

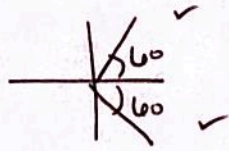
PreAP Precalculus  
Solving Review

Name: Key

Solve each equation for  $[0, 2\pi)$ .

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

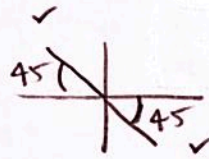
$\cos x = \frac{1}{2}$



$x = \frac{\pi}{3}, \frac{5\pi}{3}$

2.  $3 + \tan x = 2$

$\tan x = -1$



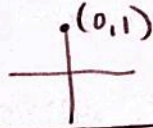
$x = \frac{3\pi}{4}, \frac{7\pi}{4}$

3.  $2\sin^2 x - \sin x - 1 = 0$

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

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

$\sin x = 1$



$x = \frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$

4.  $1 - 3\cos x = \sin^2 x = 1 - \cos^2 x$

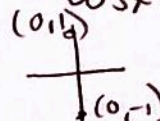
$\cos^2 x - 1 - 3\cos x = 0$

$\cos^2 x - 3\cos x = 0$

$\cos x (\cos x - 3) = 0$

$\cos x = 0$

$\cos x = 3$   
No Sol!



$x = \frac{\pi}{2}, \frac{3\pi}{2}$

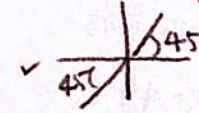
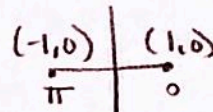
6.  $\sin x \tan x = \sin x$

$\sin x \tan x - \sin x = 0$

$\sin x (\tan x - 1) = 0$

$\sin x = 0$

$\tan x = 1$



$x = 0, \frac{\pi}{4}, \pi, \frac{5\pi}{4}$

5.  $2\cos^2 x - 1 = 0$

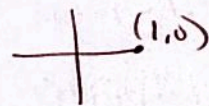
$\cos^2 x = \frac{1}{2}$

$\cos x = \pm \frac{\sqrt{2}}{2}$



$x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

7.  $\cos(3x) = 1$



$\frac{3x}{3} = \frac{0}{3}$

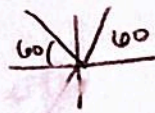
Add New Period  $(\frac{2\pi}{3})$

$x = 0, \frac{2\pi}{3}, \frac{4\pi}{3}$

~~$\frac{\pi}{3}$~~   
↑  
Not in interval!

8.  $\frac{2}{2} \sin(2x) = \frac{\sqrt{3}}{2}$

$\sin(2x) = \frac{\sqrt{3}}{2}$



$\frac{2x}{2} = \frac{\pi}{3}, \frac{2\pi}{3}$

Add New Period

$\frac{2\pi}{2} = \pi$

$x = \frac{\pi}{6}, \frac{\pi}{3}, \frac{7\pi}{6}, \frac{4\pi}{3}$

~~$\frac{5\pi}{6}$~~   
or  $\frac{3\pi}{3}$

Use :  $30^\circ, 45^\circ, 60^\circ, 90^\circ, 120^\circ, \dots$  all unit circle  $\&s!$

Use a sum and difference identities to find the exact value of each expression.

9.  $\sin 165^\circ \rightarrow \sin(120^\circ + 45^\circ)$

$$\sin(120)\cos(45) + \cos(120)\sin(45)$$

$$\frac{\sqrt{3}}{2} \left(\frac{\sqrt{2}}{2}\right) + \left(-\frac{1}{2}\right) \left(\frac{\sqrt{2}}{2}\right)$$

$$\frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} \rightarrow \frac{\sqrt{6} - \sqrt{2}}{4}$$

11.  $\cos 80^\circ \cos 20^\circ + \sin 80^\circ \sin 20^\circ$

*Exchange  $80^\circ$  to  $70^\circ$*   
 $\cos(u+v)$

$$\cos(70+20)$$

$$\cos(90^\circ) = \boxed{0}$$

10.  $\cos \frac{\pi}{12} \rightarrow \cos\left(\frac{\pi}{3} - \frac{\pi}{4}\right)$

$$\cos\left(\frac{\pi}{3}\right)\cos\left(\frac{\pi}{4}\right) + \sin\left(\frac{\pi}{3}\right)\sin\left(\frac{\pi}{4}\right)$$

$$\frac{1}{2} \left(\frac{\sqrt{2}}{2}\right) + \frac{\sqrt{3}}{2} \left(\frac{\sqrt{2}}{2}\right) \rightarrow \frac{\sqrt{2}}{4} + \frac{\sqrt{6}}{4}$$

12.  $\frac{\tan 20^\circ + \tan 25^\circ}{1 - \tan 20^\circ \tan 25^\circ}$

$$\tan(u+v)$$

$$\tan(20+25)$$

$$\tan(45^\circ) = \boxed{1}$$

$$\frac{\sqrt{2} + \sqrt{6}}{4}$$

Write each expression in terms of a single trigonometric function.

13.  $2\sin(3x)\cos(3x)$

$$\sin(2 \cdot 3x)$$

$$\boxed{\sin(6x)}$$

14.  $2\cos^2(5x) - 1$

$$\cos(2 \cdot 5x)$$

$$\boxed{\cos(10x)}$$

15.  $\cos^2 0.45 - \sin^2 0.45$

$$\cos(2 \cdot 0.45)$$

$$\boxed{\cos(0.9)}$$

16.  $6\sin \frac{\pi}{6} \cos \frac{\pi}{6}$

$$3 \left( 2 \sin\left(\frac{\pi}{6}\right) \cos\left(\frac{\pi}{6}\right) \right)$$

$$3 \sin(2 \cdot \frac{\pi}{6})$$

$$3 \sin\left(\frac{\pi}{3}\right)$$

$$3 \left(\frac{\sqrt{3}}{2}\right)$$

$$= \boxed{\frac{3\sqrt{3}}{2}}$$