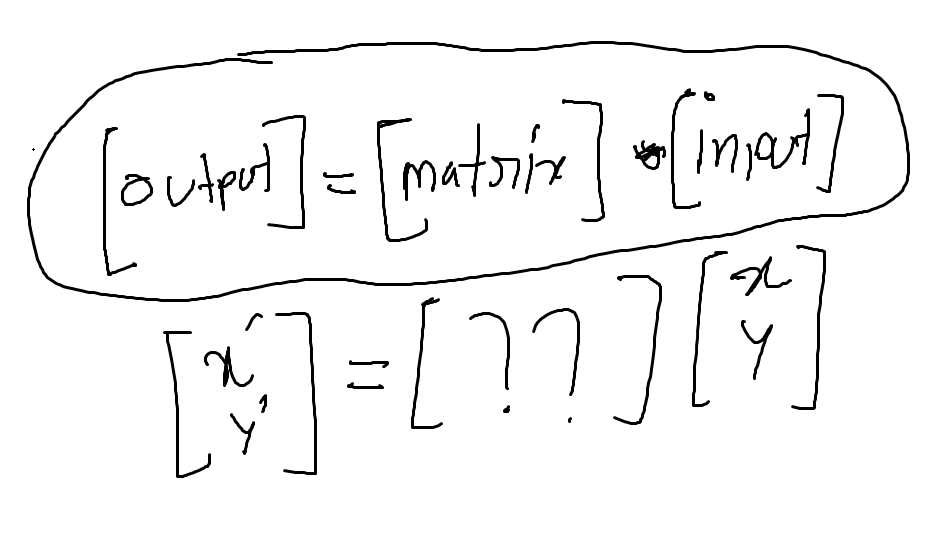
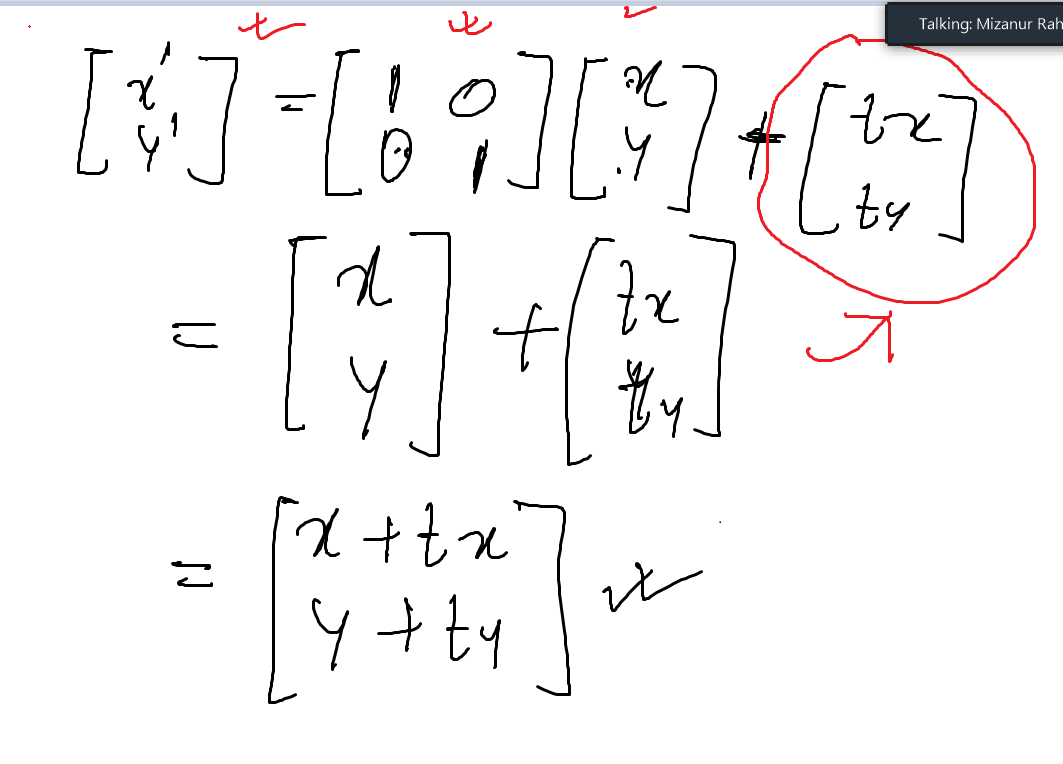
Transformation → Reposition and Resizing of an **object.**

