9). $2\sin 2x + 3\sqrt{3}(\sin x + \cos x) + 5 = 0.$

Đặt $t = \sin x + \cos x$ (Đk : $|t| \le \sqrt{2}$) $\Leftrightarrow$ $t^2 = (\sin x + \cos x)^2$ $\Leftrightarrow$ $\sin 2x = t^2 - 1$

Ta được : $2(t^2 - 1) + 3\sqrt{3}t + 5 = 0$ $\Leftrightarrow$ $2t^2 + 3\sqrt{3}t + 3 = 0$ $\Leftrightarrow$ $t = -\sqrt{3} \vee t = -\dfrac{\sqrt{3}}{2}$

So với điều kiện $t = -\dfrac{\sqrt{3}}{2}$ nhận.

Với $t = -\dfrac{\sqrt{3}}{2}$ $\Leftrightarrow$ $\sqrt{2}\sin\left(x + \dfrac{\pi}{4}\right) = -\dfrac{\sqrt{3}}{2}$ $\Leftrightarrow$ $\sin\left(x + \dfrac{\pi}{4}\right) = -\dfrac{\sqrt{6}}{4}$

$$\Leftrightarrow \left[\begin{array}{l} x + \dfrac{\pi}{4} = \arcsin\left(-\dfrac{\sqrt{6}}{4}\right) + k2\pi \\ x + \dfrac{\pi}{4} = \pi - \arcsin\left(-\dfrac{\sqrt{6}}{4}\right) + k2\pi \end{array}\right. \Leftrightarrow \left[\begin{array}{l} x = -\dfrac{\pi}{4} + \arcsin\left(-\dfrac{\sqrt{6}}{4}\right) + k2\pi \\ x = \dfrac{3\pi}{4} - \arcsin\left(-\dfrac{\sqrt{6}}{4}\right) + k2\pi \end{array}\right. (k \in \mathbb{Z})$$

Nghiệm của phương trình:

$x = -\dfrac{\pi}{4} + \arcsin\left(-\dfrac{\sqrt{6}}{4}\right) + k2\pi, x = \dfrac{3\pi}{4} - \arcsin\left(-\dfrac{\sqrt{6}}{4}\right) + k2\pi, (k \in \mathbb{Z})$

10). $(1 - \sqrt{2})(1 + \sin x - \cos x) = \sin 2x$.

Đặt $t = \sin x - \cos x$ (Đk : $|t| \le \sqrt{2}$) $\Leftrightarrow$ $\sin 2x = 1 - t^2$

Ta được : $(1 - \sqrt{2})(1 + t) = 1 - t^2$ $\Leftrightarrow$ $t^2 + (1 - \sqrt{2})t - \sqrt{2} = 0$ $\Leftrightarrow$ $t = \sqrt{2} \vee t = -1$

Với $t = \sqrt{2}$ $\Leftrightarrow$ $\sqrt{2}\sin\left(x - \dfrac{\pi}{4}\right) = \sqrt{2}$ $\Leftrightarrow$ $\sin\left(x - \dfrac{\pi}{4}\right) = 1$

$\Leftrightarrow$ $x - \dfrac{\pi}{4} = \dfrac{\pi}{2} + k2\pi$ $\Leftrightarrow$ $x = \dfrac{3\pi}{4} + k2\pi$ $(k \in \mathbb{Z})$

Với $t = -1$ $\Leftrightarrow$ $\sqrt{2}\sin\left(x - \dfrac{\pi}{4}\right) = -1$ $\Leftrightarrow$ $\sin\left(x - \dfrac{\pi}{4}\right) = -\dfrac{1}{\sqrt{2}}$

$$\Leftrightarrow \left[\begin{array}{l} x - \dfrac{\pi}{4} = -\dfrac{\pi}{4} + k2\pi \\ x - \dfrac{\pi}{4} = \pi + \dfrac{\pi}{4} + k2\pi \end{array}\right. \Leftrightarrow \left[\begin{array}{l} x = k2\pi \\ x = \dfrac{3\pi}{2} + k2\pi \end{array}\right. (k \in \mathbb{Z})$$

Nghiệm của phương trình: $x = \dfrac{3\pi}{4} + k2\pi$, $x = k2\pi, x = \dfrac{3\pi}{2} + k2\pi, (k \in \mathbb{Z})$

11). $(1 + \sqrt{2})(\sin x + \cos x) - 2\sin x\cos x - 1 - \sqrt{2} = 0.$

Đặt $t = \sin x + \cos x$ (Đk : $|t| \le \sqrt{2}$ $\Rightarrow \sin x\cos x = \dfrac{t^2 - 1}{2}$. Ta được : $(1 + \sqrt{2})t - (t^2 - 1) - 1 - \sqrt{2} = 0$ $\Leftrightarrow$

$-t^2 + (1 + \sqrt{2})t - \sqrt{2} = 0$ $\Leftrightarrow$ $t = \sqrt{2} \vee t = 1$

Với $t = \sqrt{2}$ $\Leftrightarrow$ $\sqrt{2}\sin\left(x + \dfrac{\pi}{4}\right) = \sqrt{2}$ $\Leftrightarrow$ $\sin\left(x + \dfrac{\pi}{4}\right) = 1$

$\Leftrightarrow$ $x + \dfrac{\pi}{4} = \dfrac{\pi}{2} + k2\pi$ $\Leftrightarrow$ $x = \dfrac{\pi}{4} + k2\pi$ $(k \in \mathbb{Z})$

Với $t=1 \Leftrightarrow \sqrt{2}\sin\left(x+\frac{\pi}{4}\right)=1 \Leftrightarrow \sin\left(x+\frac{\pi}{4}\right)=\frac{1}{\sqrt{2}}$

$$\Leftrightarrow \left[\begin{array}{l} x+\frac{\pi}{4}=\frac{\pi}{4}+k2\pi \\ x+\frac{\pi}{4}=\pi-\frac{\pi}{4}+k2\pi \end{array}\right. \Leftrightarrow \left[\begin{array}{l} x=k2\pi \\ x=\frac{\pi}{2}+k2\pi \end{array}\right.(k\in\mathbb{Z})$$

Nghiệm của phương trình: $x=\frac{\pi}{4}+k2\pi$, $x=k2\pi, x=\frac{\pi}{2}+k2\pi, (k\in\mathbb{Z})$