Rotações no plano:

$$\begin{pmatrix} x \\ y \end{pmatrix} \xmapsto{R_a} \begin{pmatrix} \cos a\, x - \operatorname{sen} a\, y \\ \operatorname{sen} a\, x + \cos a\, y \end{pmatrix} \xmapsto{R_b} \begin{pmatrix} \cos b\,(\cos a\, x - \operatorname{sen} a\, y) - \operatorname{sen} b\,(\operatorname{sen} a\, x + \cos a\, y) \\ \operatorname{sen} b\,(\cos a\, x - \operatorname{sen} a\, y) + \cos b\,(\operatorname{sen} a\, x + \cos a\, y) \end{pmatrix}$$

$$= \begin{pmatrix} (\cos b \cos a - \operatorname{sen} b \operatorname{sen} a)\, x - (\operatorname{sen} a \cos b + \operatorname{sen} b \cos a)\, y \\ (\operatorname{sen} b \cos a + \operatorname{sen} a \cos b)\, x + (\cos a \cos b - \operatorname{sen} a \operatorname{sen} b)\, y \end{pmatrix}$$

Também:

$$\begin{pmatrix} x \\ y \end{pmatrix} \xmapsto{R_{a+b}} \begin{pmatrix} \cos(a+b)\, x - \operatorname{sen}(a+b)\, y \\ \operatorname{sen}(a+b)\, x + \cos(a+b)\, y \end{pmatrix}$$

Comparando:
$$\begin{cases} \cos(a+b) = \cos a \cos b - \operatorname{sen} a \operatorname{sen} b \\ \operatorname{sen}(a+b) = \operatorname{sen} a \cos b + \operatorname{sen} b \cos a \end{cases}$$