Object → Set of points

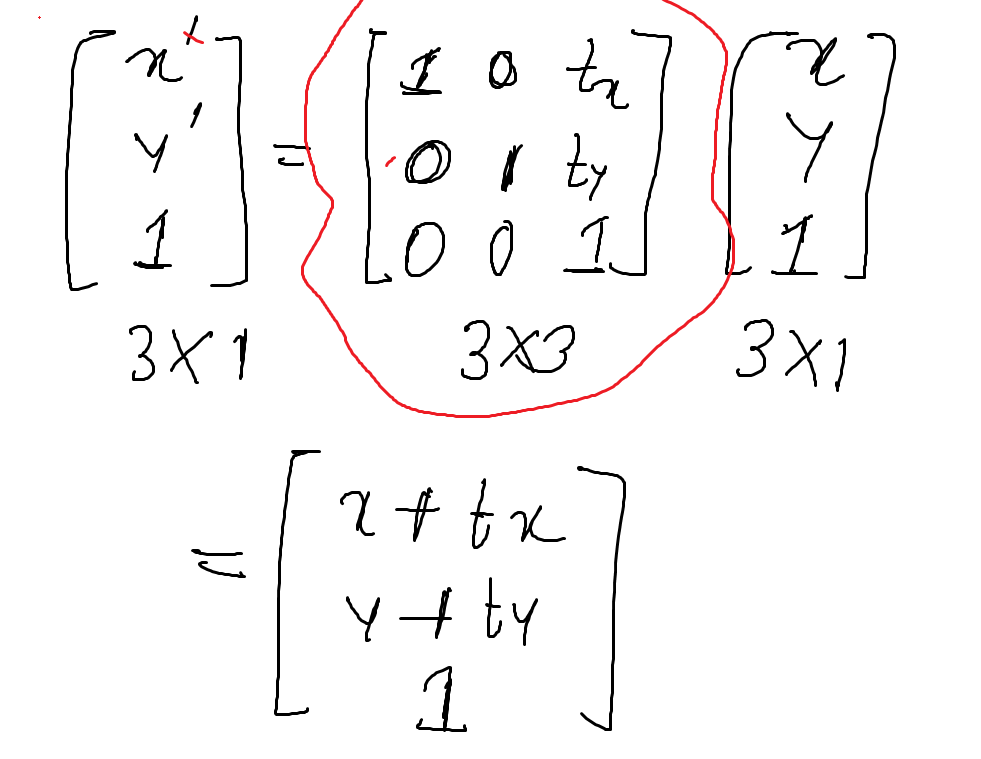
1. **Translation**
2. Scaling
3. **Rotation**
4. Reflection
5. Shearing



