



FIND

$${}^N R^A$$

$${}^N R^B$$

$${}^N R^C$$

$${}^N R^A = \hat{a} \text{ rotated by } \theta_1 \text{ about } \hat{n}_2$$

$${}^A R^B = \hat{b} \text{ rotated by } \theta_2 \text{ about } \hat{a}_2$$

$${}^B R^C = \hat{c} \text{ rotated by } \theta_3 \text{ about } \hat{b}_3$$

$${}^N R^A = \begin{bmatrix} \cos \theta_1 & 0 & \sin \theta_1 \\ 0 & 1 & 0 \\ -\sin \theta_1 & 0 & \cos \theta_1 \end{bmatrix}$$

$${}^A R^B = \begin{bmatrix} \cos \theta_2 & 0 & \sin \theta_2 \\ 0 & 1 & 0 \\ -\sin \theta_2 & 0 & \cos \theta_2 \end{bmatrix}$$

$${}^B R^C = \begin{bmatrix} \cos \theta_3 & -\sin \theta_3 & 0 \\ \sin \theta_3 & \cos \theta_3 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$${}^N R^B = ({}^N R^A)({}^A R^B)$$

$${}^N R^C = ({}^N R^A)({}^A R^B)({}^B R^C)$$