4.4 Worksheet Name: Key Hour: ____

1. Given that $\sin\theta = \frac{-12}{13}$, and θ is in Quadrant III, Find all 5 remaining trig functions.

$y \quad x = -12 \quad y = -5 \quad r = 13$

$\sin\theta$	$\cos\theta$	$\tan\theta$	$\sec\theta$	$\csc\theta$	$\cot\theta$
$(-12)^2 + y^2 = 13^2$ $144 + y^2 = 169$ $y^2 = 25$ $y = -5$	$\frac{-5}{13}$	$\frac{12}{5}$ $\frac{\frac{-12}{13}}{\frac{-5}{13}} = \frac{-12}{-5}$	$-\frac{13}{5}$	$\frac{13}{-12}$	$\frac{5}{12}$

2. Given that $\tan\theta = \frac{+1}{-3}$, and $\sin\theta > 0$, Find all 5 remaining trig functions. QII $y = 1 \quad x = -3 \quad r = \sqrt{10}$

$\sin\theta$	$\cos\theta$	$\tan\theta$	$\sec\theta$	$\csc\theta$	$\cot\theta$
$\frac{1}{\sqrt{10}}\left(\frac{\sqrt{10}}{\sqrt{10}}\right)$ $\frac{\sqrt{10}}{10}$	$\frac{-3}{\sqrt{10}}\left(\frac{\sqrt{10}}{\sqrt{10}}\right)$ $\frac{-3\sqrt{10}}{10}$	$1^2 + (-3)^2 = r^2$ $1 + 9 = r^2$ $\sqrt{10} = \sqrt{r^2}$ $r = \sqrt{10}$	$\frac{\sqrt{10}}{-3}$	$\sqrt{10}$	-3

3. Given that $\csc\theta = \frac{-4}{1}$, and θ is in Quadrant III, Find all 5 remaining trig functions. $y = -1 \quad x = -\sqrt{15} \quad r = 4$

$\sin\theta$ $\frac{y}{r}$	$\cos\theta$ $\frac{x}{r}$	$\tan\theta$ $\frac{y}{x}$	$\sec\theta$ $\frac{r}{x}$	$\csc\theta$	$\cot\theta$ $\frac{x}{y}$
$-\frac{1}{4}$	$\frac{-\sqrt{15}}{4}$	$\frac{-1}{-\sqrt{15}}\left(\frac{\sqrt{15}}{\sqrt{15}}\right)$ $\frac{\sqrt{15}}{15}$	$\frac{4}{-\sqrt{15}}\left(\frac{\sqrt{15}}{\sqrt{15}}\right)$ $-\frac{4\sqrt{15}}{15}$	$(-1)^2 + x^2 = 4^2$ $1 + x^2 = 16$ $x^2 = \sqrt{15}$ $x = \sqrt{15}$	$\frac{-\sqrt{15}}{-1}$ $\sqrt{15}$

#4-12: Find a reference angle for each of the following, and then evaluate using the reference angle.

4. $\sin 300°$ $360 - 300 = 60$ $\sin 60° = \sqrt{3}/2$	5. $\tan\frac{9\pi}{2}$ $\frac{9\pi}{2} - \frac{4\pi}{2} = \frac{5\pi}{2} - \frac{4\pi}{2} = \frac{\pi}{2}$ $\tan\frac{\pi}{2} = \frac{1}{0}$ UND	6. $\sec 510°$ $510 - 360 = 150$ ref $\angle = 30$ $\frac{1}{\cos 30} = \frac{2}{\sqrt{3}}\left(\frac{\sqrt{3}}{\sqrt{3}}\right) \frac{2\sqrt{3}}{3}$ $-2\sqrt{3}/3$
7. $\sec 240°$ $240 - 180 = 60 = RA$ $\frac{1}{\cos 60} = 2$ -2	8. $\sin(-225°)$ $+360$ 135 $180 - 135 = 45 = RA$ $\sin 45 = \frac{\sqrt{2}}{2}$ $-\frac{\sqrt{2}}{2}$	9. $\cos\frac{35\pi}{6}$ $\frac{35\pi}{6} - \frac{24\pi}{6} = \frac{11\pi}{6}$ $RA = \pi/6$ $\cos \pi/6 = \sqrt{3}/2$ $\sqrt{3}/2$
10. $\tan 405°$ -360 $\tan 45° = 1$	11. $\tan\left(-\frac{\pi}{6}\right)$ $\tan\frac{\pi}{6}$ $-\frac{\sqrt{3}}{3}$	12. $\cot\frac{13\pi}{3}$ $\frac{12\pi}{3} = \cos\frac{\pi}{3} = \frac{1}{2}$