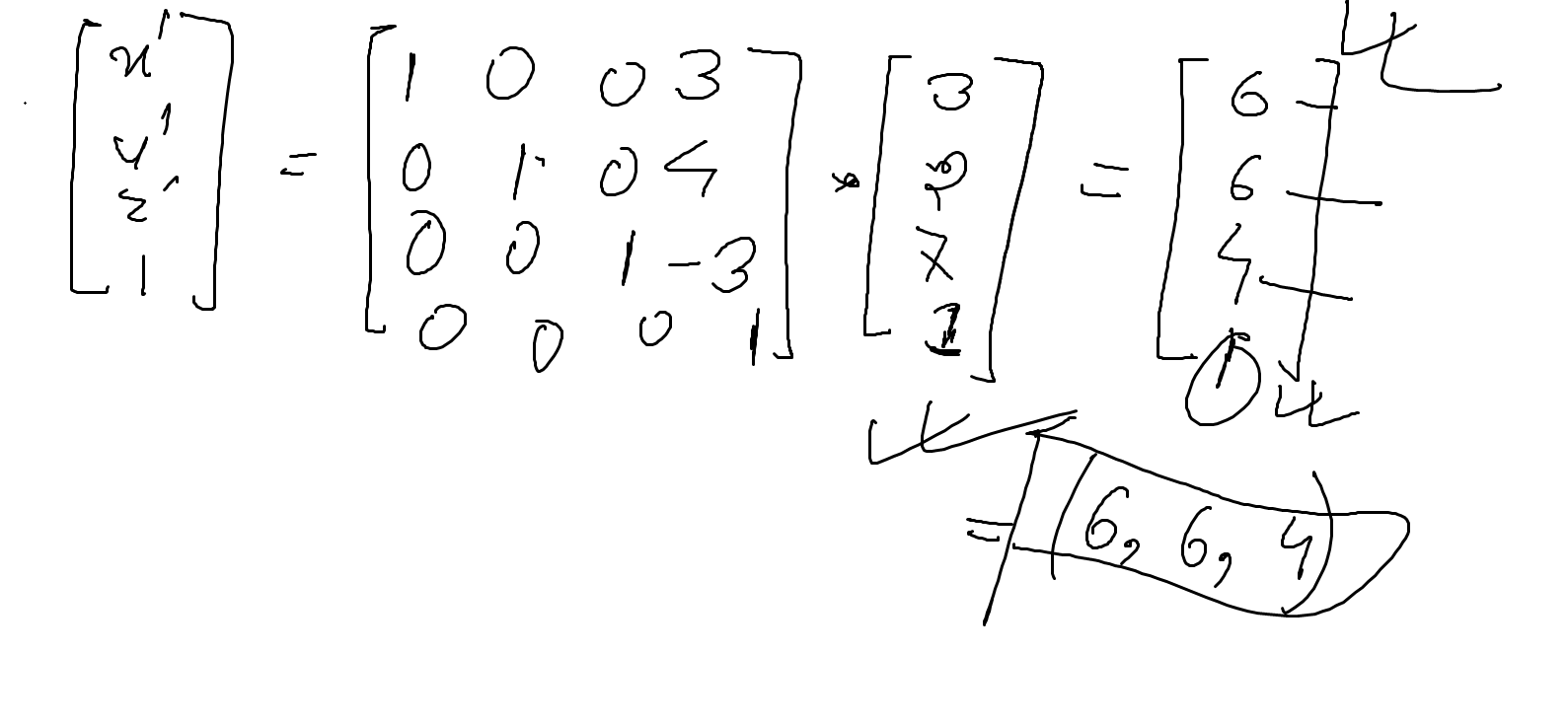
**Cartesian Representation**

****

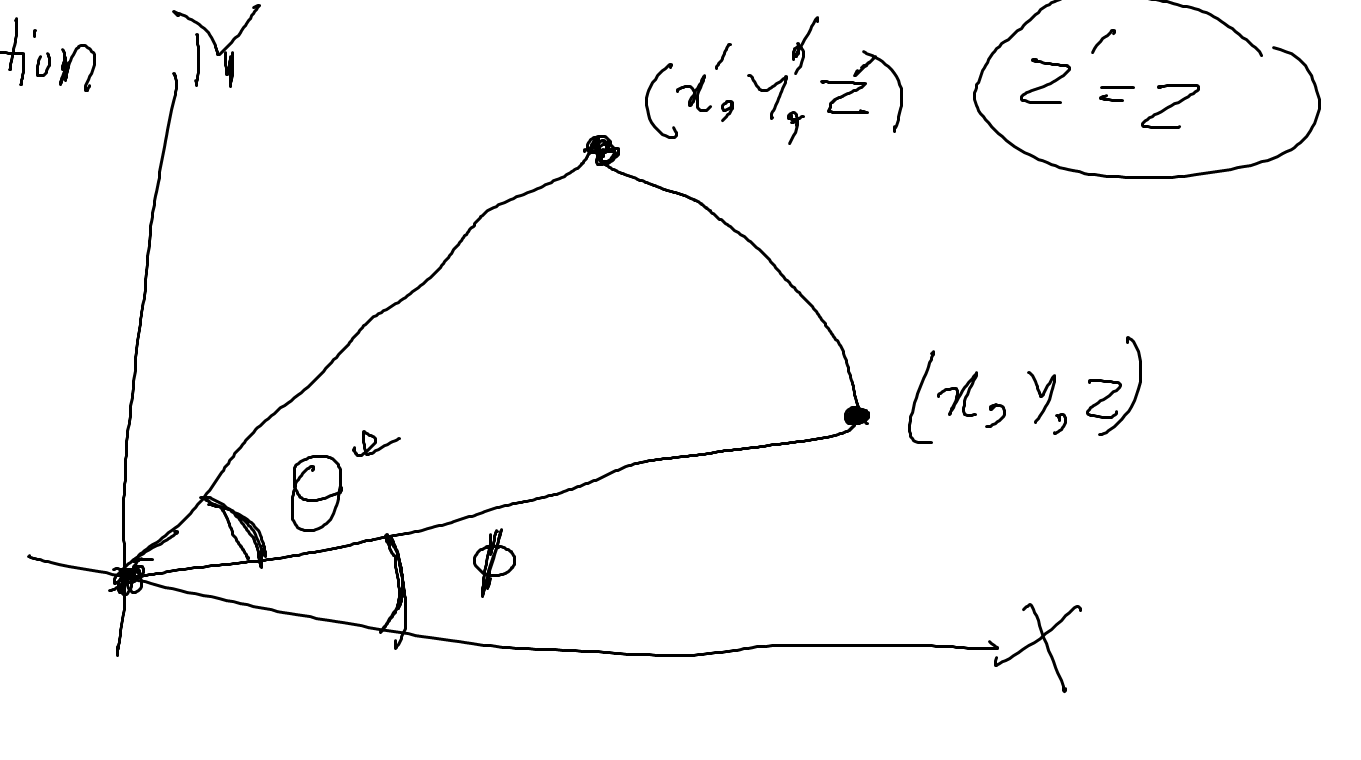
**Homogeneous Representation**

****

Translate point (3,2,7) → 3 units in x axis, 4 units in y axis and -3 unit z axis.



Rotation : (Z based Rotation, with respect to origin)

