COMSATS University Islamabad, Lahore Campus

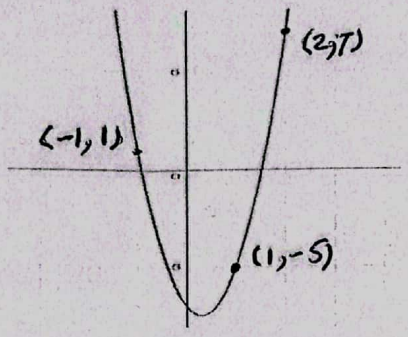
Department of Mathematics

Mid-Term Exam

Course Title:	Linear Algebra			Course Code:	MTH231	Credit Hours:	3(3,0)
Course Instructor/s:	Dr. Maqsood Ahmad			Programme Name:	BCS		
Semester:	3rd	Batch:	SP22-BCS	Section:	A, B & C	Date:	05-05-2022
Time Allowed:	01:30 Hours			Maximum Marks:		50	
Student's Name:	[redacted]			Reg. No.	[redacted]		

Question 1:

Find the quadratic interpolant for the three distinct points $(1,-5),(-1,1),(2,7)$ (10)

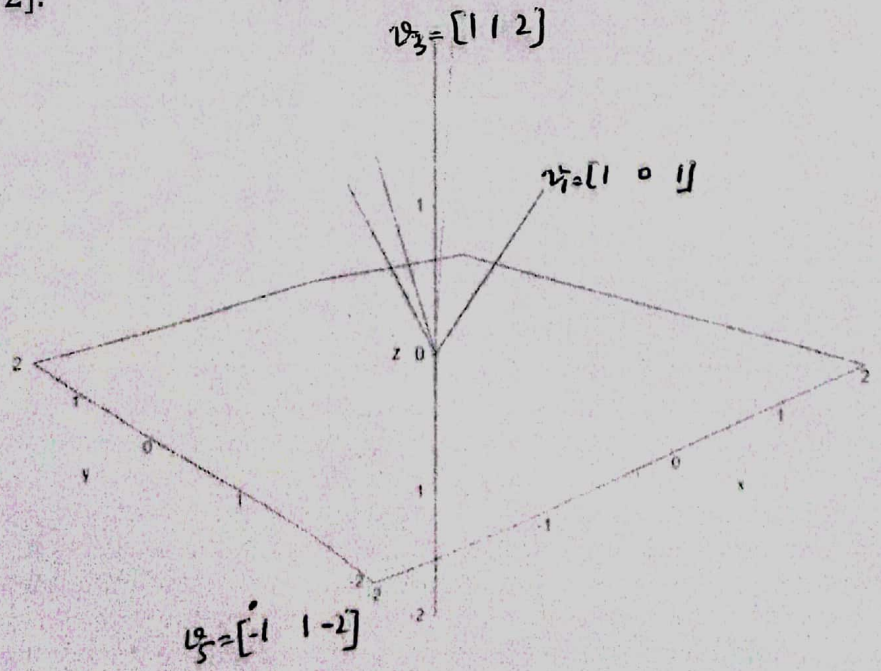


Question 2: **Decode** the encrypted message **TBC CUG**, where encryption is applied by following matrix (10)

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 1 \\ 1 & 0 & 2 \end{bmatrix}$$

Question 3: Find the basis for the vector space R_3 spanned by the vectors (10)

$v_1 = [1 \quad 0 \quad 1], v_2 = [0 \quad 1 \quad 1], v_3 = [1 \quad 1 \quad 2], v_4 = [1 \quad 2 \quad 1], v_5 = [-1 \quad 1 \quad -2]$.



Question 4: Using properties of the determinants, show that **(10)**

$$\begin{vmatrix} a-3 & a & a \\ a & a-3 & a \\ a & a & a-3 \end{vmatrix} = 27(a-1)$$

Question 5: **(10)**

Let $V = \left\{ \begin{bmatrix} a & b \\ c & d \end{bmatrix} : abcd = 0 \right\}$ with ordinary addition and scalar multiplication. Is V a vector space or not?