$$\cos(2x) = \sin(x) + 1$$

$$1 - 2\sin^2(x) - \sin(x) - 1 = 0$$
$$2\sin^2(x) + \sin(x) = 0$$
$$\sin(x)(2\sin(x) + 1) = 0$$
$$\begin{array}{lll} \sin(x) = 0 & \vee & 2\sin(x) = -1 \\ x = k\pi & \vee & \sin(x) = -\frac{1}{2} \\ & & x = \frac{5\pi}{6} + 2k\pi \vee x = \frac{7\pi}{6} + 2k\pi \end{array}$$