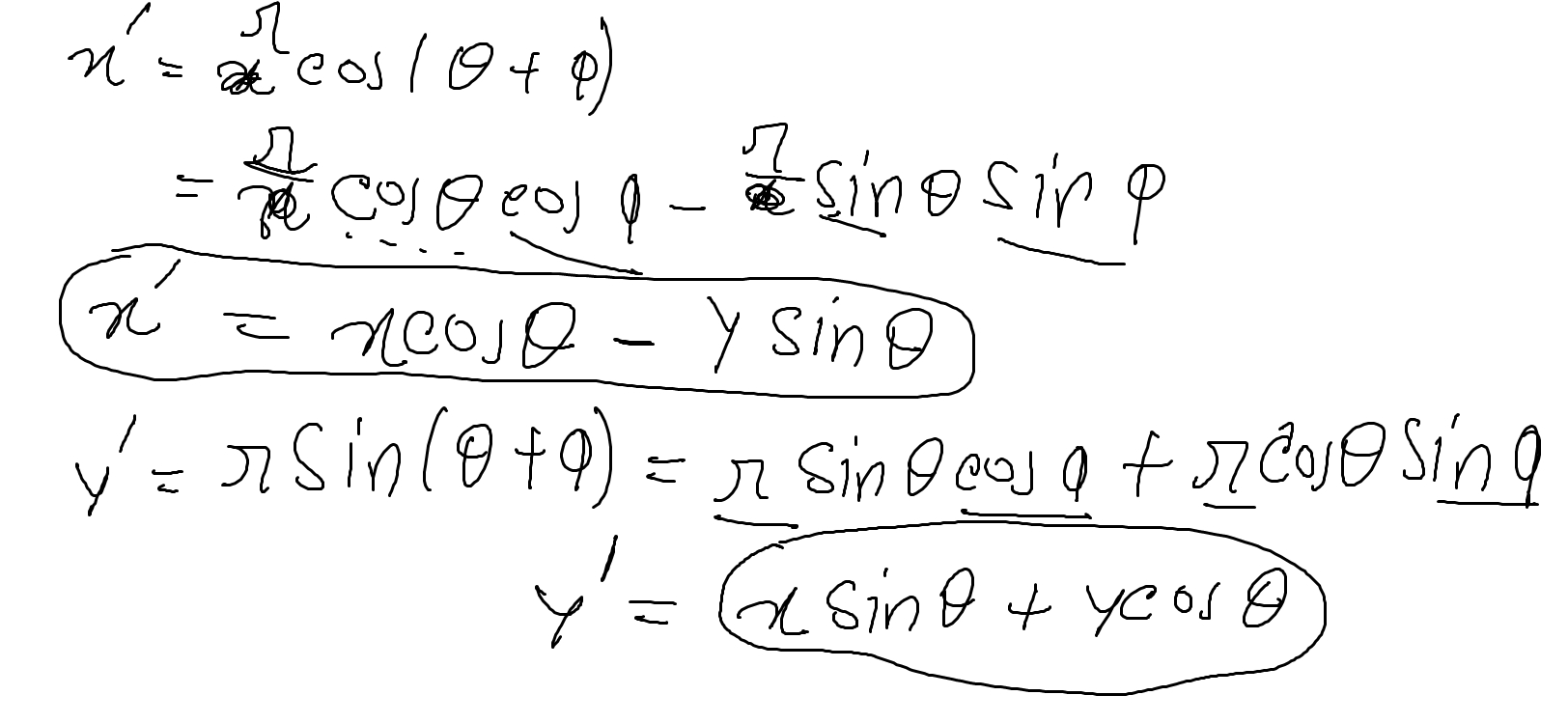


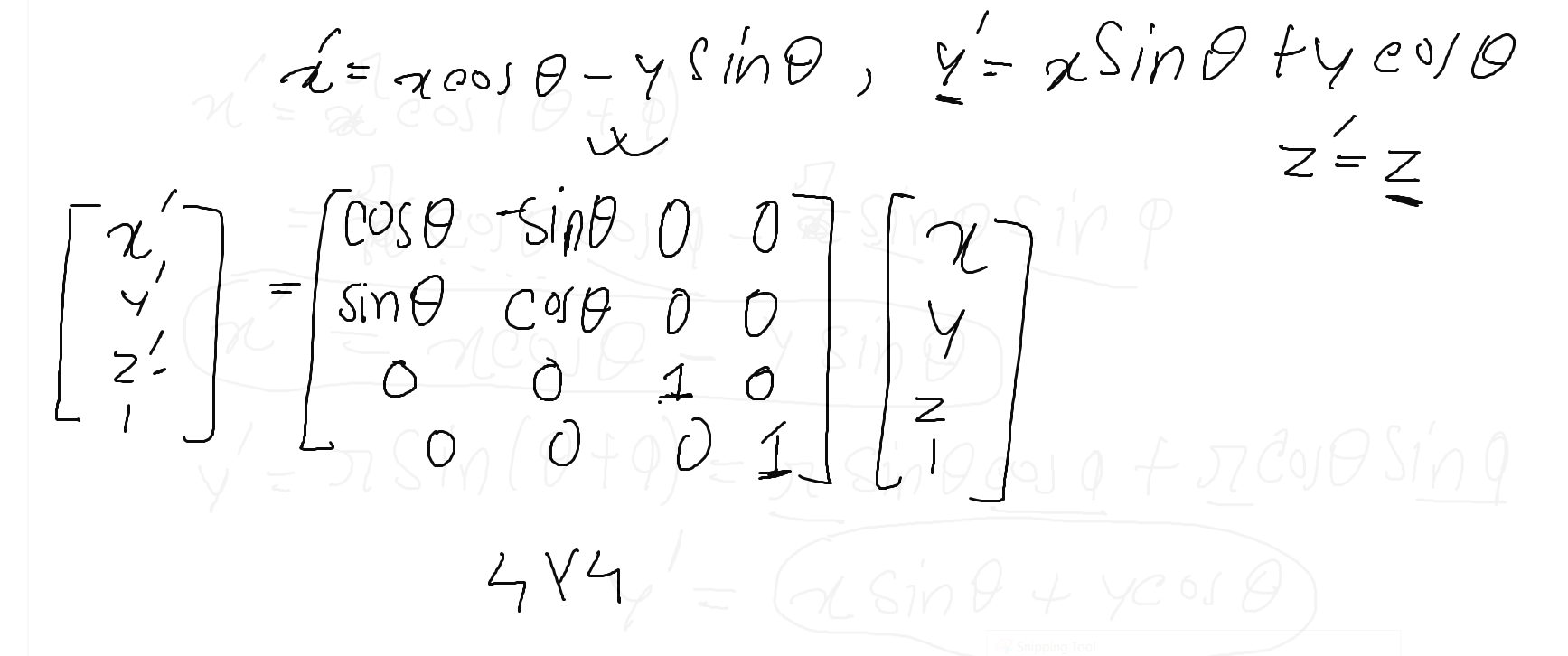
x= r cos (phi)

y= r sin (phi)

