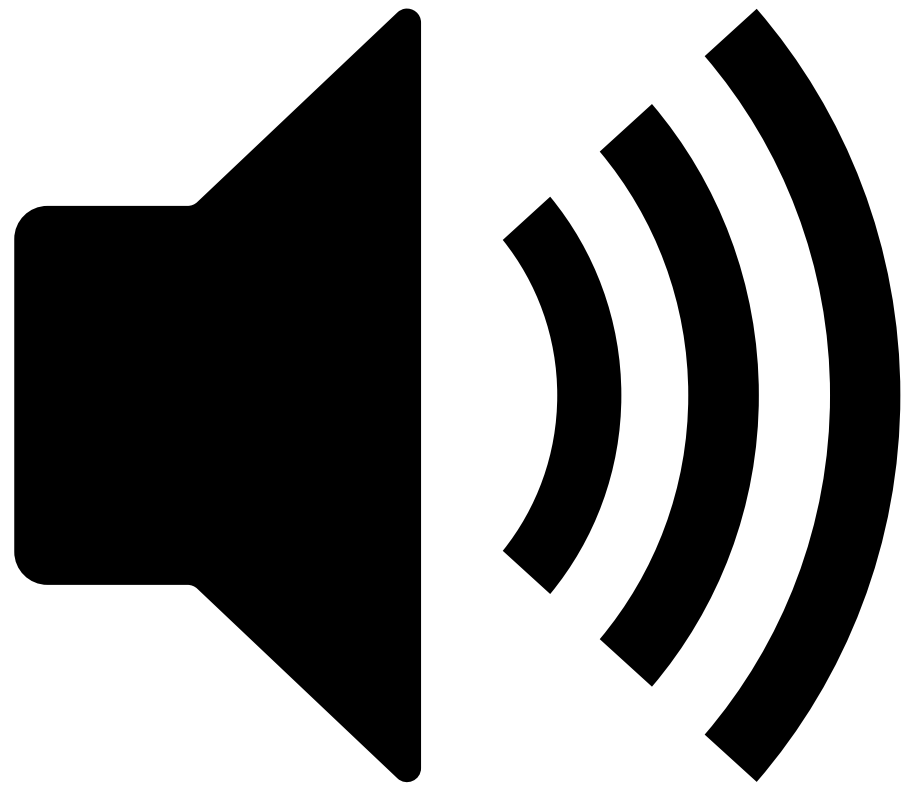
Rotation

- The second basic transformation is rotation, where you also move a point from one location to another but the new location is yielded by applying a rotation of let's say by theta angle, of that point by keeping the origin as the pivot.

- Mathematically, this is similar to have an object moving on a circle of the radius as distance between origin and the original point.

- And then, moving along the circumference by theta radians or degrees as given, usually in the clockwise direction.

- This in premise lays foundation for a new coordinate system, which is called as Polar Coordinate System. The origin can instead be called as Pole.



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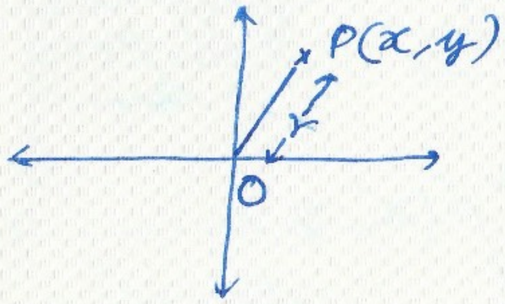
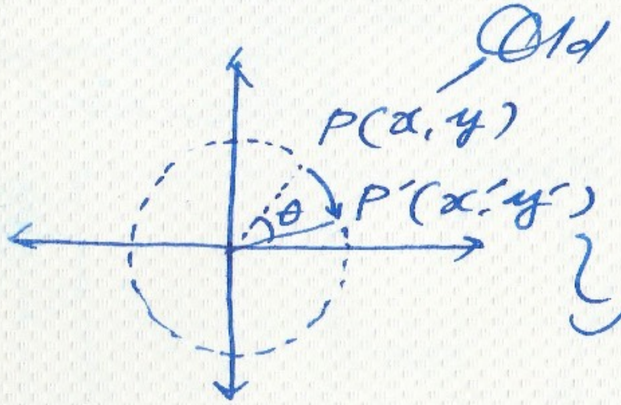
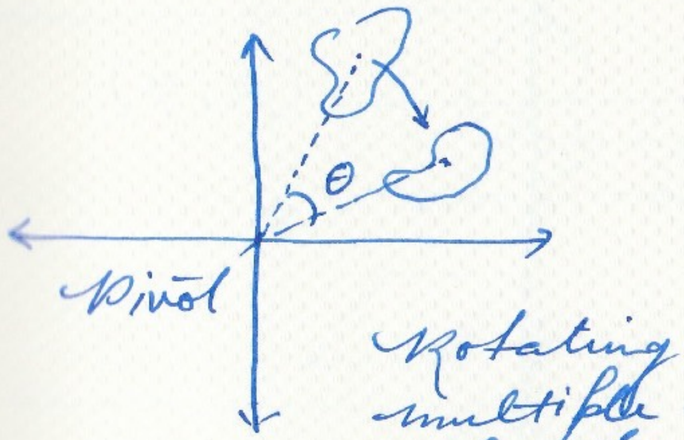




$$\begin{bmatrix} x' \\ y' \end{bmatrix} = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix}$$

$$x' = x\cos\theta - y\sin\theta$$
$$y' = x\sin\theta + y\cos\theta$$



Rotating multiple points.