

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

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

3.  $\sin x + \sin x \cos x = 0$   
 $\sin x (1 + \cos x) = 0$   
 $\sin x = 0 \quad 1 + \cos x = 0$   
 $\cos x = -1$

5.  $\cos x = 3\cos x - 2$   
 $-\cos x - \cos x$   
 $0 = 2\cos x - 2$   
 $+2$   
 $2 = 2\cos x$   
 $1 = \cos x$

7.  $\sin^2 x - 2\sin x = 3$   
 $x^2 - 2x - 3 = 0$   
 $x^2 - 2x - 3 = 0$   
 $(x+1)(x-3) = 0$   
 $\sin x = -1 \quad \sin x = 3$   
 $\sin x = -1 \quad \sin x = 3$

9.  $3\tan^2 x = \sqrt{3}\tan x$   
 $-\sqrt{3}\tan x - \sqrt{3}\tan x$   
 $3\tan^2 x - \sqrt{3}\tan x = 0$   
 $\tan x (3\tan x - \sqrt{3}) = 0$   
 $\tan x = 0 \quad 3\tan x - \sqrt{3} = 0$   
 $3\tan x = \sqrt{3}$   
 $\tan x = \frac{\sqrt{3}}{3}$

11.  $\sin x \tan x = \tan x$   
 $-\tan x - \tan x$   
 $\sin x \tan x - \tan x = 0$   
 $\tan x (\sin x - 1) = 0$   
 $\tan x = 0 \quad \sin x - 1 = 0$   
 $\sin x = 1$

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

15.  $4\cos^2 x = 4\cos x - 1$   
 $4\cos^2 x - 4\cos x + 1 = 0$   
 $4x^2 - 4x + 1 = 0$   
 $(x - \frac{1}{2})(x - \frac{1}{2}) = 0$   
 $\cos x - \frac{1}{2} = 0$   
 $\cos x = \frac{1}{2}$

17.  $9\tan^2 x - 3 = 0$   
 $+3 +3$   
 $9\tan^2 x = 3$   
 $\sqrt{9\tan^2 x} = \sqrt{\frac{3}{9}}$

2.  $\tan^2 x = \sqrt{3}\tan x$   
 $-\sqrt{3}\tan x - \sqrt{3}\tan x$   
 $\tan^2 x - \sqrt{3}\tan x = 0$   
 $\tan x (\tan x - \sqrt{3}) = 0$   
 $\tan x = 0 \quad \tan x - \sqrt{3} = 0$   
 $\tan x = \sqrt{3}$

4.  $\sin^2 x - 3\sin x + 2 = 0$   
 $x^2 - 3x + 2 = 0$   
 $(x-1)(x-2) = 0$   
 $\sin x - 1 = 0 \quad \sin x - 2 = 0$   
 $\sin x = 1 \quad \sin x = 2$

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

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

10.  $(\cos^2 x - 1)(\csc x + 1) = 0$   
 $\cos^2 x - 1 = 0 \quad \csc x + 1 = 0$   
 $\sqrt{\cos^2 x - 1} = \sqrt{1 - 1}$   
 $\cos x = \pm 1 \quad \csc x = -1$   
 $\sin x = -1$

12.  $2\cos^2 x - 5\cos x + 2 = 0$   
 $2x^2 - 5x + 2 = 0$   
 $(x - \frac{1}{2})(x - 2) = 0$   
 $\cos x - \frac{1}{2} = 0 \quad \cos x - 2 = 0$   
 $\cos x = \frac{1}{2} \quad \cos x = 2$

14.  $\cos x - 2\cos x \sin x = 0$   
 $\cos x (1 - 2\sin x) = 0$   
 $\cos x = 0 \quad 1 - 2\sin x = 0$   
 $-\frac{2\sin x}{2} = -\frac{1}{2}$   
 $\sin x = \frac{1}{2}$

16.  $2\tan x \cos x + \tan x = 0$   
 $\tan x (2\cos x + 1) = 0$   
 $\tan x = 0 \quad 2\cos x + 1 = 0$   
 $2\cos x = -1$   
 $\cos x = -\frac{1}{2}$

$$\tan x = \pm \frac{\sqrt{3}}{3}$$

PreCalculus

## SOLVING TRIG EQUATIONS WS 2

### Answers:

1.  $0, \pi, \frac{7\pi}{6}, \frac{11\pi}{6}$

2.  $0, \pi, \frac{\pi}{3}, \frac{4\pi}{3}$

3.  $0, \pi$

4.  $\frac{\pi}{2}$

5.  $0$

6.  $\frac{\pi}{4}, \frac{7\pi}{4}$

7.  $\frac{3\pi}{2}$

8.  $\frac{5\pi}{6}, \frac{7\pi}{6}$

9.  $0, \pi, \frac{\pi}{6}, \frac{7\pi}{6}$

10.  $\frac{3\pi}{2}$

11.  $0, \pi$

12.  $\frac{\pi}{3}, \frac{5\pi}{3}$

13.  $0, \frac{\pi}{4}, \frac{5\pi}{4}$

14.  $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$

15.  $\frac{\pi}{3}, \frac{5\pi}{3}$

16.  $0, \pi, \frac{2\pi}{3}, \frac{4\pi}{3}$

17.  $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$