Solving trigonometric equations on stated intervals

6 questions | 18 marks

Equivalent correct methods earn the corresponding marks.

1. Solve sinx=1/2 on $0 \le x \le 2\pi$. [3 marks]

Use positive sine in quadrantsI andII.

Answer: $\pi/6, 5\pi/6$

2. Solve $\cos x = -\sqrt{2}/2$ on $0 \le x \le 2\pi$. [3 marks]

Use referenceπ/4 in quadrantsII andIII.

Answer: $3\pi/4, 5\pi/4$

3. Solve tanx=1 on $-\pi \le x \le \pi$. [3 marks]

Tangent repeats afterπ.

Answer: $-3\pi/4, \pi/4$

4. Solve sin(2 x)=0 on $0 \le x \le 2\pi$. [3 marks]

2 x runs from 0 to 4π; its zeros are multiples ofπ.

Answer: $0, \pi/2, \pi, 3\pi/2, 2\pi$

5. Solve $2\sin^2 x - \sin x = 0$ on $0 \le x < 2\pi$. [3 marks]

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

Combine the sinx=0 and sinx=1/2 roots; exclude 2π.

Answer: $0, \pi/6, 5\pi/6, \pi$

6. Solve $\cos(x - \pi/4) = 0$ on $0 \le x \le 2\pi$. [3 marks]

$x - \pi/4 = \pi/2 + k\pi$; retain the two allowed values.

Answer: $3\pi/4, 7\pi/4$