5.5A HW
Answers

Tuesday, December 12, 2017 8:25 AM

39. $2\sin^2 x - \sin x - 1 = 0$

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

$2\sin x + 1 = 0$ or $\sin x - 1 = 0$

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

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

$x = \frac{7\pi}{6}$ $x = \frac{11\pi}{6}$ $x = \frac{\pi}{2}$

The solutions in the interval $[0, 2\pi)$ are $\frac{\pi}{2}$, $\frac{7\pi}{6}$, and $\frac{11\pi}{6}$.

41. $2\cos^2 x + 3\cos x + 1 = 0$

$(2\cos x + 1)(\cos x + 1) = 0$

$2\cos x + 1 = 0$ or $\cos x + 1 = 0$

$2\cos x = -1$ $\cos x = -1$

$\cos x = -\frac{1}{2}$

$x = \frac{2\pi}{3}$ $x = \frac{4\pi}{3}$ $x = \pi$

The solutions in the interval $[0, 2\pi)$ are $\frac{2\pi}{3}$, π, and $\frac{4\pi}{3}$.

47. $4\cos^2 x - 1 = 0$

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

$2\cos x + 1 = 0$ or $2\cos x - 1 = 0$

$\cos x = -\frac{1}{2}$ $\cos x = \frac{1}{2}$

$x = \frac{2\pi}{3}, \frac{4\pi}{3}$ $x = \frac{\pi}{3}, \frac{5\pi}{3}$

The solutions in the interval $[0, 2\pi)$ are $\frac{\pi}{3}$, $\frac{2\pi}{3}$, $\frac{4\pi}{3}$, and $\frac{5\pi}{3}$.

49. $9\tan^2 x - 3 = 0$

, 3

43. $2\sin^2 x = \sin x + 3$

$2\sin^2 x - \sin x - 3 = 0$

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

$2\sin x - 3 = 0$ or $\sin x + 1 = 0$

$2\sin x = 3$ $\sin x = -1$

$\sin x = \frac{3}{2}$ $x = \frac{3\pi}{2}$

$\sin x$ cannot be greater than 1.

The solution in the interval $[0, 2\pi)$ is $\frac{3\pi}{2}$.

45. $\sin^2 \theta - 1 = 0$

$(\sin \theta - 1)(\sin \theta + 1) = 0$

$\sin \theta - 1 = 0$ or $\sin \theta + 1 = 0$

$\sin \theta = 1$ $\sin \theta = -1$

$\theta = \frac{\pi}{2}$ $\theta = \frac{3\pi}{2}$

The solutions in the interval $[0, 2\pi)$ are $\frac{\pi}{2}$ and $\frac{3\pi}{2}$.

51. $\sec^2 x - 2 = 0$

$\sec^2 x = 2$

$\cos^2 x = \frac{1}{2}$

$\cos x = \pm\sqrt{\frac{1}{2}}$

$\cos x = \pm\frac{\sqrt{2}}{2}$

$\cos x = \frac{\sqrt{2}}{2}$ or $\cos x = -\frac{\sqrt{2}}{2}$

$x = \frac{\pi}{4}, \frac{7\pi}{4}$ $x = \frac{3\pi}{4}, \frac{5\pi}{4}$

The solutions in the interval $[0, 2\pi)$ are

π 3π 5π and 7π

49. $9\tan^2 x - 3 = 0$

$$\tan^2 x = \frac{3}{9}$$

$$\tan x = \pm\sqrt{\frac{3}{9}}$$

$$\tan x = \pm\frac{\sqrt{3}}{3}$$

$\tan x = \frac{\sqrt{3}}{3}$ or $\tan x = -\frac{\sqrt{3}}{3}$

$x = \frac{\pi}{6}, \frac{7\pi}{6}$ $x = \frac{5\pi}{6}, \frac{11\pi}{6}$

The solutions in the interval $[0, 2\pi)$ are $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}$, and $\frac{11\pi}{6}$.

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The solutions in the interval $[0, 2\pi)$ are $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}$, and $\frac{7\pi}{4}$.

53. $(\tan x - 1)(\cos x + 1) = 0$

$\tan x - 1 = 0$ or $\cos x + 1 = 0$

$\tan x = 1$ $\cos x = -1$

$x = \frac{\pi}{4}$ $x = \frac{5\pi}{4}$ $x = \pi$

The solutions in the interval $[0, 2\pi)$ are $\frac{\pi}{4}, \pi$, and $\frac{5\pi}{4}$

55. $\left(2\cos x + \sqrt{3}\right)(2\sin x + 1) = 0$

$2\cos x + \sqrt{3} = 0$ or $2\sin x + 1 = 0$

$2\cos x = -\sqrt{3}$ $2\sin x = -1$

$\cos x = -\frac{\sqrt{3}}{2}$ $\sin x = -\frac{1}{2}$

$x = \frac{5\pi}{6}$ $x = \frac{7\pi}{6}$ $x = \frac{7\pi}{6}$ $x = \frac{11\pi}{6}$

The solutions in the interval $[0, 2\pi)$ are $\frac{5\pi}{6}, \frac{7\pi}{6}$, and $\frac{11\pi}{6}$.

57. $\cot x(\tan x - 1) = 0$

$\cot x = 0$ or $\tan x - 1 = 0$

$\tan x = 1$

$x = \frac{\pi}{2}$ $x = \frac{3\pi}{2}$ $x = \frac{\pi}{4}$ $x = \frac{5\pi}{4}$

The solutions in the interval $[0, 2\pi)$ are $\frac{\pi}{4}$ and $\frac{5\pi}{4}$ since tan is undefined for $\frac{\pi}{2}$ and $\frac{3\pi}{2}$.

59. $\sin x + 2\sin x\cos x = 0$

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

$\sin x = 0$ or $1 + 2\cos x = 0$

$2\cos x = -1$

$\cos x = -\frac{1}{2}$

$x = 0$ $x = \pi$ $x = \frac{2\pi}{3}$ $x = \frac{4\pi}{3}$

The solutions in the interval $[0, 2\pi)$ are $0, \frac{2\pi}{3}, \pi$, and $\frac{4\pi}{3}$.

61. $\tan^2 x\cos x = \tan^2 x$

$\tan^2 x\cos x - \tan^2 x = 0$

$\tan^2 x(\cos x - 1) = 0$

$\tan^2 x = 0$ or $\cos x - 1 = 0$

$\tan x = 0$ $\cos x = 1$

$x = 0$ $x = \pi$ $x = 0$

The solutions in the interval $[0, 2\pi)$ are 0 and π.