Question

Solve on the interval $[0, 2\pi)$:

$4\csc x + 6 = -2$

$\dfrac{\pi}{3}, \dfrac{5\pi}{3}$

$\dfrac{2\pi}{3}, \dfrac{4\pi}{3}$

$\dfrac{\pi}{6}, \dfrac{5\pi}{6}$

$\dfrac{7\pi}{6}, \dfrac{11\pi}{6}$

Solution

$4\csc x + 6 = -2, 0 \le x < 2\pi;$

$\dfrac{4}{\sin x} = -2 - 6;$

$\dfrac{4}{\sin x} = -8;$

$\sin x = -\dfrac{1}{2};$

$x = \dfrac{7\pi}{6}$ or $x = \dfrac{11\pi}{6}.$

Answer: $\dfrac{7\pi}{6}, \dfrac{11\pi}{6}.$

Solve on the interval $[0, 2\pi)$:

$3\sec x - 2 = 1$

0

$\dfrac{\pi}{3}, \dfrac{5\pi}{3}$

$\dfrac{\pi}{6}, \dfrac{5\pi}{6}$

$\dfrac{2\pi}{3}, \dfrac{4\pi}{3}$

Solution

$3secx - 2 = 1, 0 \le x < 2\pi;$

$\dfrac{3}{\cos x} = 1 + 2;$

$\dfrac{3}{\cos x} = 3;$

$\cos(x) = 1;$

$x = 0.$

Answer: 0.

Question

Which value is a solution for the equation $\tan\frac{x}{2} = -1$?

$\dfrac{3\pi}{4}$

$\dfrac{7\pi}{4}$

$\dfrac{5\pi}{4}$

$\dfrac{3\pi}{2}$

Solution

$\tan\frac{x}{2} = -1$;

$\frac{x}{2} = -\frac{\pi}{4} + n\pi$, where n is integer;

$x = -\frac{\pi}{2} + 2n\pi$.

If we take $n = 1$, then
$x = -\frac{\pi}{2} + 2\pi = \frac{2\cdot2\pi - \pi}{2} = \frac{3\pi}{2}$.

Answer: $\frac{3\pi}{2}$.