3.22 (a)(b) 解：由已知，$x(t)=\begin{cases} t+2 & -2<t\le -1 \\ 1 & -1<t<1 \\ 2-t & 1\le t<2 \end{cases}$

周期 $T=6$

$a_0=\frac{1}{2}$

$a_k=\begin{cases} 0 & k\text{为偶数} \\ \frac{6}{\pi^2k^2}\sin(\frac{\pi k}{2})\sin(\frac{\pi k}{6}) & k\text{为奇数} \end{cases}$

3.23 (c) 解：由已知，得

$a_1=a_{-1}^*=j \quad a_2=a_{-2}^*=2j$

$\because$ 周期为4

$\therefore x(t)=a_1e^{j\frac{2\pi}{4}t}+a_{-1}^*e^{-j\frac{2\pi}{4}t}+a_2e^{2j\frac{2\pi}{4}t}+a_{-2}^*e^{-2j\frac{2\pi}{4}t}$

$=je^{j\frac{\pi}{2}t}+je^{-j\frac{\pi}{2}t}+2je^{j\pi t}+2je^{-j\pi t}$

$=-2\sin(\frac{\pi}{2}t)-4\sin(\pi t)$

3.25、解：

(a) 由已知，得 $\cos(4\pi t)=\frac{1}{2}(e^{j4\pi t}+e^{-j4\pi t})$

$\therefore \cancel{a_1=a_{-1}^*=\frac{1}{2}} \quad a_1=a_{-1}=\frac{1}{2}$

(b) 由已知，得 $\sin(4\pi t)=-\frac{1}{2}j(e^{j4\pi t}-e^{-j4\pi t})$

$\cancel{\therefore b_1=b_{-1}^*=-\frac{1}{2}j} \quad \cancel{\therefore b_1=-\frac{1}{2}j\ b_{-1}^*=} \quad \therefore b_1=b_{-1}^*=\frac{1}{2}j$

(c) 由已知，得

$z(t)=x(t)y(t)\xleftrightarrow{FS}c_k=\sum_{l=-\infty}^{\infty}a_lb_{k-l}$

$\therefore c_k=a_k*b_k=\frac{1}{4j}\delta[k-2]-\frac{1}{4j}\delta[k+2]$

$\therefore c_2=c_{-2}^*=\frac{1}{4j}$

(d) $z(t)=\sin4t\cos4t=\frac{1}{2}\sin8t$

得 $c_2=c_{-2}^*=\frac{1}{4j}$，与(c)一致

3.30. 解：(a) 由已知，得

$$a_0 = \frac{1}{6}\sum_{n=\langle 6\rangle} x[n] = 1$$

$$a_1 = a_{-1} = \frac{1}{2}$$

(b) 由已知，得

$$b_1 = b_{-1}^* = \frac{e^{-j\frac{\pi}{4}}}{2}$$

(c) $z[n] = x[n]y[n] \xleftrightarrow{FS} c_k = \sum_{l=-2}^{2} a_l b_{k-l}$

得 $c_0 = \frac{\cos\frac{\pi}{4}}{2}$

$c_1 = c_{-1}^* = \frac{e^{-j\frac{\pi}{4}}}{2}$ $\qquad c_2 = c_{-2}^* = \frac{e^{-j\frac{\pi}{4}}}{4}$

(d) 由已知，得

$$z[n] = \sin\left(\frac{2\pi}{6}n+\frac{\pi}{4}\right) + \sin\left(\frac{2\pi}{6}n+\frac{\pi}{4}\right)\cos\left(\frac{2\pi}{6}n\right)$$

$$= \sin\left(\frac{2\pi}{6}n+\frac{\pi}{4}\right) + \frac{1}{2}\left[\sin\left(\frac{4\pi}{6}n+\frac{\pi}{4}\right) + \sin\left(\frac{\pi}{4}\right)\right]$$

得 $c_0 = \frac{\cos\frac{\pi}{4}}{2}$

$c_1 = c_{-1}^* = \frac{e^{-j\frac{\pi}{4}}}{2}$ $\qquad c_2 = c_{-2}^* = \frac{e^{-j\frac{\pi}{4}}}{4}$ $\qquad$ 与 (c) 一致