

Câu : Giải các phương trình sau:

- 1).  $2 \sin^2 2x + \sin 7x - 1 = \sin x$  [ĐH B07]
- 2).  $\sin\left(\frac{5x}{2} - \frac{\pi}{4}\right) - \cos\left(\frac{x}{2} - \frac{\pi}{4}\right) = \sqrt{2} \cos \frac{3x}{2}$  [Dự bị 1 ĐH B07]
- 3).  $2\sqrt{2} \sin\left(x - \frac{\pi}{12}\right) \cos x = 1$  [Dự bị 1 ĐH D07]
- 4).  $2 \sin x(1 + \cos 2x) + \sin 2x = 1 + 2 \cos x$  [ĐH D08]
- 5).  $\sin\left(2x - \frac{\pi}{4}\right) = \sin\left(x - \frac{\pi}{4}\right) + \frac{\sqrt{2}}{2}$  [Dự bị 2 ĐH A08]
- 6).  $3 \sin x + \cos 2x + \sin 2x = 4 \sin x \cos^2 \frac{x}{2}$  [Dự bị 2 ĐH B08]
- 7).  $4(\sin^4 x + \cos^4 x) + \cos 4x + \sin 2x = 0$  [Dự bị 1 ĐH D08]
- 8).  $\sin x + \cos x \sin 2x + \sqrt{3} \cos 3x = 2(\cos 4x + \sin^3 x)$  [ĐH B09]

LỜI GIẢI

$$1). 2 \sin^2 2x + \sin 7x - 1 = \sin x$$

$$\Leftrightarrow \sin 7x - \sin x + 2 \sin^2 2x - 1 = 0 \Leftrightarrow 2 \cos 4x \cdot \sin 3x - \cos 4x = 0$$

$$\Leftrightarrow \cos 4x(2 \sin 3x - 1) = 0 \Leftrightarrow \cos 4x = 0 \vee 2 \sin 3x - 1 = 0$$

$$\text{Với } \cos 4x = 0 \Leftrightarrow 4x = \frac{\pi}{2} + k\pi \Leftrightarrow x = \frac{\pi}{8} + \frac{k\pi}{4}, (k \in \mathbb{Z})$$

$$\text{Với } 2 \sin 3x - 1 = 0 \Leftrightarrow x = \frac{\pi}{18} + \frac{k2\pi}{3} \text{ hoặc } x = \frac{5\pi}{18} + \frac{k2\pi}{3}, (k \in \mathbb{Z})$$

$$\text{Nghiệm của phương trình: } x = \frac{\pi}{8} + \frac{k\pi}{4}, x = \frac{\pi}{18} + \frac{k2\pi}{3}, x = \frac{5\pi}{18} + \frac{k2\pi}{3}, (k \in \mathbb{Z})$$

$$2). \sin\left(\frac{5x}{2} - \frac{\pi}{4}\right) - \cos\left(\frac{x}{2} - \frac{\pi}{4}\right) = \sqrt{2} \cos \frac{3x}{2}$$

$$\Leftrightarrow \sin\left(\frac{5x}{2} - \frac{\pi}{4}\right) - \sin\left[\frac{\pi}{2} + \left(\frac{\pi}{4} - \frac{x}{2}\right)\right] = \sqrt{2} \cos \frac{3x}{2}$$

$$\Leftrightarrow 2 \cos\left(x + \frac{\pi}{4}\right) \sin\left(\frac{3x}{2} - \frac{\pi}{2}\right) = \sqrt{2} \cos \frac{3x}{2}$$

$$\Leftrightarrow -2 \cos\left(x + \frac{\pi}{4}\right) \cos \frac{3x}{2} = \sqrt{2} \cos \frac{3x}{2}$$

$$\Leftrightarrow \cos \frac{3x}{2} \left[ \sqrt{2} + 2 \cos\left(x + \frac{\pi}{4}\right) \right] = 0$$

$$\Leftrightarrow \cos \frac{3x}{2} = 0 \vee \cos\left(x + \frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2}$$

Với  $\cos \frac{3x}{2} = 0 \Leftrightarrow \frac{3x}{2} = \frac{\pi}{2} + k\pi \Leftrightarrow x = \frac{\pi}{3} + \frac{k2\pi}{3}, (k \in \mathcal{Z})$

