Answer on Question #58926 – Math – Trigonometry

Question

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

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

Solution

$2\sin^2 x - 3\sin x + 1 = 0$, $0 \le x < 2\pi$. Let $t = \sin(x)$, $-1 \le t \le 1$.

Then $2t^2 - 3t + 1 = 0$, $D = 3^2 - 4\cdot 2\cdot 1 = 9 - 8 = 1$, $t = \frac{3 \pm \sqrt{D}}{2\cdot 2} = \frac{3\pm 1}{4} = \frac{3+1}{4}; \frac{3-1}{4} = 1; \frac{1}{2}$, hence $\sin(x) = 1$ or $\sin(x) = \frac{1}{2}$ and finally obtain $x = \frac{\pi}{2}$, $x = \frac{\pi}{6}$, $x = \frac{5\pi}{6}$.

Answer: $x = \frac{\pi}{2}$, $x = \frac{\pi}{6}$, $x = \frac{5\pi}{6}$.

Question

2. Solve

$tgx(tgx - 1) = 0$

Solution

$tgx(tgx-1) = 0 \Rightarrow tgx = 0$ or $tgx = 1 \Rightarrow x = \pm\pi n$ or $x = \frac{\pi}{4} \pm \pi n$, where n is integer.

Answer: $x = \pm\pi n$, $x = \frac{\pi}{4} \pm \pi n$.

Question

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

$1 - \cos\theta = \frac{1}{2}$.

Solution

$1 - \cos\theta = \frac{1}{2}$, $0 \le \theta < 2\pi \Rightarrow \cos\theta = \frac{1}{2} \Rightarrow \theta = \frac{2\pi}{3}$, $\theta = \frac{4\pi}{3}$ on the interval $[0,2\pi)$.

Answer: $\theta = \frac{2\pi}{3}$, $\theta = \frac{4\pi}{3}$.