

► **R07** Calculer :

$$\sum_{k=1}^6 \cos\left(k \frac{\pi}{7}\right)$$

Corrigé

$$\begin{aligned} & \sum_{k=1}^6 \cos\left(k \frac{\pi}{7}\right) \\ &= \cos\left(\frac{\pi}{7}\right) + \cos\left(\frac{2\pi}{7}\right) + \cos\left(\frac{3\pi}{7}\right) + \cos\left(\frac{4\pi}{7}\right) \\ & \quad + \cos\left(\frac{5\pi}{7}\right) + \cos\left(\frac{6\pi}{7}\right) \\ &= \cos\left(\frac{\pi}{7}\right) + \cos\left(\frac{2\pi}{7}\right) + \cos\left(\frac{3\pi}{7}\right) + \cos\left(\pi - \frac{3\pi}{7}\right) \\ & \quad + \cos\left(\pi - \frac{2\pi}{7}\right) \\ & \quad + \cos\left(\pi - \frac{\pi}{7}\right) \\ &= \cos\left(\frac{\pi}{7}\right) + \cos\left(\frac{2\pi}{7}\right) \\ & \quad + \cos\left(\frac{3\pi}{7}\right) - \cos\left(\frac{3\pi}{7}\right) - \cos\left(\frac{2\pi}{7}\right) - \cos\left(\frac{\pi}{7}\right) \\ &= 0 \end{aligned}$$

Résumons : $A = 0$.



The screenshot shows a TI-84 Plus calculator screen. At the top, the mode settings are 'NORMAL', 'FLOTT', 'AUTO', 'RÉEL', 'RAD', and 'MP'. Below this, the expression $\sum_{k=1}^6 \left(\cos\left(k \frac{\pi}{7}\right) \right)$ is entered. The result, 0, is displayed at the bottom right of the screen.