Với  $\cos\left(x + \frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2} \Leftrightarrow x = \frac{\pi}{2} + k2\pi$  hoặc  $x = -\pi + k2\pi, (k \in \mathcal{Z})$

Nghiệm của phương trình  $x = \frac{\pi}{3} + \frac{k2\pi}{3}, x = \frac{\pi}{2} + k2\pi, x = -\pi + k2\pi, (k \in \mathcal{Z})$

3).  $2\sqrt{2} \sin\left(x - \frac{\pi}{12}\right) \cos x = 1$

$$\Leftrightarrow \sqrt{2} \left[ \sin\left(2x - \frac{\pi}{12}\right) - \sin \frac{\pi}{12} \right] = 1 \Leftrightarrow \sin\left(2x - \frac{\pi}{12}\right) - \sin \frac{\pi}{12} = \frac{1}{\sqrt{2}}$$

$$\Leftrightarrow \sin\left(x - \frac{\pi}{12}\right) = \sin \frac{\pi}{4} + \sin \frac{\pi}{12} = 2 \sin \frac{\pi}{6} \cos \frac{\pi}{12}$$

$$\Leftrightarrow \sin\left(x - \frac{\pi}{12}\right) = \cos \frac{\pi}{12} = \cos\left(\frac{\pi}{2} - \frac{5\pi}{12}\right) = \sin \frac{5\pi}{12}$$

$$\Leftrightarrow x = \frac{\pi}{4} + k\pi \text{ hoặc } x = \frac{\pi}{3} + k\pi, (k \in \mathcal{Z})$$

Nghiệm của phương trình  $x = \frac{\pi}{4} + k\pi, x = \frac{\pi}{3} + k\pi, (k \in \mathcal{Z})$ .

4).  $2 \sin x (1 + \cos 2x) + \sin 2x = 1 + 2 \cos x$

LỜI GIẢI

$$\Leftrightarrow 4 \sin x \cos^2 x + \sin 2x = 1 + 2 \cos x \Leftrightarrow \sin 2x(2 \cos x + 1) - (1 + 2 \cos x) = 0$$

$$\Leftrightarrow (2 \cos x + 1)(\sin 2x - 1) = 0 \Leftrightarrow 2 \cos x + 1 = 0 \vee \sin 2x - 1 = 0$$

Với  $2 \cos x + 1 = 0 \Leftrightarrow \cos x = -\frac{1}{2} \Leftrightarrow x = \pm \frac{2\pi}{3} + k2\pi, (k \in \mathcal{Z})$

Với  $\sin 2x - 1 = 0 \Leftrightarrow \sin 2x = 1 \Leftrightarrow 2x = k2\pi \Leftrightarrow x = k\pi, (k \in \mathcal{Z})$

Nghiệm của phương trình  $x = \pm \frac{2\pi}{3} + k2\pi, x = k\pi, (k \in \mathbb{Z})$ .

$$5). \sin\left(2x - \frac{\pi}{4}\right) = \sin\left(x - \frac{\pi}{4}\right) + \frac{\sqrt{2}}{2}$$

$$\Leftrightarrow \frac{1}{\sqrt{2}}(\sin 2x - \cos 2x) = \frac{1}{\sqrt{2}}(\sin x - \cos x + 1)$$

$$\Leftrightarrow \sin 2x - \sin x - (1 + \cos 2x) + \cos x = 0$$

$$\Leftrightarrow \sin x(2 \cos x - 1) - 2 \cos^2 x + \cos x = 0$$

$$\Leftrightarrow \sin x(2 \cos x - 1) - \cos x(2 \cos x - 1) = 0$$

$$\Leftrightarrow (2 \cos x - 1)(\sin x - \cos x) = 0 \Leftrightarrow 2 \cos x - 1 = 0 \vee \sin x - \cos x = 0$$

Với  $2 \cos x - 1 = 0 \Leftrightarrow \cos x = \frac{1}{2} \Leftrightarrow x = \pm \frac{\pi}{3} + k2\pi, (k \in \mathbb{Z})$

Với  $\sin x - \cos x = 0 \Leftrightarrow \sin\left(x - \frac{\pi}{4}\right) = 0 \Leftrightarrow x = \frac{\pi}{4} + k\pi, (k \in \mathbb{Z})$

