

## Step-1

To check the product of 5 reflections and 8 rotations of the  $x$ - $y$  plane produce.

Reflection yields;  $(x, y) \xrightarrow{\text{Re}} (y, x)$

Rotation yields;  $(x, y) \xrightarrow{\text{Ro}} (y, -x)$

## Step-2

Let  $(x, y)$  be vector.

Re denote reflection, Ro denotes rotations

Now the product of 5 reflections and 8 rotations is as shown below.  $(x, y) \xrightarrow{\text{Re}} (y, x) \xrightarrow{\text{Re}} (x, y) \xrightarrow{\text{Re}} (y, x) \xrightarrow{\text{Re}} (x, y)$

$$\xrightarrow{\text{Re}} (y, x) \xrightarrow{\text{Ro}} (-x, y) \xrightarrow{\text{Ro}} (-y, -x) \xrightarrow{\text{Ro}} (x, -y)$$

$$\xrightarrow{\text{Ro}} (y, x) \xrightarrow{\text{Ro}} (-x, y) \xrightarrow{\text{Ro}} (-y, -x) \xrightarrow{\text{Ro}} (x, -y)$$

$$\xrightarrow{\text{Ro}} (y, x)$$

Hence the product of 5 reflections and 8 rotations of  $x$ - $y$  plane produce a reflection.