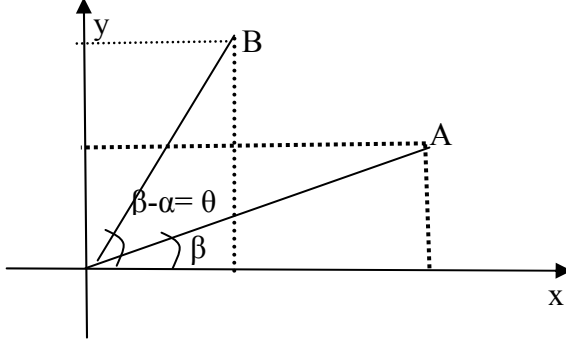
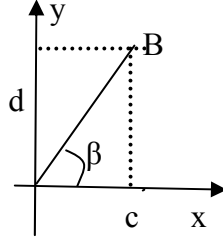
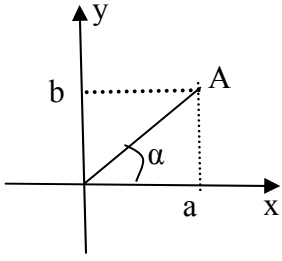


Image Rotation



$$\begin{bmatrix} c \\ d \end{bmatrix} = \begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix} \begin{bmatrix} a \\ b \end{bmatrix}$$

$$\begin{bmatrix} x_2 \\ y_2 \end{bmatrix} = \begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix} \begin{bmatrix} x_1 \\ y_1 \end{bmatrix}$$

P161) A(3,4) noktasi a)pozitif yonde (saat yonunun tersi) 30° , b)negatif yonde 60° c)pozitif yonde 90° d)negatif yonde 90° e)pozitif yonde 180° d)negatif yonde 180° dondurulurse, yeni noktanin koordinatlari nedir.

$$x_2 = x_1 \cos \theta - y_1 \sin \theta$$

$$y_2 = x_1 \sin \theta + y_1 \cos \theta$$

a) $x_2 = 3 \cos 30 - 4 \sin 30 = 0.59$

$$y_2 = 3 \sin 30 + 4 \cos 30 = 4.96$$

$x_1=3, y_1=4, \theta=30, x_2=0.59, y_2=4.96,$

$x_1=3, y_1=4, \theta=-60, x_2=4.96, y_2=-0.59,$

$x_1=3, y_1=4, \theta=90, x_2=-4, y_2=3,$

$x_1=3, y_1=4, \theta=-90, x_2=4, y_2=-3,$

$x_1=3, y_1=4, \theta=180, x_2=-3, y_2=-4,$

$x_1=3, y_1=4, \theta=-180, x_2=-3, y_2=-4,$

P321)P noktasi A noktasi etrafinda θ kadar dondurulurse Q noktasinin koordinatlarini hesaplayin.

A noktasi orogin olsa idi

$$\begin{bmatrix} x_2 \\ y_2 \end{bmatrix} = \begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix} \begin{bmatrix} x_1 \\ y_1 \end{bmatrix}$$

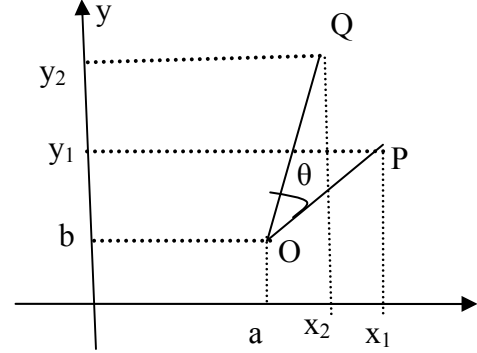
bagintisi gecerli olacakti. O halde bu noktalarin origine uzakligini eklersek dondurme formulu bulmus oluruz.

$$\begin{bmatrix} x_2 - a \\ y_2 - b \end{bmatrix} = \begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix} \begin{bmatrix} x_1 - a \\ y_1 - b \end{bmatrix}$$

veya

$$\begin{bmatrix} x_2 \\ y_2 \end{bmatrix} = \begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix} \begin{bmatrix} x_1 - a \\ y_1 - b \end{bmatrix} + \begin{bmatrix} a \\ b \end{bmatrix}$$

bagintisi gecerli olacakti.



P161) P(3,4) noktasi A(1,2) noktasi etrafinda a)pozitif yonde (saat yonunun tersi) 30° , b)negatif yonde 60° c)pozitif yonde 90° d)negatif yonde 90° e)pozitif yonde 180° d)negatif yonde 180° dondurulurse, yeni noktanin koordinatlari nedir.

$$\begin{bmatrix} x_2 \\ y_2 \end{bmatrix} = \begin{bmatrix} \cos 30 & -\sin 30 \\ \sin 30 & \cos 30 \end{bmatrix} \begin{bmatrix} 3-1 \\ 4-2 \end{bmatrix} + \begin{bmatrix} 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 1.73 \\ 4.73 \end{bmatrix}$$

$x_1=3, y_1=4, \text{teta}=30, \text{ox}=1, \text{oy}=2, x_2=1.73, y_2=4.73,$

$x_1=3, y_1=4, \text{teta}=-60, \text{ox}=1, \text{oy}=2, x_2=3.73, y_2=1.26,$

$x_1=3, y_1=4, \text{teta}=90, \text{ox}=1, \text{oy}=2, x_2=-1, y_2=4,$

$x_1=3, y_1=4, \text{teta}=-90, \text{ox}=1, \text{oy}=2, x_2=3, y_2=0$

$x_1=3, y_1=4, \text{teta}=180, \text{ox}=1, \text{oy}=2, x_2=-1, y_2=0$

$x_1=3, y_1=4, \text{teta}=-180, \text{ox}=1, \text{oy}=2, x_2=-1, y_2=0,$