

Β ΛΥΚΕΙΟΥ ΑΛΓΕΒΡΑ

14.11 1)

$$\alpha) \quad \sigma\upsilon\nu\frac{29\pi}{6} = \sigma\upsilon\nu\frac{24\pi+5\pi}{6} = \sigma\upsilon\nu\left(4\pi+\frac{5\pi}{6}\right) = \sigma\upsilon\nu\left(\frac{5\pi}{6}\right) = \sigma\upsilon\nu\left(\pi-\frac{\pi}{6}\right) \stackrel{\sigma\upsilon\nu(\pi-\omega)=-\sigma\upsilon\nu\omega}{=} -\sigma\upsilon\nu\frac{\pi}{6} = -\frac{\sqrt{3}}{2}$$

$$\beta) \quad \sigma\varphi\frac{21\pi}{4} = \sigma\varphi\frac{20\pi+\pi}{4} = \sigma\varphi\left(5\pi+\frac{\pi}{4}\right) = \sigma\varphi\left(4\pi+\pi+\frac{\pi}{4}\right) = \sigma\varphi\left(\pi+\frac{\pi}{4}\right) \stackrel{\sigma\varphi(\pi+\omega)=+\sigma\varphi\omega}{=} \sigma\varphi\frac{\pi}{4} = 1$$

$$\gamma) \quad \eta\mu\frac{14\pi}{3} = \eta\mu\frac{12\pi+2\pi}{3} = \eta\mu\left(4\pi+\frac{2\pi}{3}\right) = \eta\mu\left(\frac{2\pi}{3}\right) = \eta\mu\left(\pi-\frac{\pi}{3}\right) \stackrel{\eta\mu(\pi-\omega)=\eta\mu\omega}{=} \eta\mu\frac{\pi}{3} = \frac{\sqrt{3}}{2}$$

$$\delta) \quad \varepsilon\varphi\left(-\frac{47\pi}{3}\right) \stackrel{\varepsilon\varphi(-\omega)=-\varepsilon\varphi\omega}{=} -\varepsilon\varphi\frac{47\pi}{3} = -\varepsilon\varphi\frac{45\pi+2\pi}{3} = -\varepsilon\varphi\left(15\pi+\frac{2\pi}{3}\right) = -\varepsilon\varphi\left(14\pi+\pi+\frac{2\pi}{3}\right) =$$

$$= -\varepsilon\varphi\left(\pi+\frac{2\pi}{3}\right) \stackrel{\varepsilon\varphi(\pi+\omega)=\varepsilon\varphi\omega}{=} -\varepsilon\varphi\frac{2\pi}{3} = -\varepsilon\varphi\left(\pi-\frac{\pi}{3}\right) \stackrel{\varepsilon\varphi(\pi-\omega)=-\varepsilon\varphi\omega}{=} \varepsilon\varphi\frac{\pi}{3} = \sqrt{3}$$

14.11 2)

$$\sigma\upsilon\nu\frac{14\pi}{3} = \sigma\upsilon\nu\left(\frac{12\pi}{3}+\frac{2\pi}{3}\right) = \sigma\upsilon\nu\left(4\pi+\frac{2\pi}{3}\right) = \sigma\upsilon\nu\frac{2\pi}{3} = \sigma\upsilon\nu\left(\pi-\frac{\pi}{3}\right) = -\sigma\upsilon\nu\frac{\pi}{3} = -\frac{1}{2}$$

14.11 3)

$$\varepsilon\varphi\frac{19\pi}{6} = \varepsilon\varphi\left(\frac{18\pi}{6}+\frac{\pi}{6}\right) = \varepsilon\varphi\left(3\pi+\frac{\pi}{6}\right) = \varepsilon\varphi\left(2\pi+\pi+\frac{\pi}{6}\right) = \varepsilon\varphi\left(\pi+\frac{\pi}{6}\right) = \varepsilon\varphi\frac{\pi}{6} = \frac{\sqrt{3}}{3}$$

14.11 4)

$$\eta\mu\frac{51\pi}{4} = \eta\mu\left(\frac{52\pi}{4}-\frac{\pi}{4}\right) = \eta\mu\left(13\pi-\frac{\pi}{4}\right) = \eta\mu\left(12\pi+\pi-\frac{\pi}{4}\right) = \eta\mu\left(\pi-\frac{\pi}{4}\right) = \eta\mu\frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

14.11 5)

$$\sigma\varphi\left(-\frac{35\pi}{6}\right) = -\sigma\varphi\frac{35\pi}{6} = -\sigma\varphi\left(\frac{36\pi}{6}-\frac{\pi}{6}\right) = -\sigma\varphi\left(6\pi-\frac{\pi}{6}\right) = \sigma\varphi\frac{\pi}{6} = \sqrt{3}$$

14.11 6)

$$\sigma\upsilon\nu\left(-\frac{15\pi}{4}\right) = \sigma\upsilon\nu\frac{15\pi}{4} = \sigma\upsilon\nu\left(\frac{16\pi}{4}-\frac{\pi}{4}\right) = \sigma\upsilon\nu\left(4\pi-\frac{\pi}{4}\right) = \sigma\upsilon\nu\frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

14.11 7)

$$\eta\mu\frac{17\pi}{3} = \eta\mu\left(\frac{18\pi}{3}-\frac{\pi}{3}\right) = \eta\mu\left(6\pi-\frac{\pi}{3}\right) = \eta\mu\left(-\frac{\pi}{3}\right) = -\eta\mu\frac{\pi}{3} = -\frac{\sqrt{3}}{2}$$

14.11 8)

$$\varepsilon\varphi\left(-\frac{31\pi}{4}\right) = -\varepsilon\varphi\frac{31\pi}{4} = -\varepsilon\varphi\left(\frac{32\pi}{4}-\frac{\pi}{4}\right) = -\varepsilon\varphi\left(8\pi-\frac{\pi}{4}\right) = -\varepsilon\varphi\frac{\pi}{4} = 1$$

14.11 9)

$$\sigma\varphi\frac{65\pi}{3} = \sigma\varphi\left(\frac{66\pi}{3}-\frac{\pi}{3}\right) = \sigma\varphi\left(22\pi-\frac{\pi}{3}\right) = \sigma\varphi\left(-\frac{\pi}{3}\right) = -\sigma\varphi\frac{\pi}{3} = -\frac{\sqrt{3}}{3}$$

14.11 10)

$$\begin{aligned}\eta\mu\left(-\frac{89\pi}{6}\right) &= -\eta\mu\frac{89\pi}{6} = -\eta\mu\left(\frac{90\pi}{6}-\frac{\pi}{6}\right) = -\eta\mu\left(15\pi-\frac{\pi}{6}\right) = -\eta\mu\left(14\pi+\pi-\frac{\pi}{6}\right) = \\ &= -\eta\mu\left(\pi-\frac{\pi}{6}\right) = -\eta\mu\frac{\pi}{6} = -\frac{1}{2}\end{aligned}$$