Solve each equation on the given interval.

1. \(2 \sin^2 x = 1\) for \(0 \leq x \leq 2\pi\)
2. \(\sin^2 x - \sin x + 1 = \cos^2 x\) for \(0 \leq x < 360^\circ\)
3. \(2 \cos^2 x + 3 \cos x - 2 = 0\) for \(0 \leq x < 360^\circ\)
4. \(\tan^2 x + 2 \tan x + 1 = 0\) (Solve for all real values of \(x\) in radians)
5. \(\sin x + \sqrt{2} = -\sin x\) (Solve for all real values of \(x\) in radians)
6. \(2 \sin^2 x + 3 \cos x - 3 = 0\) (Solve for the principal values of \(x\) in radians)
7. \(\sin^2 x - \sin x + 1 = \cos^2 x\) for \(0 \leq x < 360^\circ\) (Solve for all real values of \(x\) in radians)
Example 3  Solve equation for $0 \leq x < 360^\circ$
\[ 2\sin^2 x = 5\sin x + 3 \]
\[ a = 2, b = 5, c = 3 \]
\[ \Delta = b^2 - 4ac = 25 - 24 = 1 \]
\[ x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-5 \pm 1}{4} \]
\[ x = \frac{-6}{4}, \frac{-4}{4} \]
\[ x = -1.5, -1 \]

Example 4  Solve equation for $0 \leq x < 360^\circ$
\[ 2\cos^2 x + 3\cos x - 2 = 0 \]
\[ \cos x = \frac{2}{2} = 1 \] or \[ \cos x = \frac{-2}{2} = -1 \]
\[ x = 0^\circ, 360^\circ \]

Example 5  Solve for all real values of $x$ in radians where the tangent function has a period of $1\pi$.
\[ \tan^2 x + 2\tan x + 1 = 0 \]
\[ (\tan x + 1)^2 = 0 \]
\[ \tan x = -1 \]
\[ x = 225^\circ + 180^\circ k, \text{ where } k \text{ is an integer} \]

Example 6  Solve for all real values of $x$ in radians.
\[ \sin x + \sqrt{2} = 0 \]
\[ x = \frac{3\pi}{4}, \frac{7\pi}{4} \]
Example 6: Solve for all real values of $x$ in radians.

\[
\sin x = \sqrt{3} - x = \sin x
\]

the sine function has a period of $2\pi$.

Example 7: Solve for all real values of $x$ in radians.

\[
2\sin^2 x + 3\cos x - 3 = 0
\]

Let $y = \cos x$

\[
y = \frac{1}{2}
\]

Example 8: Solve for the principal values.

\[
\sin x - \sin x \tan x = 0
\]

\[
\sin x = \frac{1}{2}
\]

\[
x = \sin^{-1} \left( \frac{1}{2} \right)
\]

\[
x = \frac{\pi}{6}, \frac{5\pi}{6}
\]

Dec 13-10:40 AM
Example 9
Solve $\sin(2x) = -\frac{1}{2}$ for $0^\circ \leq x < 360^\circ$

Dec 13-11:58 AM

Example 9
Solve $\sin(2x) = -\frac{1}{2}$ for $0^\circ \leq x < 360^\circ$

Dec 13-11:58 AM

For #1-7, solve each equation for all real values of $x$

1) $2\cos x + 1 = 0$
2) $2\sin x - 1 = 0$
3) $\tan x + 1 = 0$
4) $3\sec^2 x - 4 = 0$
5) $4\sin^2 x - 3 = 0$
6) $(3\tan x - 1)(\tan x - 3) = 0$
7) $-10\cos^2 x - 3\sin x + 9 = 0$

For #8-13 solve each equation for $0^\circ \leq x < 360^\circ$

8) $\cos^3 x = \cos x$
9) $\tan^3 x - 1 = 0$
10) $3\tan^2 x = \tan x$
11) $2\sin^3 x = 2 + \cos x$
12) $\sec^2 x - \sec x = 2$
13) $\sec x(\csc x) = 2\csc x$

Nov 9-9:52 PM