

M1170 W02 Quiz 5 Solutions

Friday, November 27, 2020 6:47 PM

$$\#1 \text{ (1)} \quad LS = \left(\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x} \right) (\cos x + \sin x)$$

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

$$\text{(1)} = \frac{1}{\sin x} + \frac{1}{\cos x}$$

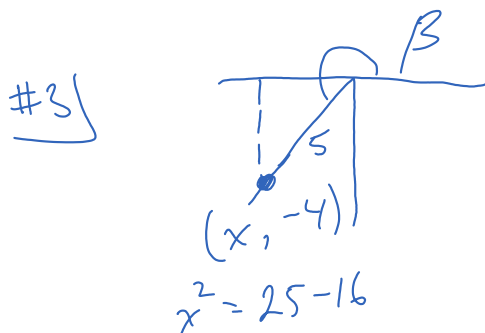
$$\text{(1)} = \csc x + \sec x = RS \checkmark$$

$$\#2 \text{ (1)} \quad \tan u (\tan u + 1) = 0$$

$$\text{(1)} \quad \tan u = 0 \text{ or } \tan u = -1$$

$$\text{(2)} \quad \therefore u = \pi n \text{ or } u = -\frac{\pi}{4} + \pi n$$

for any $n \in \mathbb{Z}$



$$\text{(1)} \quad x = -3$$

$$\text{(1)} \quad \tan(\alpha - \beta) = \frac{\tan \alpha - \tan \beta}{1 + \tan \alpha \tan \beta}$$

$$\text{(1)} = \frac{-\frac{7}{24} - \frac{4}{3}}{1 + \left(-\frac{7}{24}\right)\left(\frac{4}{3}\right)}$$

$$1 - \frac{7}{24} \cdot \frac{4}{3} = 1 - \frac{7}{18} = \frac{11}{18}$$

$$\textcircled{1} = \frac{-\frac{7}{24} - \frac{4}{3}}{1 + (-\frac{7}{24})(\frac{4}{3})}$$

$$\textcircled{1} = \frac{-\frac{39}{24} - \frac{18}{11}}{1} = \boxed{-\frac{117}{44}}$$

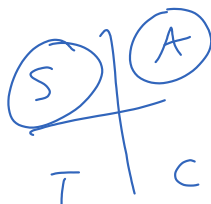
#4) $\textcircled{1} \sin \theta = \frac{80^2}{16} \cdot \frac{1}{2} \sin 2\theta$

$\frac{3}{4} = \sin 2\theta$

$\textcircled{1}$ Since $\sin^{-1} \frac{3}{4} \approx 48.59^\circ$, then

$\textcircled{1} 2\theta = 48.59^\circ \text{ or } 131.41^\circ$

$\textcircled{1} \therefore \theta = 24.30^\circ \text{ or } 65.70^\circ$

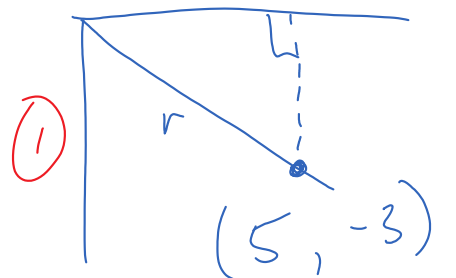


Note: $\theta \in [0^\circ, 90^\circ]$
 $\therefore 2\theta \in [0^\circ, 180^\circ]$

#5) $\csc(\tan^{-1}(-\frac{3}{5}))$

$\textcircled{1} = \csc \theta$, where $\tan \theta = -\frac{3}{5}$
 and $\theta \in (-\frac{\pi}{2}, \frac{\pi}{2})$

$\textcircled{1} \therefore \csc \theta = \frac{r}{y} = -\frac{\sqrt{34}}{3}$



$r^2 = 25 + 9 = 34$

$\textcircled{1} r = \sqrt{34}$