

WARMUP

$$y = -7 \quad x = -24$$

$$(-24)^2 + (-7)^2 = r^2$$

Note Title

2/11/2016

1) Given $\tan \theta = \frac{7}{24} = \frac{y}{x}$ with θ in Q_{III}

$$r = 25$$

$$\sin \theta = \frac{-7}{25} = \frac{y}{r}$$

calculate $\sin \theta$ and $\cos \theta$

$$\cos \theta = \frac{-24}{25} = \frac{x}{r}$$



2) Given $\sec \alpha = \frac{41}{9} = \frac{r}{x}$ $\frac{3\pi}{2} < \alpha < 2\pi$
 Q_{IV}

$$9^2 + y^2 = 41^2$$

$$81 + y^2 = 1681$$

$$y^2 = 1600$$

$$y = -40$$

calculate $\sin \alpha$, $\cos \alpha$, and $\tan \alpha$

$$\begin{array}{ccc} \downarrow & \downarrow & \swarrow \\ \frac{-40}{41} & \frac{9}{41} & \frac{-40}{9} \end{array}$$

Section 6.4 Continued

ex: Given $\tan \alpha = \frac{3}{4}$, α in QI,

For α , $y=3$, $x=4$, $r=5$

$$\sin \alpha = \frac{3}{5} \quad \cos \alpha = \frac{4}{5}$$

3, 4, 5 8, 15, 17
5, 12, 13 9, 40, 41
7, 24, 25

$\sin \beta = \frac{7}{25}$, $90^\circ < \beta < 180^\circ$
QII, $x < 0$

For β , $y=7$, $r=25$, $x=-24$

$$\sin \beta = \frac{7}{25} \quad \cos \beta = -\frac{24}{25}$$

Find $\sin(\alpha + \beta)$, $\cos(\alpha + \beta)$, $\tan(\alpha + \beta)$

$$\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta = \frac{3}{5} \cdot \left(-\frac{24}{25}\right) + \frac{4}{5} \cdot \frac{7}{25} = \frac{-72}{125} + \frac{28}{125} = \frac{-44}{125}$$

$$\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta = \frac{4}{5} \cdot \left(-\frac{24}{25}\right) - \frac{3}{5} \cdot \frac{7}{25} = \frac{-96}{125} - \frac{21}{125} = \frac{-117}{125}$$

$$\tan(\alpha + \beta) = \frac{\sin(\alpha + \beta)}{\cos(\alpha + \beta)} = \frac{\frac{-44}{125}}{\frac{-117}{125}} = \frac{-44}{125} \cdot \frac{125}{117} = \frac{44}{117}$$

What quadrant is $(\alpha + \beta)$ in? III

Assignment

1) Find $\sin(\alpha - \beta)$, $\cos(\alpha - \beta)$, $\tan(\alpha - \beta)$ and what Quadrant $\alpha - \beta$ is in if:

$$\sin \alpha = \frac{3}{5} \quad 0 < \alpha < \frac{\pi}{2} \quad ; \quad \cos \beta = \frac{40}{41} \quad \frac{3\pi}{2} < \beta < 2\pi$$

2) Find $\sin(\alpha + \beta)$, $\cos(\alpha + \beta)$, $\tan(\alpha + \beta)$ and what Quadrant $\alpha + \beta$ is in if:

$$\sec \alpha = -\frac{25}{7} \quad \frac{\pi}{2} < \alpha < \pi \quad ; \quad \cot \beta = \frac{12}{5} \quad \beta \text{ in Q I}$$

3) Establish the identity: $1 - \frac{\sin^2 \theta}{1 - \cos \theta} = -\cos \theta$