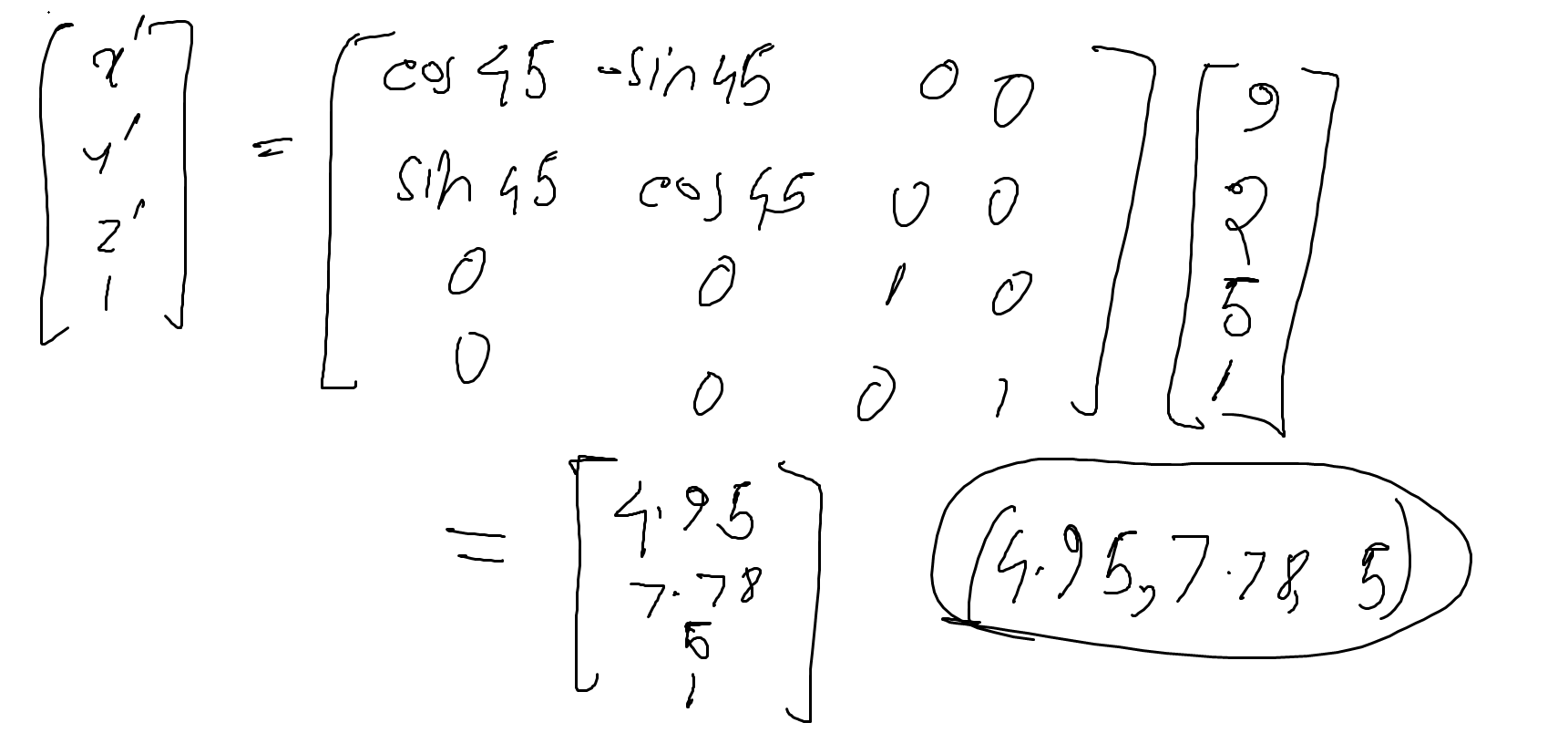
x\_prime = r cos (theta + phi)

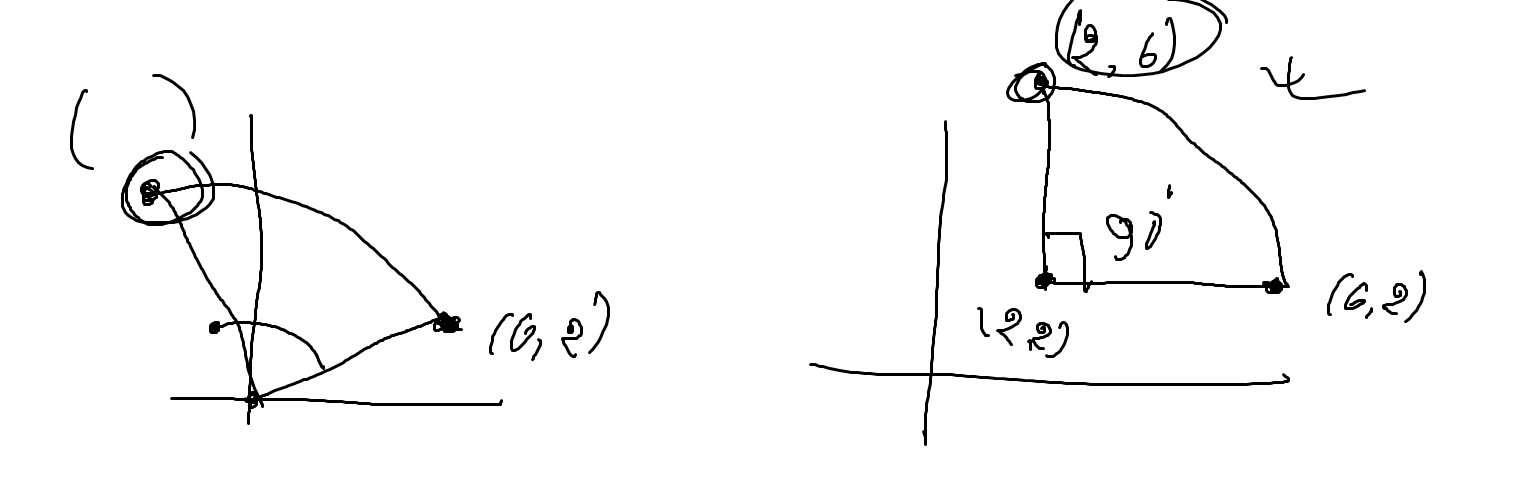
y\_prime = r sin (theta + phi)



