QUIZ 1 - ALGEBRA I - AUGUST-NOVEMBER 2024

The time alloted for this quiz is 45 minutes. Write your name and roll number on every page that you use as an answer sheet. Write clearly, legibly, logically and justify all your assertions.

Throughout this quiz, r = last two digits of your roll number + 5. For example, if your role number is $\dot{}$. BMC202435, then r = 40.

(1) Find all ways of expressing w as a linear combination of vectors v_1, v_2, v_3 , where

$$v_1 = \begin{bmatrix} 1\\1\\1\\1 \end{bmatrix}, v_2 = \begin{bmatrix} 1\\r\\1\\2 \end{bmatrix}, v_3 = \begin{bmatrix} 1\\2\\r\\3 \end{bmatrix}, w = \begin{bmatrix} 5\\4\\5\\7 \end{bmatrix}.$$

(2) Determine whether or not the set of column vectors corresponding to the tuples $\{(1,0,r,0),(1,r,0,0),(0,1,0,r),(0,0,1,r)\}$

tumn vectors corresponding to the tuples (1,r,0,0),(0,1,0,r),(0,0,1,r)

is a basis for \mathbb{R}^4 .

(3) Recall from homework that we define E_{ij} to be the square $n \times n$ matrix with 1 in row i and column j and 0 in every other entry. For n = 2, find all matrices M such that $E_{12}M = ME_{12}$.

n 45 g = 5 れ かまる 2+B9+22=4 2+9+B=5 SE +183 $C_1 + C_2 = 1$ n+29+3t=25 1862 + 63 = 0 y=2 144, 4 6 =0 C3+C4 = 0 C, +C2 = /2 C3 = - C4 1462+63=10 1 0 0 0 0 1 1861+64=10 0 0 0 1 1863+1864= 000 18 18 G+62=1 . C3+C4=0 (5+62=0) 1862+C3=0 (5+62=0) 186,-fC3=0 (3+64=0)