Kết luận nghiệm của phương trình  $x = \pm \frac{\pi}{3} + k2\pi, x = \frac{\pi}{4} + k\pi, (k \in \mathbb{Z})$

$$6). 3 \sin x + \cos 2x + \sin 2x = 4 \sin x \cos^2 \frac{x}{2}$$

$$\Leftrightarrow 3 \sin x + \cos 2x + \sin 2x = 4 \sin x \left(\frac{1 + \cos x}{2}\right)$$

$$\Leftrightarrow 3 \sin x + \cos 2x + \sin 2x = 2 \sin x + \sin 2x$$

$$\Leftrightarrow \cos 2x + \sin x = 0 \Leftrightarrow 2 \sin^2 x - \sin x - 1 = 0 \Leftrightarrow \sin x = 1 \vee \sin x = -\frac{1}{2}$$

Với  $\sin x = 1 \Leftrightarrow x = \frac{\pi}{2} + k2\pi, (k \in \mathbb{Z})$

Với  $\sin x = -\frac{1}{2} \Leftrightarrow x = -\frac{\pi}{6} + k2\pi$  hoặc  $x = \frac{7\pi}{6} + k2\pi, (k \in \mathbb{Z})$

Nghiệm của phương trình  $x = \frac{\pi}{2} + k2\pi, x = -\frac{\pi}{6} + k2\pi, x = \frac{7\pi}{6} + k2\pi, (k \in \mathbb{Z})$

$$7). 4(\sin^4 x + \cos^4 x) + \cos 4x + \sin 2x = 0$$

$$\Leftrightarrow 4\left(1 - \frac{\sin^2 2x}{2}\right) + 1 - 2 \sin^2 2x + \sin 2x = 0$$

$$\Leftrightarrow 4 \sin^2 2x - \sin 2x - 5 = 0 \Leftrightarrow \sin 2x = -1 \vee \sin 2x = \frac{5}{4} \text{ (loại).}$$

$$\text{Với } \sin 2x = -1 \Leftrightarrow x = -\frac{\pi}{4} + k\pi, (k \in \mathbb{Z})$$

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

$$8). \sin x + \cos x \sin 2x + \sqrt{3} \cos 3x = 2(\cos 4x + \sin^3 x)$$

$$\Leftrightarrow \sin x(1 - 2 \sin^2 x) + \cos x \sin 2x + \sqrt{3} \cos 3x = 2 \cos 4x$$

$$\Leftrightarrow \sin x \cos 2x + \cos x \sin 2x + \sqrt{3} \cos 3x = 2 \cos 4x$$

$$\Leftrightarrow \sin 3x + \sqrt{3} \cos 3x = 2 \cos 4x \Leftrightarrow \frac{1}{2} \sin 3x + \frac{\sqrt{3}}{2} \cos 3x = \cos 4x$$

$$\Leftrightarrow \cos\left(3x - \frac{\pi}{6}\right) = \cos 4x \Leftrightarrow x = -\frac{\pi}{6} + k2\pi \text{ hoặc } x = \frac{\pi}{42} + \frac{k2\pi}{7}, (k \in \mathbb{Z})$$

$$\text{Nghiệm của phương trình } x = -\frac{\pi}{6} + k2\pi, x = \frac{\pi}{42} + \frac{k2\pi}{7}, (k \in \mathbb{Z})$$

Câu : Giải các phương trình sau:

1).  $(1 + 2 \sin x)^2 \cos x = 1 + \sin x + \cos x$  [CĐ 09]

2).  $(\sin 2x + \cos 2x) \cos x + 2 \cos 2x - \sin x = 0$  [ĐH B10]

3).  $\sin 2x - \cos 2x + 3 \sin x - \cos x - 1 = 0$  [ĐH D10]

4).  $\sin 2x \cos x + \sin x \cos x = \cos 2x + \sin x + \cos x$  [ĐH B11]

5).  $\sqrt{3} \cos 2x + 2 \cos x (\sin x - 1) = 0$  [DB D11]

6).  $\sqrt{3} \sin 2x + \cos 2x = 2 \cos x - 1$  [ĐH A 2012]

7).  $2(\cos x + \sqrt{3} \sin x) \cos x = \cos x - \sqrt{3} \sin x + 1$  [ĐH B 2012]

