

Algebra II/ Trig.: 6.1-6.3 Quiz

Find all degree solutions

1.  $\sin(2A + 50^\circ) = \frac{\sqrt{3}}{2}$



$$2A + 50^\circ = 60^\circ + 360^\circ n$$

-50^\circ   -50^\circ

$$\frac{2A}{2} = \frac{10^\circ}{2} + \frac{360^\circ n}{2}$$

$$2A + 50^\circ = 170^\circ + 360^\circ n$$

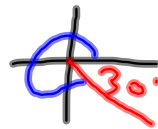
-50^\circ   -50^\circ

$$\frac{2A}{2} = \frac{120^\circ}{2} + \frac{360^\circ n}{2}$$

$$A = 5^\circ + 180^\circ n, 35^\circ + 180^\circ n$$



3.  $\cos 3\theta = \frac{\sqrt{3}}{2}$



$$\frac{3\theta}{3} = \frac{30^\circ}{3} + \frac{360^\circ n}{3}$$

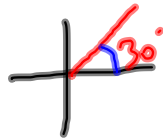
$$\frac{3\theta}{3} = \frac{330^\circ}{3} + \frac{360^\circ n}{3}$$

$$\theta = 10^\circ + 120^\circ n, 110^\circ + 120^\circ n$$

4.

$$\cot 2\theta = \sqrt{3}$$

$$\tan 2\theta = \frac{1}{\sqrt{3}}$$



$$\frac{2\theta}{2} = \frac{30^\circ}{2} + \frac{360^\circ n}{2}$$

$$\frac{2\theta}{2} = \frac{210^\circ}{2} + \frac{360^\circ n}{2}$$

$$\theta = 15^\circ + 180^\circ n, 105^\circ + 180^\circ n$$

5.  $\sin \theta \cos 3\theta - \cos \theta \sin 3\theta = 1$

$$\sin(\theta - 3\theta) = 1$$

$$\sin(-2\theta) = 1$$

$$-1 [-\sin 2\theta = 1]$$

$$\sin 2\theta = -1$$



$$\frac{2\theta}{2} = \frac{270}{2} + \frac{360n}{2}$$

$$\theta = 135^\circ + 180n$$

$$6. \quad 2 \cos^2 2\theta + 3 \cos 2\theta + 1 = 0$$

$$\cos 2\theta = x$$

$$2x^2 + 3x + 1 = 0$$

$$(2x+1)(x+1) = 0$$

$$x = -\frac{1}{2}, -1$$

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



$$\frac{2\theta}{2} = \frac{120^\circ}{2} + \frac{360^\circ n}{2}$$



$$\frac{2\theta}{2} = \frac{240^\circ}{2} + \frac{360^\circ n}{2}$$

$$\cos 2\theta = -1$$



$$\frac{2\theta}{2} = \frac{180^\circ}{2} + \frac{360^\circ n}{2}$$

$$\theta = 60^\circ + 180^\circ n, 120^\circ + 180^\circ n, 90^\circ + 180^\circ n$$

Find all solutions if  $0 \leq \theta < 360^\circ$

7.  $3 \sin \theta + 5 = -2 \sin \theta$

$$+2 \sin \theta - 5 + 2 \sin \theta - 5$$

$$\frac{5 \sin \theta}{5} = \frac{-5}{5}$$

$$\sin \theta = -1$$

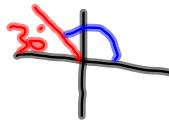
$$\theta = 270^\circ$$

8. 
$$\frac{3\cos\theta + \sqrt{3}}{-\cos\theta - \sqrt{3}} = \frac{\cos\theta}{-\sqrt{3}}$$

$$\frac{2\cos\theta}{2} = \frac{-\sqrt{3}}{2}$$

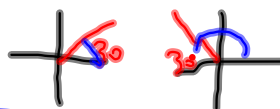
$$\cos\theta = -\frac{\sqrt{3}}{2}$$

$$\theta = 150^\circ, 210^\circ$$



9.  $(\sin \theta - 1)(2 \sin \theta - 1) = 0$

$\sin \theta = 1$        $\sin \theta = \frac{1}{2}$

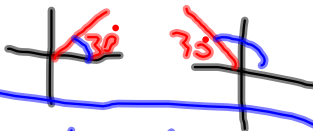
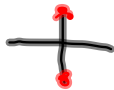


$\theta = 90^\circ, 30^\circ, 150^\circ$

10.  $\cos \theta - 2 \sin \theta \cos \theta = 0$

$$\cos \theta (1 - 2 \sin \theta) = 0$$

$$\cos \theta = 0 \quad \sin \theta = \frac{1}{2}$$



$$\theta = 90^\circ, 270^\circ, 30^\circ, 150^\circ$$

$$\begin{aligned}
11. \quad & 2\sin^2 \theta - \cos \theta - 1 = 0 \\
& 2(1 - \cos^2 \theta) - \cos \theta - 1 = 0 \\
& 2 - 2\cos^2 \theta - \cos \theta - 1 = 0 \\
& -1 \left[ -2\cos^2 \theta - \cos \theta + 1 = 0 \right] \\
& 2\cos^2 \theta + \cos \theta - 1 = 0 \\
& \cos \theta = x \\
& 2x^2 + x - 1 = 0 \\
& (2x - 1)(x + 1) = 0 \\
& x = \frac{1}{2}, -1 \\
& \cos \theta = \frac{1}{2} \quad \cos \theta = -1 \\
& \begin{array}{ccc}
+ & \oplus & + \\
\cancel{60^\circ} & \cancel{120^\circ} & 180^\circ
\end{array} \\
& \theta = 60^\circ, 300^\circ, 180^\circ
\end{aligned}$$