$\frac{1}{\sqrt{3}} = \frac{1}{2} \cdot \frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

#13-18: Evaluate each of the following:

13. $\sin\frac{\pi}{3}\cos\pi - \cos\frac{\pi}{3}\sin\frac{3\pi}{2}$

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

$-\frac{\sqrt{3}}{2} + \frac{1}{2}$

$\boxed{\frac{-\sqrt{3}+1}{2}}$

14. $\sin\frac{\pi}{4}\cos 0 - \sin\frac{\pi}{6}\cos\pi$

$\frac{\sqrt{2}}{2}(1) - \frac{1}{2}(-1)$

$\frac{\sqrt{2}}{2} + \frac{1}{2}$

$\boxed{\frac{\sqrt{2}+1}{2}}$

15. $\sin\frac{11\pi}{4}\cos\frac{5\pi}{6} + \cos\frac{11\pi}{4}\sin\frac{5\pi}{6}$

$\left(\sin\frac{3\pi}{4}\right)\left(-\cos\frac{\pi}{6}\right) + \left(\cos\frac{3\pi}{4}\right)\left(\sin\frac{\pi}{6}\right)$

$\left(\sin\frac{\pi}{4}\right)\left(-\cos\frac{\pi}{6}\right) + \left(-\cos\frac{\pi}{4}\right)\left(\sin\frac{\pi}{6}\right)$

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

$-\frac{\sqrt{6}}{4} + \left(-\frac{\sqrt{2}}{4}\right) = \boxed{\frac{-\sqrt{6}-\sqrt{2}}{4}}$

16. $\sin\frac{17\pi}{3}\cos\frac{5\pi}{4} + \cos\frac{17\pi}{3}\sin\frac{5\pi}{4}$

$\sin\left(\frac{5\pi}{3}\right)\left(-\cos\frac{\pi}{4}\right) + \left(\cos\frac{5\pi}{3}\right)\left(-\sin\frac{\pi}{4}\right)$

$\left(-\sin\frac{\pi}{3}\right)\left(-\frac{\sqrt{2}}{2}\right) + \left(\cos\frac{\pi}{3}\right)\left(-\frac{\sqrt{2}}{2}\right)$

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

$\frac{\sqrt{6}}{4} + \left(-\frac{\sqrt{2}}{4}\right) = \boxed{\frac{\sqrt{6}-\sqrt{2}}{4}}$

17. $\sin\frac{3\pi}{2}\tan\left(-\frac{15\pi}{4}\right) - \cos\left(-\frac{5\pi}{6}\right)$

$\left(-\sin\frac{\pi}{2}\right)\left(\tan\frac{\pi}{4}\right) - \left(\cos\frac{7\pi}{6}\right)$

$(-1)\left(\frac{\sqrt{2}}{2}\right) - \left(-\cos\frac{\pi}{6}\right)$

$-\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}$

$\boxed{\frac{-\sqrt{2}+\sqrt{3}}{2}}$

18. $\sin\frac{3\pi}{2}\tan\left(-\frac{8\pi}{3}\right) + \cos\left(-\frac{5\pi}{6}\right)$

$(-1)\left(\tan\frac{4\pi}{3}\right) + \left(\cos\frac{7\pi}{6}\right)$

$(-1)\left(\tan\frac{\pi}{3}\right) + \left(-\cos\frac{\pi}{6}\right)$

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

$-\sqrt{3} - \frac{\sqrt{3}}{2}$ or $\frac{-2\sqrt{3}-\sqrt{3}}{2}$

$-\frac{3\sqrt{3}}{2}$

Find two values of θ, 0<θ<2π, that satisfies each equation.

19.) $\sin\theta = \frac{\sqrt{2}}{2}$

QI
QII

$\theta = \frac{\pi}{4}$

$\theta = \frac{3\pi}{4}$

20.) $\cos\theta = \frac{1}{2}$

$\theta = \frac{\pi}{3}$

$\theta = \frac{5\pi}{3}$

21.) $\sin\theta = -\frac{\sqrt{2}}{2}$

QIII QIV

$\theta = \frac{5\pi}{4}, \frac{7\pi}{4}$

22.) $\cos\theta = -\frac{1}{2}$

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

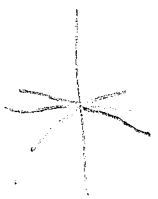
$\frac{4\pi}{3}$

20.) $\tan\theta = -\sqrt{3}$

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

$\frac{5\pi}{3}$

21.) $\tan\theta = -\frac{\sqrt{3}}{3}$



$\frac{5\pi}{6}, \frac{11\pi}{6}$