8).  $\sin 3x + \cos 3x - \sin x + \cos x = \sqrt{2} \cos 2x$  [ĐH D 2012]

### LỜI GIẢI

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

$$\Leftrightarrow (1 + 4 \sin x + 4 \sin^2 x) \cos x = 1 + \sin x + \cos x$$

$$\Leftrightarrow \cos x + 2 \sin 2x + 4 \sin^2 x \cos x - 1 - \sin x - \cos x = 0$$

$$\Leftrightarrow (2 \sin 2x - 1) + \sin x(2 \sin 2x - 1) = 0$$

$$\Leftrightarrow (2 \sin 2x - 1)(\sin x + 1) = 0 \Leftrightarrow 2 \sin 2x - 1 = 0 \vee \sin x + 1 = 0$$

$$\text{Với } 2 \sin 2x - 1 = 0 \Leftrightarrow \sin 2x = \frac{1}{2} \Leftrightarrow x = \frac{\pi}{12} + k\pi \text{ hoặc } x = \frac{5\pi}{12} + k\pi, (k \in \mathbb{Z})$$

$$\text{Với } \sin x + 1 = 0 \Leftrightarrow \sin x = -1 \Leftrightarrow x = -\frac{\pi}{2} + k\pi, (k \in \mathbb{Z})$$

$$\text{Nghiệm của phương trình } x = \frac{\pi}{12} + k\pi, \quad x = \frac{5\pi}{12} + k\pi, \quad x = -\frac{\pi}{2} + k\pi, (k \in \mathbb{Z})$$

$$2). (\sin 2x + \cos 2x) \cos x + 2 \cos 2x - \sin x = 0 \quad (1)$$

$$(1) \Leftrightarrow \sin 2x \cos x + \cos 2x \cos x + 2 \cos 2x - \sin x = 0$$

$$\Leftrightarrow 2 \sin x \cos^2 x - \sin x + \cos 2x \cos x + 2 \cos 2x = 0 \quad (\text{công thức nhân đôi của } \sin 2x)$$

$$\Leftrightarrow \sin x(2 \cos^2 x - 1) + \cos 2x \cos x + 2 \cos 2x = 0$$

$$\Leftrightarrow \cos 2x \sin x + \cos 2x \cos x + 2 \cos 2x = 0$$

$$\Leftrightarrow \cos 2x(\sin x + \cos x + 2) = 0 \Leftrightarrow \cos 2x = 0 \vee \sin x + \cos x + 2 = 0$$

$$\text{Với } \cos 2x = 0 \Leftrightarrow 2x = \frac{\pi}{2} + k\pi \Leftrightarrow x = \frac{\pi}{4} + \frac{k\pi}{2}, k \in \mathbb{Z}$$

$$\text{Với } \sin x + \cos x + 2 = 0 \Leftrightarrow \sqrt{2} \sin\left(x + \frac{\pi}{4}\right) = -2 \Leftrightarrow \sin\left(x + \frac{\pi}{4}\right) = -\sqrt{2} \quad (\text{vô nghiệm}).$$

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

$$3). \sin 2x - \cos 2x + 3 \sin x - \cos x - 1 = 0 \quad (1)$$

$$(1) \Leftrightarrow 2 \sin x \cos x - \cos x - (1 - 2 \sin^2 x) + 3 \sin x - 1 = 0$$

$$\Leftrightarrow \cos x(2 \sin x - 1) + (2 \sin^2 x + 3 \sin x - 2) = 0$$

$$\Leftrightarrow \cos x(2 \sin x - 1) + (2 \sin x - 1)(\sin x + 2) = 0$$

$$\Leftrightarrow (2 \sin x - 1)(\cos x + \sin x + 2) = 0 \Leftrightarrow 2 \sin x - 1 = 0 \vee \cos x + \sin x + 2 = 0$$

$$\text{Với } 2 \sin x - 1 = 0 \Leftrightarrow \sin x = \frac{1}{2} \Leftrightarrow x = \frac{\pi}{6} + k2\pi \text{ hoặc } x = \frac{5\pi}{6} + k2\pi, (k \in \mathbb{Z})$$

Với  $\sin x + \cos x + 2 = 0 \Leftrightarrow \sin\left(x + \frac{\pi}{4}\right) = -\sqrt{2}$  (vô nghiệm).

