

Key to Check up on Trig Equations.notebook

November 19, 2012

Part math 30
Solving equations Trig
Name _____ Date _____ Score _____
ID # _____

Part A. SOLVE BY GRAPHING

- Solve to two decimal places: $\cos x = -0.82$, for $0 \leq x \leq 2\pi$.
 $x \approx 2.55, 3.55$
- Solve to two decimal places for $-\pi \leq x \leq \pi$:
 $14 - 6x = 21 - 18 \cos x$
 $x \approx 1.00, 1.60$
- Write the general solution for this equation (rounded to four decimal places). In the answer, n is an integer.
 $\sin(x + \frac{\pi}{2}) = 0.5$
 $x = 2n\pi + (-1)^n \cdot \frac{\pi}{6}$
- Find the general solution. In the answer, n is an integer:
 $\sin 2x = -\cos 2x$
 $\tan 2x = -1$
 $2x = 0.375 + \frac{1}{2}n\pi, n \in \mathbb{Z}$
 $x = \frac{0.375}{2} + \frac{n\pi}{4}, n \in \mathbb{Z}$
- The general solution for $4\cos^2 x + \cos x - 2 = 0$ includes:
 I. $0.8098 + 2\pi n$
 II. $1.8754 + 2\pi n$
 III. $4.7004 + 2\pi n$
 IV. $8.6473 + 2\pi n$
 where n is an integer.
- Solve to 2 decimal places: $\frac{1}{2}\sin x = x + 1$
 $x = -1.50$ rad
 $x = -100^\circ$ degrees

B. Algebraically

- $0 \leq 3x \leq 6\pi$
 $0 \leq x \leq 2\pi$
- $3x = 0$
 $x = 0, \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}, 2\pi$
- $\sin x = \frac{\sqrt{3}}{2}$
 $\sin x = \frac{\sqrt{3}}{2}$
 $x = \frac{\pi}{3}, \frac{2\pi}{3}$
- $\cos x = \frac{1}{2}$
 $\cos x = \frac{1}{2}$
 $x = \frac{\pi}{3}, \frac{5\pi}{3}$

Part B. SOLVE ALGEBRAICALLY

- How many solutions are there for $\cos x = \frac{\sqrt{3}}{2}$, where $0 \leq x \leq 2\pi$?
 6 solutions
- Solve exactly: $\sin x = 0$, where $0 \leq x < 2\pi$.
 $x = 0, \pi, 2\pi$
- Solve exactly: $\sin x = \frac{1}{2}$, where $0 \leq x < 2\pi$.
 $x = \frac{\pi}{6}, \frac{5\pi}{6}$
- Solve: $\tan 2x = \frac{1}{2}$, where $0 \leq x \leq 2\pi$.
 $x = \frac{\pi}{12}, \frac{7\pi}{12}, \frac{19\pi}{12}, \frac{25\pi}{12}$
- Solve: $\cos x = \frac{\sqrt{3}}{2}$, where $0 \leq x < 2\pi$.
 There are 2 solutions because the cosine function is symmetric about $\pi/2$.
 $x = \frac{\pi}{6}, \frac{11\pi}{6}$
- Solve: $\cos x - 12 = 0$, where $0 \leq x \leq 2\pi$.
 $\cos x = 12$ (No solution)
- Solve: $\cos x = \sqrt{1 - \cos^2 x} = \sqrt{1 - \sin^2 x}$.
 $\cos x = \pm \sqrt{1 - \sin^2 x}$
- Solve: $\cos x - 1 = 0$, where $0 \leq x \leq 2\pi$.
 $\cos x = 1$
 $x = 0$
- Solve: $4\cos^2 x + 4\cos x + 1 = 0$, where $0 \leq x \leq 2\pi$.
 $(2\cos x + 1)^2 = 0$
 $\cos x = -\frac{1}{2}$
 $x = \frac{2\pi}{3}, \frac{4\pi}{3}$
- Solve: $4\sin^2 x - 4\sin x + 1 = 0$, where $0 \leq x \leq 2\pi$.
 $(2\sin x - 1)^2 = 0$
 $\sin x = \frac{1}{2}$
 $x = \frac{\pi}{6}, \frac{5\pi}{6}$
- Solve: $\tan 2x = -1$, where $0 \leq x \leq 2\pi$.
 $x = \frac{\pi}{4}, \frac{5\pi}{4}$
- Solve: $\tan^2 x + 1 = 0$, where $0 \leq x < 2\pi$.
 $\tan x = \pm i$
 $x = \frac{\pi}{2}$
- Solve: $\tan x = 1$, where $0 \leq x < 2\pi$.
 $x = \frac{\pi}{4}$
- Which equation has a root of $\frac{11\pi}{12}$ over the domain $0 \leq x \leq 2\pi$?

X - multiple angles

- How many solutions are there for $\cos 2x = \frac{\sqrt{3}}{2}$, where $0 \leq x \leq \pi$?
 6 solutions
- Solve: $\cos 2x = 0$, where $0 \leq x \leq \pi$.
 $2x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \frac{7\pi}{2}$
 $x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$
- Solve: $\sin x = \frac{1}{2}$, where $0 \leq x \leq \pi$.
 $x = \frac{\pi}{6}, \frac{5\pi}{6}$
- Solve: $\cos x = \frac{1}{2}$, where $0 \leq x \leq \pi$.
 $x = \frac{\pi}{3}$
- Solve: $\cos 2x = 1$, where $0 \leq x \leq \pi$.
 $2x = 0$
 $x = 0$
- Solve: $\cos 2x = -1$, where $0 \leq x \leq \pi$.
 $2x = \pi$
 $x = \frac{\pi}{2}$
- Solve: $\tan 2x = 1$, where $0 \leq x \leq \pi$.
 $2x = \frac{\pi}{4}$
 $x = \frac{\pi}{8}$
- Solve: $\tan x = -1$, where $0 \leq x < 2\pi$.
 $x = \frac{3\pi}{4}, \frac{7\pi}{4}$