Study Guide – Solving/Inverses/Sum&Diff
PreCalculus

Name: Key
Date: _____ Period: _____

Solve the following equations for x on the interval $[0, 2\pi)$

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

$\sqrt{3}\sec x = 2$

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

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

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

2. $3\csc^2 x - 4 = 0$

$3\csc^2 x = 4$

$\csc^2 x = \frac{4}{3}$

$\csc x = \pm\frac{\sqrt{4}}{\sqrt{3}} = \frac{2}{\sqrt{3}}$

$\sin x = \pm\frac{\sqrt{3}}{2}$ $x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

3. $2\sin x = \sqrt{2}$

$\sin x = \frac{\sqrt{2}}{2}$

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

4. $2\cos^2 x + \cos x - 1 = 0$

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

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

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

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

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

5. $\cot x - \cot x \sec x = 0$

$\cot x(1 - \sec x) = 0$

$\cot x = 0$ $1 - \sec x = 0$

$\tan x = \frac{1}{0}$ $1 = \sec x$

$= \text{undefined}$ $1 = \cos x$

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

6. $(3\tan^2 x - 1)(\tan^2 x - 3) = 0$

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

$3\tan^2 x = 1$ $\tan^2 x = 3$

$\tan^2 x = \frac{1}{3}$ $\tan x = \pm\sqrt{3}$

$\tan x = \pm\frac{\sqrt{1}}{\sqrt{3}} = \frac{1}{\sqrt{3}}$

$x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$ $x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

7. ~~$8\cos 2\theta = -4\sqrt{3}$~~

8. ~~$\frac{3}{4}\tan(3\theta) = -\frac{\sqrt{3}}{4}$~~

Will Not be an QUIZ!

Evaluate each of the following expressions.

9. $\tan(\arcsin 0)$

$\tan(0)$

$= \boxed{0}$

10. $\sin\left(\cos^{-1}\left(-\frac{1}{2}\right)\right)$

$\sin\left(2\pi/3\right)$

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

11. $\arccos\left(\sin\frac{3\pi}{4}\right)$

$\cos^{-1}\left(\frac{\sqrt{2}}{2}\right)$

$= \boxed{\pi/4}$

12. $\tan^{-1}\left(\sin\frac{3\pi}{2}\right)$

$\tan^{-1}(-1)$

$= \boxed{\frac{-\pi}{4}}$

13. $\cos\left(\tan^{-1} 0\right)$

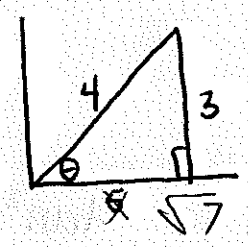
$\cos(0)$

$= \boxed{1}$

14. $\arccos\left(-\frac{\sqrt{3}}{2}\right)$

$\boxed{5\pi/6}$

15. $\tan\left(\sin^{-1}\left(\frac{3}{4}\right)\right)$



~~$\tan\theta = \frac{3}{5}$~~

$9 + b^2 = 16$

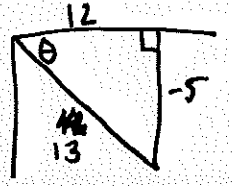
$b^2 = 7$

$b = \pm\sqrt{7}$

$\tan\theta = \frac{3}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}}$

$= \boxed{\frac{3\sqrt{7}}{7}}$

16. $\cos\left(\arctan\left(-\frac{5}{12}\right)\right)$



$12^2 + (-5)^2 = c^2$

$144 + 25 =$

$169 = c^2$

$13 = c$

$\boxed{\cos\theta = \frac{12}{13}}$

17. Evaluate: $\sin\left(\frac{\pi}{3}+\frac{\pi}{4}\right)$

$u=\frac{\pi}{3}$ $\quad v=\frac{\pi}{4}$

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

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

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

18. Evaluate: $\cos 15°$

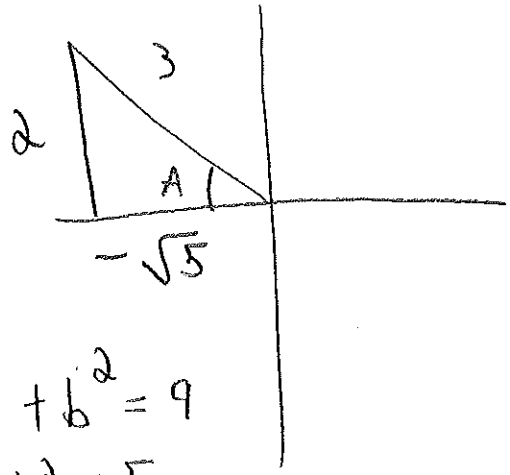
$\cos(45°-30°)$

$\cos(45)\cos(30)+\sin(45)\sin(30)$

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

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

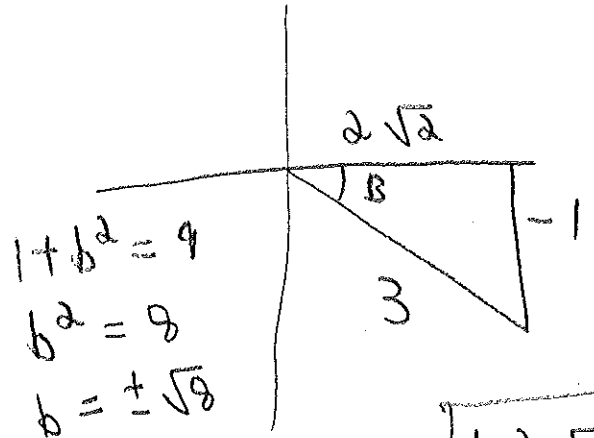
19. Given $\sin A=\frac{2}{3}$ and $\sin B=-\frac{1}{3}$ and A is in QII while B is in QIV, find $\cos(A+B)$ and $\sin(A-B)$.



$4+b^2=9$

$b^2=5$

$\boxed{b=\pm\sqrt{5}}$



$1+b^2=9$

$b^2=8$

$b=\pm\sqrt{8}$

$=\pm\sqrt{4}\sqrt{2}=\boxed{\pm 2\sqrt{2}}$

$\cos(A+B)=\cos A\cos B-\sin B\sin A$

$\left(\frac{-\sqrt{5}}{3}\right)\left(\frac{2\sqrt{2}}{3}\right)-\left(\frac{-1}{3}\right)\left(\frac{2}{3}\right)$

$\frac{-2\sqrt{10}}{9}+\frac{2}{9}=\boxed{\frac{2-2\sqrt{10}}{9}}$

$\sin(A-B)$

$=\sin A\cos B-\cos A\sin B$

$\left(\frac{2}{3}\right)\left(\frac{2\sqrt{2}}{3}\right)-\left(\frac{-\sqrt{5}}{3}\right)\left(\frac{-1}{3}\right)$

$\frac{4\sqrt{2}}{9}-\frac{\sqrt{5}}{9}$

$=\boxed{\frac{4\sqrt{2}-\sqrt{5}}{9}}$