Nghiệm của phương trình  $x = \frac{\pi}{6} + k2\pi, x = \frac{5\pi}{6} + k2\pi, (k \in \mathbb{Z})$

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

$$\Leftrightarrow 2 \sin x \cos x - \sin x - \cos 2x + \sin x \cos x - \cos x = 0$$

$$\Leftrightarrow \sin x(2 \cos^2 x - 1) - \cos 2x + \sin x \cos x - \cos x = 0$$

$$\Leftrightarrow \sin x \cos 2x - \cos 2x + \sin x \cos x - \cos x = 0$$

$$\Leftrightarrow \cos 2x(\sin x - 1) + \cos(\sin x - 1) = 0$$

$$\Leftrightarrow (\sin x - 1)(\cos 2x + \cos x) = 0$$

$$\Leftrightarrow \sin x - 1 = 0 \vee \cos 2x + \cos x = 0$$

Với  $\sin x - 1 = 0 \Leftrightarrow \sin x = 1 \Leftrightarrow x = \frac{\pi}{2} + k2\pi, k \in \mathbb{Z}$

Với  $\cos 2x + \cos x = 0 \Leftrightarrow \cos 2x = -\cos x = \cos(\pi - x) \Leftrightarrow x = \frac{\pi}{3} + \frac{k2\pi}{3}$

Vậy nghiệm của phương trình:  $x = \frac{\pi}{3} + \frac{k2\pi}{3}, x = \frac{\pi}{2} + k2\pi, k \in \mathbb{Z}$

5).  $\sqrt{3} \cos 2x + 2 \cos x(\sin x - 1) = 0$  (1)

$$(1) \Leftrightarrow \sqrt{3} \cos 2x + 2 \cos x \sin x - 2 \cos x = 0 \Leftrightarrow \sqrt{3} \cos 2x + \sin 2x = 2 \cos x$$

$$\Leftrightarrow \frac{\sqrt{3}}{2} \cos 2x + \frac{1}{2} \sin 2x = \cos x \Leftrightarrow \cos 2x \cos \frac{\pi}{6} + \sin 2x \sin \frac{\pi}{6} = \cos x$$

$$\Leftrightarrow \cos\left(2x - \frac{\pi}{6}\right) = \cos x \Leftrightarrow x = \frac{\pi}{6} + k2\pi \text{ hoặc } x = \frac{\pi}{18} + \frac{k2\pi}{3}, (k \in \mathbb{Z})$$

Nghiệm của phương trình:  $x = \frac{\pi}{6} + k2\pi, x = \frac{\pi}{18} + \frac{k2\pi}{3}, (k \in \mathbb{Z})$

6).  $\sqrt{3} \sin 2x + \cos 2x = 2 \cos x - 1$  (1)

$$(1) \Leftrightarrow 2\sqrt{3} \sin x \cos x + 2 \cos^2 x - 2 \cos x = 0 \Leftrightarrow \cos x(\sqrt{3} \sin x + \cos x - 1) = 0$$

$$\Leftrightarrow \cos x = 0 \vee \sqrt{3} \sin x + \cos x - 1 = 0$$

$$\text{Với } \cos x = 0 \Leftrightarrow x = \frac{\pi}{2} + k\pi$$

$$\text{Với } \sqrt{3} \sin x + \cos x = 1 \Leftrightarrow \sin\left(x + \frac{\pi}{6}\right) = \frac{1}{2} \Leftrightarrow x = k2\pi \vee x = \frac{2\pi}{3} + k2\pi, (k \in \mathbb{Z})$$

$$\text{Kết luận nghiệm phương trình: } x = \frac{\pi}{2} + k\pi, x = k2\pi, x = \frac{2\pi}{3} + k2\pi, (k \in \mathbb{Z})$$

$$7). 2(\cos x + \sqrt{3} \sin x) \cos x = \cos x - \sqrt{3} \sin x + 1 \quad (1)$$

$$(1) \Leftrightarrow 2 \cos^2 x + 2\sqrt{3} \sin x \cos x = \cos x - \sqrt{3} \sin x + 1$$

