		
98	Let $f(x) \in \mathbb{Z}[x]$ be a monic polynomial. Then the roots of $f$				b	Always belongs to $(\mathbb{C} \setminus \mathbb{Q}) \cup \mathbb{Z}$
	a) Always belongs to $\mathbb{Z}$	b) Always belongs to $(\mathbb{C} \setminus \mathbb{Q}) \cup \mathbb{Z}$	c) Always belongs to $(\mathbb{R} \setminus \mathbb{Q}) \cup \mathbb{Z}$	d) can belong to $(\mathbb{Q} \setminus \mathbb{Z})$		
99	A group of prime order has				a	No proper subgroup.
	a) No proper subgroup.	b) At least one proper subgroup.	c) No improper subgroup.	d) At least two proper subgroup.		
100	The matrix of the linear transformation $T: \mathbb{R}^2 \rightarrow \mathbb{R}^2$ , defined by $T(x, y) = (2x + 3y, 4x - 5y)$ , relative to the basis $\{(1, -2), (2, -5)\}$ is				b	$\begin{bmatrix} 8 & 11 \\ -6 & -11 \end{bmatrix}$
	a) $\begin{bmatrix} 8 & -6 \\ 11 & -11 \end{bmatrix}$	b) $\begin{bmatrix} 8 & 11 \\ -6 & -11 \end{bmatrix}$	c) $\begin{bmatrix} -4 & 14 \\ -11 & 33 \end{bmatrix}$	d) $\begin{bmatrix} -4 & -11 \\ 14 & 33 \end{bmatrix}$		



**SPACE FOR ROUGH WORK**

