Problem 7.27

From the description of minimum-shift keying presented in Section 7.4, we recall the following:

- The transmission of symbol 1 increases the phase of the MSK signal by $\pi/2$ radians.
- The transmission of symbol 0 decreases the phase of the MSK signal by $\pi/2$ radians.

Accordingly, we may justify the entries listed in Table 7.4 as follows:

(a) When $\theta(0) = 0$, the transmission of symbol 0 yields

$$\theta(T_b) = -\pi/2 \text{ radians}$$

(b) When $\theta(0) = \pi$ radians, the transmission of symbol 1 yields

$$\theta(T_b) = \pi + \pi/2 = 3\pi/2 \text{ radians}$$

which, in modulo-2π arithmetic, is equivalent to

$$\theta(T_b) = 3\pi/2 - 2\pi = -\pi/2 \text{ radians}$$

(c) When $\theta(0) = \pi$ radians, the transmission of symbol 0 yields

$$\theta(T_b) = \pi - (\pi/2) = +\pi/2 \text{ radians}$$

(d) When $\theta(0) = 0$, the transmission of symbol 1 yields

$$\theta(T_b) = 0 + \pi/2 = +\pi/2 \text{ radians}$$