$$\Leftrightarrow \cos 2x + \sqrt{3} \sin 2x = \cos x - \sqrt{3} \sin x$$

$$\Leftrightarrow \cos\left(2x - \frac{\pi}{3}\right) = \cos\left(x + \frac{\pi}{3}\right) \Leftrightarrow x = \frac{2\pi}{3} + k2\pi \text{ hoặc } x = \frac{k2\pi}{3}, (k \in \mathbb{Z})$$

$$\text{Vậy nghiệm của phương trình: } x = \frac{2\pi}{3} + k2\pi, x = \frac{k2\pi}{3}, (k \in \mathbb{Z})$$

$$8). \sin 3x + \cos 3x - \sin x + \cos x = \sqrt{2} \cos 2x \quad (1)$$

$$(1) \Leftrightarrow (\sin 3x - \sin x) + (\cos 3x + \cos x) = \sqrt{2} \cos 2x$$

$$\Leftrightarrow 2 \cos 2x \sin x + 2 \cos 2x \cos x = \sqrt{2} \cos 2x$$

$$\Leftrightarrow \cos 2x (2 \sin x + 2 \cos x) = \sqrt{2} \cos 2x \Leftrightarrow \cos 2x (2 \sin x + 2 \cos x - \sqrt{2}) = 0$$

$$\Leftrightarrow \cos 2x = 0 \vee 2 \sin x + 2 \cos x - \sqrt{2} = 0$$

$$\text{Với } \cos 2x = 0 \Leftrightarrow 2x = \frac{\pi}{2} + k\pi \Leftrightarrow x = \frac{\pi}{4} + \frac{k\pi}{2}, k \in \mathbb{Z}$$

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

$$\Leftrightarrow x = -\frac{\pi}{12} + k2\pi \text{ hoặc } x = \frac{7\pi}{12} + k2\pi, (k \in \mathbb{Z}).$$

$$\text{Nghiệm phương trình: } x = \frac{\pi}{4} + \frac{k\pi}{2}, x = -\frac{\pi}{12} + k2\pi, x = \frac{7\pi}{12} + k2\pi, (k \in \mathbb{Z}).$$

$$1). \sin 5x + 2 \cos^2 x = 1$$

[ĐH B 2013]

$$2). \sin 3x + \cos 2x - \sin x = 0$$

[ĐH D 2013]

3).  $\sin x + 4 \cos x = 2 + \sin 2x$  [ĐH A 2014]

4).  $\sqrt{2}(\sin x - 2 \cos x) = 2 - \sin 2x$  [ĐH B 2014]

LỜI GIẢI

1).  $\sin 5x + 2 \cos^2 x = 1$  (1)

$$(1) \Leftrightarrow \sin 5x + \cos 2x = 0 \Leftrightarrow \cos(5x + \frac{\pi}{2}) = \cos 2x$$

$$\Leftrightarrow x = -\frac{\pi}{6} + \frac{k2\pi}{3} \quad x = -\frac{\pi}{14} + \frac{k2\pi}{7}, (k \in \mathbb{Z})$$

Kết luận nghiệm của phương trình:  $x = -\frac{\pi}{6} + \frac{k2\pi}{3}, x = -\frac{\pi}{14} + \frac{k2\pi}{7}, (k \in \mathbb{Z})$

2).  $\sin 3x + \cos 2x - \sin x = 0$  (1)

$$(1) \Leftrightarrow (\sin 3x - \sin x) + \cos 2x = 0 \Leftrightarrow 2 \cos 2x \sin x + \cos 2x = 0$$

$$\Leftrightarrow \cos 2x(2 \sin x + 1) = 0 \Leftrightarrow \cos 2x = 0 \vee 2 \sin x + 1 = 0$$

Với  $\cos 2x = 0 \Leftrightarrow 2x = \frac{\pi}{2} + k\pi \Leftrightarrow x = \frac{\pi}{4} + \frac{k\pi}{2}, (k \in \mathbb{Z})$

Với  $\sin x = -\frac{1}{2} \Leftrightarrow x = -\frac{\pi}{6} + k2\pi$  hoặc  $x = \frac{7\pi}{6} + k2\pi, (k \in \mathbb{Z})$

Nghiệm của phương trình:  $x = \frac{\pi}{4} + \frac{k\pi}{2}, x = -\frac{\pi}{6} + k2\pi, x = \frac{7\pi}{6} + k2\pi, (k \in \mathbb{Z})$ .