Homework SOLUTIONS

1. Recall the Pythagorean Identity. $sin^2\theta + cos^2\theta = 1$. Prove this identity (similar to the quotient identity).
2. Given that $cos\theta = \frac{5}{13}$ and that θ is greater than 90°, find $\sin\theta$, $\tan\theta$ and for angle θ(to the nearest degree).
3. Given that $tan\theta = -1$ and θ is obtuse find $\sin\theta$ and $\cos\theta$, then solve for θ.
4. Solve $\sec x = -\sqrt{2}$. Where $0° \le x \le 360°$.
5. Solve $\tan x = -1$ where $0° \le x \le 360°$.
6. Let $\sin x = \frac{-1}{2}$ where $180° \le x \le 270°$. Find an exact value for the expression: $\cos x - \csc x + tan^2 x$

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

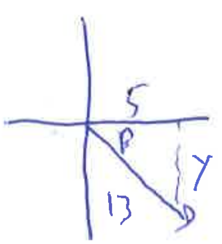
$= \left(\frac{y}{r}\right)^2 + \left(\frac{x}{r}\right)^2$

$= \frac{y^2}{r^2} + \frac{x^2}{r^2}$

$= \frac{x^2 + y^2}{r^2}$

$= \frac{r^2}{r^2} = 1$

2. $\cos\theta = \frac{5}{13}$



$y^2 = 13^2 - 5^2$

$y^2 = 144$

$y = 12$

$\beta \doteq \cos^{-1}\left(\frac{5}{13}\right)$

$\beta \doteq 67°$

$\sin\theta = \frac{12}{13}$

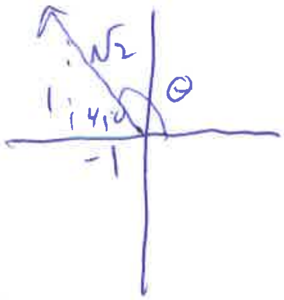
$\cos\theta = \frac{5}{13}$

$\tan\theta = \frac{12}{5}$

$\theta \doteq 360 - 67°$

$\theta \doteq 293°$.

3.



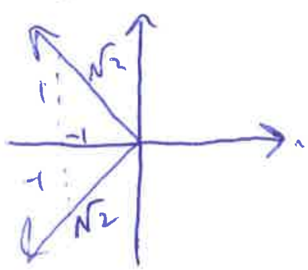
$\sin\theta = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

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

$\theta = 180° - 45°$

$\theta = 135°$.

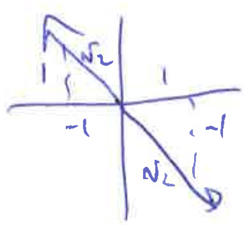
4. $\sec x = -\sqrt{2}$.



$\theta = 180° - 45°$ or $\theta = 180° + 45°$

$\boxed{\theta = 135°}$ $\boxed{\theta = 225°}$

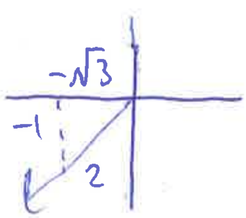
5. $\tan x = -1$



$\boxed{\theta = 135°}$ or $\theta = 360 - 45°$

$\boxed{\theta = 315°}$

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



$\cos x - \csc x + \tan^2 x$

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

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

$= \frac{-3\sqrt{3} + 12 + 2}{6}$

$= \frac{14 - 3\sqrt{3}}{6}$