COMPUTING THE INVERSE TRANSFORM MATRIX

1. A= [1, 0, tx;0, 1, ty;0, 0, 1] is the matrix for translation. Inverse of this would be undoing the translation which is done by changing the direction/signs of tx and ty. The resulting matrix will be as follows: inverse(A)= [1, 0, -tx;0, 1, -ty;0, 0, 1]. Negative sign indicates the reverse process.
2. A= [cos(theta), -sin(theta), 0; sin(theta), cos(theta), 0; 0, 0, 1]. The inverse of this matrix would be to counter the direction in which it was rotated like clockwise to counterclockwise and vice-versa. This can we obtained by using negative value of theta making the inverse as follows:

inverse(A)= [cos(theta), sin(theta), 0; -sin(theta), cos(theta), 0; 0, 0, 1].

The pattern observed is that only the sign of metric sin(theta) changes this is due to the fact sine being an odd function sin(-x) =-sin(x), similarly cos is an even function cos(-x) =cos(x) making it to not alter its sign upon negative theta.

1. A = [-1, 0, 0; 0, 1, 0; 0, 0, 1] is the matrix for reflection transformation. Its inverse would mean to invert the signs of ones in the matrix, this is due to the fact reflection changes the direction/vector value while keeping the scalar value intact. This results in inverse as follows: inverse(A)= [1, 0, 0; 0, -1, 0; 0, 0, -1]
2. Using the inverse formula provided we see that the inverse of shear along x-direction as: [1, -rx ; 0, 1]. The matrix states that we are undoing the shear along x-direction by an equal amount but in opposite direction as indicated by the sign. Similarly [1, 0; -ry, 1] is the inverse of shear along the y\*direction.