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EXERCISE 1.5

We have:

$$rot(90,x) = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \qquad rot(\alpha, z) = \begin{bmatrix} cos\alpha & -sin\alpha & 0 & 0 \\ sin\alpha & cos\alpha & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$rot(\beta, y) = \begin{bmatrix} cos\beta & 0 & sin\beta & 0 \\ 0 & 1 & 0 & 0 \\ -sin\beta & 0 & cos\beta & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

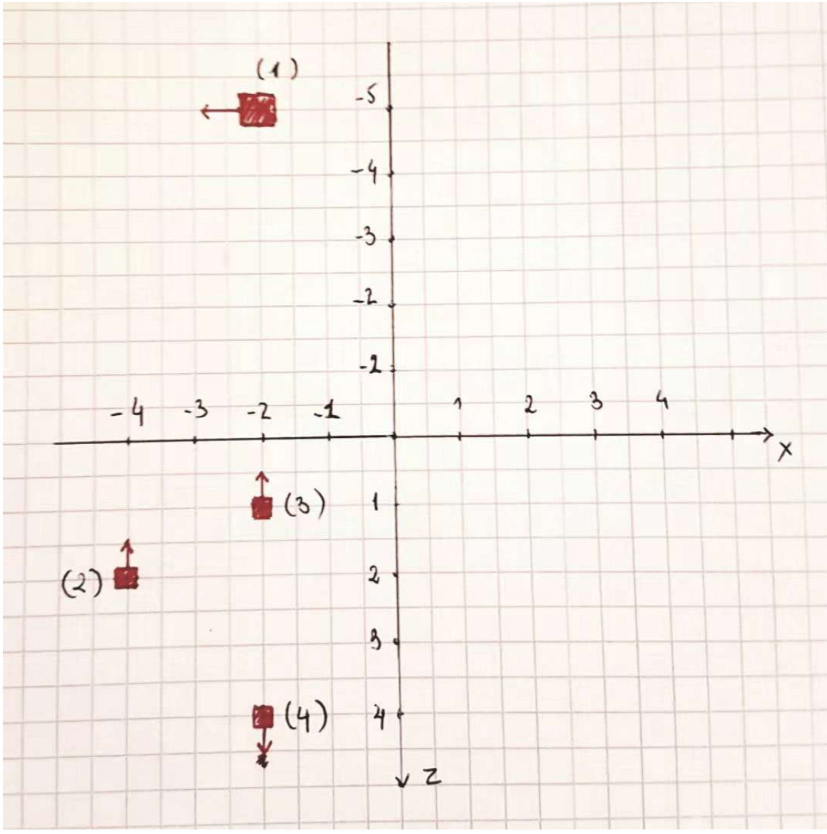
$$rot(90,x) \, . \, rot(\alpha, z) = \begin{bmatrix} cos\alpha & -sin\alpha & 0 & 0 \\ 0 & 0 & -1 & 0 \\ sin\alpha & cos\alpha & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$rot(\beta, y) \, . \, rot(90,x) = \begin{bmatrix} cos\beta & sin\beta & 0 & 0 \\ 0 & 0 & -1 & 0 \\ -sin\beta & cos\beta & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

As $rot(90,x) \, . \, rot(\alpha, z) = rot(\beta, y) \, . \, rot(90,x) \ \Rightarrow \begin{cases} cos\alpha = cos\beta \\ -sin\alpha = sin\beta \end{cases} \Rightarrow \alpha = -\beta$

EXERCISE 1.6

1) $rot(90,\mathrm{y}) \cdot trans(5.0,0.0,-2.0)$
2) $trans(-4.0,0.0,2.0) \cdot scale(0.5)$
3) $scale(0.5) \cdot trans(-4.0,0.0,2.0)$
4) $trans(-2.0,0.0,4.0) \cdot scale(0.5) \cdot rot(180,\mathrm{y})$



(1)
(2)
(3)
(4)
x
z