12.  $6\cos\theta + 7\tan\theta = \sec\theta$

$\cos\theta \left[ 6\cos\theta + \frac{7\sin\theta}{\cos\theta} = \frac{1}{\cos\theta} \right]$

$\theta \neq 90^\circ, 270^\circ$

$6\cos^2\theta + 7\sin\theta = 1$

$6(1 - \sin^2\theta) + 7\sin\theta - 1 = 0$

$6 - 6\sin^2\theta + 7\sin\theta - 1 = 0$

$-1 \left[ -6\sin^2\theta + 7\sin\theta + 5 = 0 \right]$

$6\sin^2\theta - 7\sin\theta - 5 = 0$

$\sin\theta = x$

$6x^2 - 7x - 5 = 0$

$(3x - 5)(2x + 1) = 0$

$x = \frac{5}{3}, -\frac{1}{2}$

$\sin\theta = \frac{5}{3}$   $\sin\theta = \frac{1}{2}$

~~$30^\circ$~~   ~~$30^\circ$~~

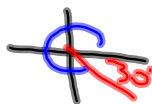
$\theta = 210^\circ, 330^\circ$

13.

$$\frac{\sqrt{3} \sec \theta = 2}{\sqrt{3} \quad \sqrt{3}}$$

$$\sec \theta = \frac{2}{\sqrt{3}}$$

$$\cos \theta = \frac{\sqrt{3}}{2}$$



$$\theta = 30^\circ, 330^\circ$$

14.  $2 \sin \theta + \cot \theta - \csc \theta = 0$

$\sin \theta \left[ 2 \sin \theta + \frac{\cos \theta}{\sin \theta} - \frac{1}{\sin \theta} = 0 \right]$

$\theta \neq 0^\circ, 180^\circ$

$2 \sin^2 \theta + \cos \theta - 1 = 0$

$2(1 - \cos^2 \theta) + \cos \theta - 1 = 0$

$2 - 2 \cos^2 \theta + \cos \theta - 1 = 0$

$-1 \left[ -2 \cos^2 \theta + \cos \theta + 1 = 0 \right]$

$2 \cos^2 \theta - \cos \theta - 1 = 0$

$\cos \theta = x$

$2x^2 - x - 1 = 0$

$(2x+1)(x-1) = 0$

$x = -\frac{1}{2}, 1$

$\rightarrow \cos \theta = -\frac{1}{2} \quad \cos \theta = 1$



$\theta = 120^\circ, 240^\circ, 0^\circ$

$\theta = 120^\circ, 240^\circ$

$$15. \quad \cos \theta - \sin \theta = 1$$

$$+ \sin \theta \quad + \sin \theta$$

$$\frac{(\cos \theta)^2 = (\sin \theta + 1)^2}{(\sin \theta + 1)(\sin \theta + 1)}$$

$$\cos^2 \theta = \sin^2 \theta + 2 \sin \theta + 1$$

$$\frac{1 - \sin^2 \theta = \sin^2 \theta + 2 \sin \theta + 1}{-1 + \sin^2 \theta \quad + \sin^2 \theta \quad -1}$$

$$2 \sin^2 \theta + 2 \sin \theta = 0$$

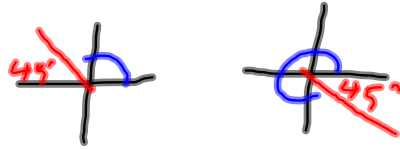
$$2 \sin \theta (\sin \theta + 1) = 0$$

$$\sin \theta = 0 \quad \sin \theta = -1$$

$$\theta = 0, 180, 270$$

$$\theta = 0, 270$$

16.  $\tan 2\theta = -1$



$$\frac{2\theta}{2} = \frac{135^\circ}{2}$$

$$\frac{2\theta}{2} = \frac{495^\circ}{2}$$

$$\frac{2\theta}{2} = \frac{315^\circ}{2}$$

$$\frac{2\theta}{2} = \frac{675^\circ}{2}$$

$$\theta = 67.5^\circ, 157.5^\circ, 247.5^\circ, 337.5^\circ$$

17.  $\sin 3\theta = -\frac{1}{2}$



$$\frac{3\theta}{3} = \frac{210^\circ}{3}$$

$$\frac{3\theta}{3} = \frac{570^\circ}{3}$$

$$\frac{3\theta}{3} = \frac{930^\circ}{3}$$

$$\frac{3\theta}{3} = \frac{330^\circ}{3}$$

$$\frac{3\theta}{3} = \frac{690^\circ}{3}$$

$$\frac{3\theta}{3} = \frac{1050^\circ}{3}$$

$$\theta = 70^\circ, 110^\circ, 190^\circ, 230^\circ, 310^\circ, 350^\circ$$

18.  $\cos 2\theta - 3 \sin \theta - 2 = 0$

$$1 - 2 \sin^2 \theta - 3 \sin \theta - 2 = 0$$

$$-1 [2 \sin^2 \theta - 3 \sin \theta - 1 = 0]$$

$$2 \sin^2 \theta + 3 \sin \theta + 1 = 0$$

$$\sin \theta = x$$

$$2x^2 + 3x + 1 = 0$$

$$(2x+1)(x+1) = 0$$

$$x = -\frac{1}{2}, -1$$

$$\sin \theta = -\frac{1}{2} \quad \sin \theta = -1$$



$$\theta = 210^\circ, 330^\circ, 270^\circ$$