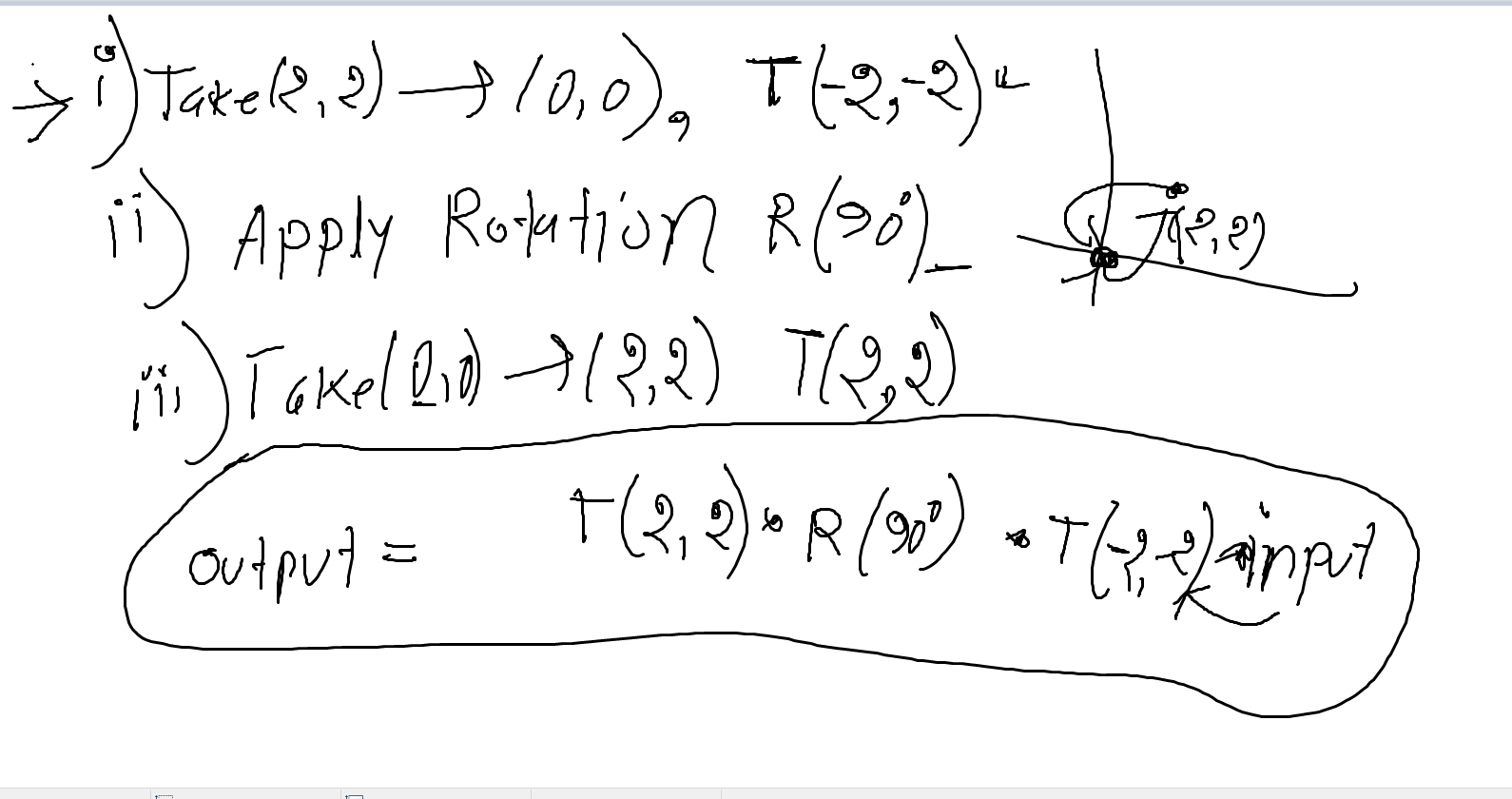


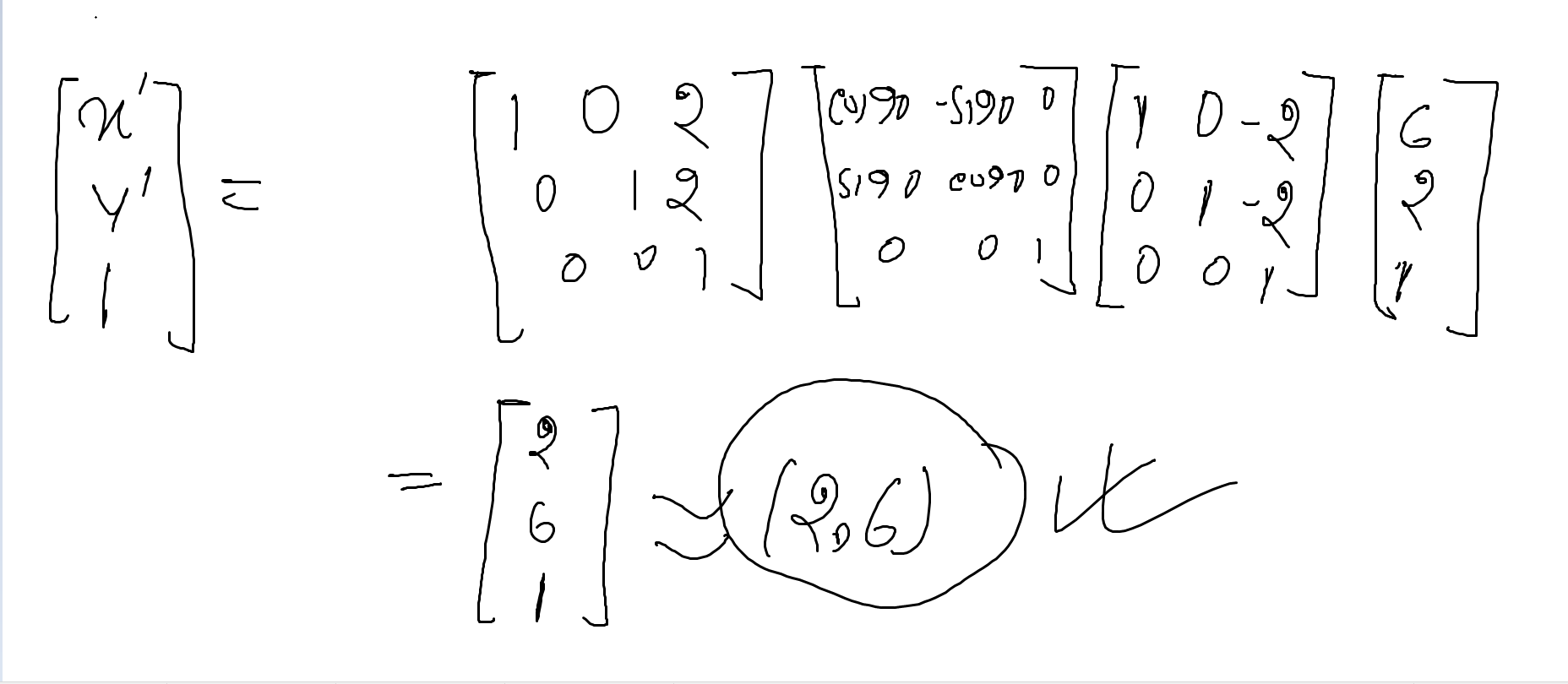
Rotate(z-based) point (9,2,5) at an angle 45 degree counterclockwise **with respect to origin**





Rotate point (6,2) at an angle 90 degree counterclockwise **with respect to point (2,2)**

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**X- based rotation / y based rotation (Self Study)**