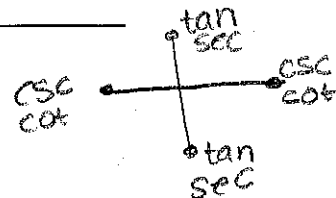


PreCalculus
SOLVING TRIG EQUATIONS WS 2

NAME Key



Solve over $[0, 2\pi)$.

1. $2\sin^2 x + \sin x = 0$

$\sin x(2\sin x + 1) = 0$
 $\sin x = 0$ $2\sin x + 1 = 0$
 $2\sin x = -1$
 $\sin x = -\frac{1}{2}$
 $x = 0, \pi$ $x = \frac{7\pi}{6}, \frac{11\pi}{6}$

3. $\sin x + \sin x \cos x = 0$

$\sin x(1 + \cos x) = 0$
 $\sin x = 0$ $1 + \cos x = 0$
 $x = 0, \pi$ $\cos x = -1$
 $x = \pi$
 $x = 0, \pi$

5. $\cos x = 3\cos x - 2$

$-2\cos x = -2$
 $\cos x = 1$
 $x = 0$

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

$\sin^2 x - 2\sin x - 3 = 0$
 $(\sin x - 3)(\sin x + 1) = 0$
 $\sin x = 3$ $\sin x = -1$
 $x = \frac{3\pi}{2}$

9. $3\tan^2 x = \sqrt{3}\tan x$

$3\tan^2 x - \sqrt{3}\tan x = 0$ $3\tan x - \sqrt{3} = 0$
 $\tan x(3\tan x - \sqrt{3}) = 0$ $3\tan x = \sqrt{3}$
 $\tan x = 0$ $\tan x = \frac{\sqrt{3}}{3}$
 $x = 0, \pi$ $x = \frac{\pi}{6}, \frac{7\pi}{6}$

11. $\sin x \tan x = \tan x$

$\sin x \tan x - \tan x = 0$
 $\tan x(\sin x - 1) = 0$
 $\tan x = 0$ $\sin x = 1$
 $x = 0, \pi$ $x = \frac{\pi}{2}$

13. $(\tan x - 1)(\sec x - 1) = 0$

$\tan x - 1 = 0$ $\sec x - 1 = 0$
 $\tan x = 1$ $\sec x = 1$
 $x = \frac{\pi}{4}, \frac{5\pi}{4}$ $x = 0$

15. $4\cos^2 x = 4\cos x - 1$

$4\cos^2 x - 4\cos x + 1 = 0$
 $(2\cos x - 1)(2\cos x - 1) = 0$
 $2\cos x - 1 = 0$
 $2\cos x = 1$
 $\cos x = \frac{1}{2}$
 $x = \frac{\pi}{3}, \frac{5\pi}{3}$

17. $9\tan^2 x - 3 = 0$

$9\tan^2 x = 3$
 $\tan^2 x = \frac{1}{3}$
 $\tan x = \pm \sqrt{\frac{1}{3}} = \pm \frac{1}{\sqrt{3}} = \pm \frac{\sqrt{3}}{3}$
 $x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

2. $\tan^2 x = \sqrt{3}\tan x$

$\tan^2 x - \sqrt{3}\tan x = 0$
 $\tan x(\tan x - \sqrt{3}) = 0$
 $\tan x = 0$ $\tan x - \sqrt{3} = 0$
 $x = 0, \pi$ $\tan x = \sqrt{3}$
 $x = \frac{\pi}{3}, \frac{4\pi}{3}$

4. $\sin^2 x - 3\sin x + 2 = 0$

$(\sin x - 2)(\sin x - 1) = 0$
 $\sin x - 2 = 0$ $\sin x - 1 = 0$
 $\sin x = 2$ $\sin x = 1$
 $x = \frac{\pi}{2}$

6. $\sqrt{2}\cos x = 1$

$\cos x = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$
 $x = \frac{\pi}{4}, \frac{7\pi}{4}$

8. $2\sqrt{3} + 3\sec x = 0$

$3\sec x = -2\sqrt{3}$
 $\sec x = -\frac{2\sqrt{3}}{3}$
 $\cos x = -\frac{3}{2\sqrt{3} \cdot \sqrt{3}} = -\frac{3\sqrt{3}}{6} = -\frac{\sqrt{3}}{2}$
 $x = \frac{5\pi}{6}, \frac{7\pi}{6}$

10. $(\cos^2 x - 1)(\csc x + 1) = 0$

$\cos^2 x - 1 = 0$ $\csc x + 1 = 0$
 $\cos^2 x = 1$ $\csc x = -1$
 $\cos x = \pm 1$ $\sin x = -1$
 $x = 0, \pi$ $x = \frac{3\pi}{2}$

12. $2\cos^2 x - 5\cos x + 2 = 0$

$(2\cos x - 1)(\cos x - 2) = 0$
 $2\cos x - 1 = 0$ $\cos x - 2 = 0$
 $2\cos x = 1$ $\cos x = 2$
 $\cos x = \frac{1}{2}$
 $x = \frac{\pi}{3}, \frac{5\pi}{3}$

14. $\cos x - 2\cos x \sin x = 0$

$\cos x(1 - 2\sin x) = 0$
 $\cos x = 0$ $1 - 2\sin x = 0$
 $x = \frac{\pi}{2}, \frac{3\pi}{2}$ $-2\sin x = -1$
 $\sin x = \frac{1}{2}$
 $x = \frac{\pi}{6}, \frac{5\pi}{6}$

16. $2\tan x \cos x + \tan x = 0$

$\tan x(2\cos x + 1) = 0$
 $\tan x = 0$ $2\cos x + 1 = 0$
 $x = 0, \pi$ $2\cos x = -1$
 $\cos x = -\frac{1}{2}$
 $x = \frac{2\pi}{3}, \frac{4\pi}{3}$