$[x_2 + 3x_2 + 14 = -7]$

Soln

Using MATHCARD

$$A = \begin{bmatrix} 1 & -2 & -1 & 3 \\ 2 & 3 & 0 & 1 \\ 1 & -0 & -4 & -2 \\ 0 & -1 & 3 & 1 \end{bmatrix} \qquad C = \begin{pmatrix} 10 \\ 8 \\ 3 \\ -7 \end{pmatrix}$$

$B = A^{-1}$

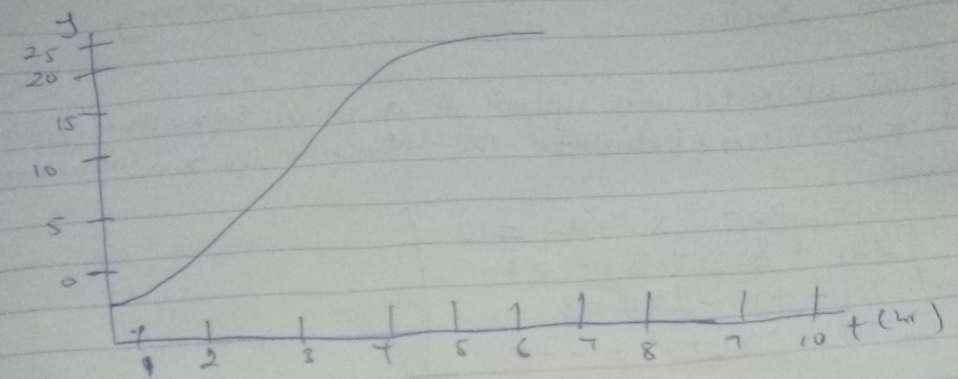
$$B = \begin{bmatrix} 0.027 & 0.24 & 0.493 & 0.667 \\ -0.093 & 0.16 & -0.227 & -0.333 \\ -0.107 & 0.04 & 0.027 & 0.333 \\ 0.227 & -0.04 & -0.307 & -0.333 \end{bmatrix}$$

$D = B \cdot C$

$$D = \begin{pmatrix} -1 \\ 2 \\ -3 \\ 4 \end{pmatrix} = \begin{pmatrix} x_1 = -1 \\ x_2 = 2 \\ x_3 = -3 \\ x_4 = 4 \end{pmatrix}$$

t	y
9.0	20.6807
9.1	20.8832
9.2	21.0833
9.3	21.2810
9.4	21.4764

y against t: Scale x-axis 2cm to 1 unit
y-axis 2cm to 5 units



The Model equation of a system has been developed to be $y = \sin(0.25t) + 2t e^{-0.5t} - 2\cos \pi/10 t$. with the aid of MATHCARD, determine its dynamic response in tabular form for $0 \leq t \leq 10$ hr with $\Delta t = 0.1$ hr

t	y	t	y	t	y
0	-1	2.0	3.0441	4.0	8.2568
0.1	-0.8555	2.1	3.2887	4.1	8.5274
0.2	-0.7024	2.2	3.5358	4.2	8.7982
0.3	-0.5413	2.3	3.7852	4.3	9.0692
0.4	-0.3726	2.4	4.0367	4.4	9.3402
0.5	-0.1969	2.5	4.2903	4.5	9.6112
0.6	-0.0146	2.6	4.5458	4.6	9.8821
0.7	0.1738	2.7	4.8030	4.7	10.1529
0.8	0.3681	2.8	5.0619	4.8	10.4234
0.9	0.5677	2.9	5.3223	4.9	10.6935
1.0	0.7727	3.0	5.5841	5.0	10.9632
1.1	0.9824	3.1	5.8473	5.1	11.2325
1.2	1.1966	3.2	6.1116	5.2	11.5012
1.3	1.4150	3.3	6.3770	5.3	11.7692
1.4	1.6375	3.4	6.6432	5.4	12.0365
1.5	1.8637	3.5	6.9106	5.5	12.3031
1.6	2.0935	3.6	7.1787	5.6	12.5688
1.7	2.3266	3.7	7.4474	5.7	12.8335
1.8	2.5628	3.8	7.7168	5.8	13.0975
		3.9	7.9866	5.9	13.3600