

2.82
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$$\cos\left(\frac{2x+3\pi}{2}\right) + \left[\sin\left(\frac{13\pi}{2} + x\right) + \cos\left(\frac{7\pi}{2} + x\right) \right]^2 = 0$$

$$+ \sin(2x) + (\cos x + \sin x)^2 = 0$$

$$+ \sin(2x) + \cos^2 x + 2\sin x \cos x + \sin^2 x = 0$$

$$-1 = 2\sin(2x)$$

$$\sin(2x) = -\frac{1}{2}$$

$$2x = -\frac{\pi}{6} + 2\pi k$$

$$\boxed{x = -\frac{\pi}{12} + \pi k}$$

$$2x = \frac{5\pi}{6} + 2\pi k$$

$$\boxed{x = \frac{5\pi}{12} + \pi k}$$