

PC 12 LG 11 Worksheet3 (Trig Equations)

1. Solve each of the following equations algebraically for x , $0 \leq x < 2\pi$. Give exact values where possible (otherwise answer accurate to 2 decimal places). Also give the general solution (solve over the set of real numbers)

a. $2\sin x + \sqrt{3} = 0$

b. $\sqrt{3}\sec x - 2 = 0$

c. $4\cos^2 x - 4 = 0$

d. $\sin^2 x + 3\sin x + 2 = 0$

e. $\sin^2 x - 3\sin x = -2$

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

g. $6\cos^2 x - \cos x - 1 = 0$

h. $\cos^2 x + 5\cos x + 6 = 0$

i. $\tan^2 x + 4\tan x = -3$

j. $6\sin^2 x - 5\sin x - 1 = 0$

k. $12\cos^2 x - \cos x - 1 = 0$

l. $\sin x \tan x + \sin x = 0$

m. $2\cos x \tan x + \sqrt{3}\tan x = 0$

n. $2\csc^2 x - 5\csc x + 2 = 0$

o. $\sin x = \cos 2x$

p. $\cos 2x = \cos x$

2. Solve the equation below (question 1. f.) over the given domains. $2\sin^2 x = \sin x + 1$

a. $-\pi \leq x < \pi$

b. $\frac{-\pi}{2} \leq x < \frac{\pi}{2}$

c. $0 \leq x < \pi$

d. $\frac{\pi}{2} \leq x < \frac{3\pi}{2}$

e. $-2\pi \leq x < 0$

f. $0 \leq x < \frac{\pi}{2}$

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3. Solve each of the following equations algebraically for x , $0 \leq x < 2\pi$. Give exact values where possible (otherwise answer accurate to 2 decimal places). Also give the general solution (solve over the set of real numbers)

a. $2\sin x = 7 - 3\csc x$

b. $3\csc x - 2\sin x = 2$

c. $\sin^2 x = 1 + \cos^2 x$

d. $2\cos^2 x = \sin x + 1$

e. $\sin^2 x = \cos x - \cos 2x$

Answer Key

- 1) a. $x = \frac{4\pi}{3}, \frac{5\pi}{3} (+2\pi n, n \in I)$
 b. $x = \frac{\pi}{6}, \frac{11\pi}{6} (+2\pi n, n \in I)$
 c. $x = 0, \pi (+2\pi n, n \in I)$
 d. $x = \frac{3\pi}{2} (+2\pi n, n \in I)$
 e. $x = \frac{\pi}{2} (+2\pi n, n \in I)$
 f. $x = \frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6} (+2\pi n, n \in I)$
 g. $x = \frac{\pi}{3}, \frac{7\pi}{3}, 1.91, 4.37 (+2\pi n, n \in I)$
 h. No solution
 i. $x = \frac{3\pi}{4}, \frac{7\pi}{4}, 1.89, 5.03 (+2\pi n, n \in I)$
 j. $x = \frac{\pi}{2}, 3.31, 6.12 (+2\pi n, n \in I)$
 k. $x = 1.23, 1.82, 4.46, 5.05 (+2\pi n, n \in I)$
 l. $x = 0, \pi, \frac{3\pi}{4}, \frac{7\pi}{4} (+2\pi n, n \in I)$
 m. $x = 0, \pi, \frac{5\pi}{6}, \frac{7\pi}{6} (+2\pi n, n \in I)$
 n. $x = \frac{\pi}{6}, \frac{5\pi}{6} (+2\pi n, n \in I)$
 o. $x = \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6} (+2\pi n, n \in I)$
 p. $x = 0, \frac{2\pi}{3}, \frac{4\pi}{3} (+2\pi n, n \in I)$

2. a. $\frac{-5\pi}{6}, \frac{-\pi}{6}, \frac{\pi}{2}$ b. $\frac{-\pi}{6}$
 c. $\frac{\pi}{2}$ d. $\frac{\pi}{2}, \frac{7\pi}{6}$
 e. $\frac{-5\pi}{6}, \frac{-\pi}{6}, \frac{3\pi}{2}$ f. No solution

3. a. $x = \frac{\pi}{6}, \frac{5\pi}{6} (+2\pi n, n \in I)$
 b. $x = \frac{\pi}{2} (+2\pi n, n \in I)$
 c. $x = \frac{\pi}{2}, \frac{3\pi}{2} (+2\pi n, n \in I)$
 d. $x = \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6} (+2\pi n, n \in I)$
 e. $x = 0, \frac{\pi}{2}, \frac{3\pi}{2} (+2\pi n, n \in I)$