1x3 Matrix for MEET ME MONDAY

$u \cdot u = 39$

$u \cdot v = -3$

$v \cdot v = 79$

$(u + 2v) \cdot (3u + v)$ distributing

$3u \cdot u + u \cdot v + 3u \cdot 2v + 2v \cdot v$

$39(3) + (-3) + 6(\cancel{u \cdot v}) + 2(79)$

$\qquad\qquad\qquad\qquad -3$

$117 - 3 - 18 + 158$

$275 - 21$

$= 254$ #

$$\begin{array}{r} 158 \\ 117 \\ \hline 275 \end{array}$$

$$\begin{array}{r} 275 \\ 21 \\ \hline 254 \end{array}$$

If u and v in W, $u + v$ in W

If u in W, scalr $c \cdot u$ in W

Cryptography

0 = __	14 = N
1 = A	15 = O
2 = B	16 = P
3 = C	17 = Q
4 = D	18 = R
5 = E	19 = S
6 = F	20 = T
7 = G	21 = U
8 = H	22 = V
9 = I	23 = W
10 = J	24 = X
11 = K	25 = Y
12 = L	26 = Z
13 = M	

$$A = \begin{bmatrix} 1 & -2 & 2 \\ -1 & 1 & 3 \\ 1 & -1 & -4 \end{bmatrix}$$

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Encrypt ROSES ARE RED

R O S E S _ A R E _ R E D _ _

$$\begin{bmatrix} 18 & 15 & 19 \end{bmatrix} \begin{bmatrix} 5 & 19 & 0 \end{bmatrix} \begin{bmatrix} 1 & 18 & 5 \end{bmatrix} \begin{bmatrix} 0 & 18 & 5 \end{bmatrix} \begin{bmatrix} 4 & 0 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 18 & 15 & 19 \end{bmatrix} \begin{bmatrix} 1 & -2 & 2 \\ -1 & 1 & 3 \\ 1 & -1 & -4 \end{bmatrix} = \begin{bmatrix} 22 & -40 & 5 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 19 & 0 \end{bmatrix} \begin{bmatrix} 1 & -2 & 2 \\ -1 & 1 & 3 \\ 1 & -1 & -4 \end{bmatrix} = \begin{bmatrix} -14 & 9 & 67 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 18 & 5 \end{bmatrix} \begin{bmatrix} 1 & -2 & 2 \\ -1 & 1 & 3 \\ 1 & -1 & -4 \end{bmatrix} = \begin{bmatrix} -12 & 11 & 36 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 18 & 5 \end{bmatrix} \begin{bmatrix} 1 & -2 & 2 \\ -1 & 1 & 3 \\ 1 & -1 & -4 \end{bmatrix} = \begin{bmatrix} -13 & 13 & 34 \end{bmatrix}$$

$$\begin{bmatrix} 4 & 0 & 0 \end{bmatrix} \begin{bmatrix} 1 & -2 & 2 \\ -1 & 1 & 3 \\ 1 & -1 & -4 \end{bmatrix} = \begin{bmatrix} 4 & -8 & 8 \end{bmatrix}$$

R E

0]

$$\begin{bmatrix} 18 & 15 & 19 \end{bmatrix}\begin{bmatrix} 1 & -2 & 2 \\ -1 & 1 & 3 \\ 1 & -1 & -4 \end{bmatrix} = \begin{bmatrix} 22 & -40 & 5 \end{bmatrix}$$

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22 −40 5 −14 9 67 −12 11 36

−13 13 34 4 −8 8

the matrix

$$A = \begin{bmatrix} 1 & -2 & 2 \\ -1 & 1 & 3 \\ 1 & -1 & -4 \end{bmatrix}$$

$$\left[\begin{array}{ccc:ccc} 1 & -2 & 2 & 1 & 0 & 0 \\ -1 & 1 & 3 & 0 & 1 & 0 \\ 1 & -1 & -4 & 0 & 0 & 1 \end{array}\right] \quad 2R_2+R_1 \to R_1$$

$$\left[\begin{array}{ccc:ccc} -1 & 0 & 8 & 1 & 2 & 0 \\ -1 & 1 & 3 & 0 & 1 & 0 \\ 1 & -1 & -4 & 0 & 0 & 1 \end{array}\right] \quad \begin{array}{l} R_2+R_3 \to R_3 \\ -R_3 \to R_3 \end{array}$$

$$\left[\begin{array}{ccc:ccc} -1 & 0 & 8 & 1 & 2 & 0 \\ -1 & 1 & 3 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & -1 & -1 \end{array}\right]$$

$$\left[\begin{array}{ccc:ccc} -1 & 0 & 8 & 1 & 2 & 0 \\ -1 & 1 & 3 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & -1 & -1 \end{array}\right] \quad -R_1+R_2 \to R_2$$

$$\left[\begin{array}{ccc:ccc} -1 & 0 & 8 & 1 & 2 & 0 \\ 0 & 1 & -5 & -1 & -1 & 0 \\ 0 & 0 & 1 & 0 & -1 & -1 \end{array}\right] \quad 5R_3+R_2 \to R_2$$

$$\left[\begin{array}{ccc:ccc} -1 & 0 & 8 & 1 & 2 & 0 \\ 0 & 1 & 0 & -1 & -6 & -5 \\ 0 & 0 & 1 & 0 & -1 & -1 \end{array}\right] \quad -8R_3+R_1 \to R_1$$

$$\left[\begin{array}{ccc:ccc} -1 & 0 & 0 & 1 & 10 & 8 \\ 0 & 1 & 0 & -1 & -6 & -5 \\ 0 & 0 & 1 & 0 & -1 & -1 \end{array}\right] \quad -R_1 \to R_1$$

$$\left[\begin{array}{ccc:ccc} 1 & 0 & 0 & -1 & -10 & -8 \\ 0 & 1 & 0 & & & \\ 0 & 0 & 1 & -1 & & \end{array}\right]$$

22 -40 5 -14 9 67 -12 11 36

-13 13 34 4 -8 8

$$A^{-1} = \begin{bmatrix} -1 & 40 & -8 \\ -1 & -6 & -5 \\ 0 & -1 & -1 \end{bmatrix}$$