what is the inverse of matrix

2 7 8

5 -3 2

3 3 0

$$A = \begin{pmatrix} 2 & 7 & 8 \\ 5 & -3 & 2 \\ 3 & 3 & 0 \end{pmatrix}$$

$$\mathbf{A}^{-1} = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & k \end{bmatrix}^{-1} = \frac{1}{\det(\mathbf{A})} \begin{bmatrix} A & B & C \\ D & E & F \\ G & H & K \end{bmatrix}^{T} = \frac{1}{\det(\mathbf{A})} \begin{bmatrix} A & D & G \\ B & E & H \\ C & F & K \end{bmatrix}$$

where the determinant of **A** can be computed by applying the rule of Sarrus as follows:

$$\det(\mathbf{A}) = a(ek - fh) - b(kd - fg) + c(dh - eg).$$

If the determinant is non-zero, the matrix is invertible, with the elements of the above matrix on the right side given by

$$\begin{array}{lll} A = (ek - fh) & D = (ch - bk) & G = (bf - ce) \\ B = (fg - dk) & E = (ak - cg) & H = (cd - af) \\ C = (dh - eg) & F = (gb - ah) & K = (ae - bd). \end{array}$$

$\det(A) = 2(-3 * 0 - 2 * 3) - 7(0 * 5 - 2 * 3) + 8(5 * 3 + 3 * 3) = 222$

$$A^{-1} = \frac{1}{222} \begin{pmatrix} -6 & 24 & 38 \\ 6 & -24 & 36 \\ 24 & 15 & -41 \end{pmatrix}$$