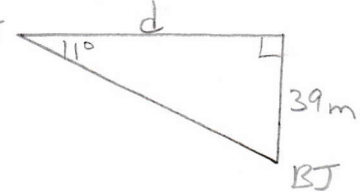
[2][a] $(x, y) = (\cos 2.7, \sin 2.7)$ 4

[b] $= (-0.9041, -0.4274)$ 4

[3] [a]



$\tan 11° = \frac{39m}{d} \rightarrow d = \frac{39m}{\tan 11°}$ 4 4

[b] $d \approx 201m$ 4

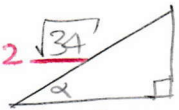
[4] [a] $\frac{428\pi}{6} = \frac{214\pi}{3} \longrightarrow \theta_{REF} = \frac{\pi}{3}$ 2½ 2

[b] $\frac{214}{3}\pi = 71\frac{1}{3}\pi \longrightarrow$ COTERMINAL WITH $1\frac{1}{3}\pi = \frac{4\pi}{3}$ 2½ 2

[c] $\csc\theta = \csc\frac{4\pi}{3} = \frac{1}{-\frac{\sqrt{3}}{2}} = -\frac{2}{\sqrt{3}} = \frac{-2\sqrt{3}}{3}$ 2½ 2 2

[d] $\cos(-\theta) = \cos\theta = \cos\frac{4\pi}{3} = -\frac{1}{2}$ 2½ 2

[5] [a]



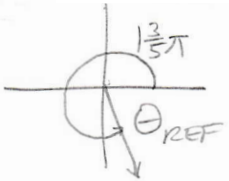
$\cot\alpha = \frac{ADJ}{OPP} = \frac{3}{5}$

$2\frac{1}{2}$ $c^2 = 3^2 + 5^2 = 34 \rightarrow c = \sqrt{34}$

[b] $\sin\alpha = \frac{OPP}{HYP} = \frac{5}{\sqrt{34}} = \frac{5\sqrt{34}}{34}$ $2\frac{1}{2}$

[c] IN Q_3, $y<0 \rightarrow \sin\mu < 0$ $2\frac{1}{2}$ $\rightarrow \sin\mu = -\frac{5\sqrt{34}}{34}$ $2\frac{1}{2}$

[6] [a] $\frac{38}{5}\pi = 7\frac{3}{5}\pi$ → COTERMINAL WITH $1\frac{3}{5}\pi$ (1½, 1)

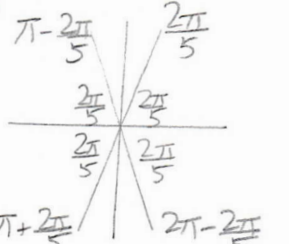


$\theta_{REF} = 2\pi - 1\frac{3}{5}\pi = \frac{2}{5}\pi$ (2)

[b] (1) $\frac{2}{5}\pi$, $\pi - \frac{2}{5}\pi = \frac{3}{5}\pi$ (1½)

$\pi + \frac{2}{5}\pi = \frac{7}{5}\pi$ (1½)

$2\pi - \frac{2}{5}\pi = \frac{8}{5}\pi$ (1)



[c] $\csc\theta < 0 \rightarrow y < 0$ (1½) → θ IN Q_3, Q_4

$\theta = \frac{7\pi}{5}, \frac{8\pi}{5}$ (1)

[7] $(2\cot x + \csc x)^2 - 4\cot x \csc x$

$= 4\cot^2 x + 4\cot x \csc x + \csc^2 x - 4\cot x \csc x$ 4

$= 4(\csc^2 x - 1) + \csc^2 x$ 4 2

$= 5\csc^2 x - 4$ 2 QED

[8] [a] $\tan\beta_{REF} = \frac{2}{7} \rightarrow \beta_{REF} = \underline{\tan^{-1}\frac{2}{7}}_{2} \approx \underline{0.2783}_{2}$

[b] $\tan\beta < 0 \rightarrow \underline{\text{SLOPE} < 0}_{2} \rightarrow \underline{\beta \text{ IN } Q_2, Q_4}_{2}$

[c]

$\beta = \underline{\pi - 0.2783}_{2}$ OR $\underline{2\pi - 0.2783}_{2}$

[d] $\underline{\sec^2\beta = \tan^2\beta + 1}_{2}$

$= \underline{\frac{4}{49} + 1}_{2}$

$= \frac{53}{49}$

$\sec\beta = \underline{\pm\frac{\sqrt{53}}{7}}_{2}$

[e] $\cot\left(\frac{\pi}{2} - \beta\right) = \underline{\tan\beta}_{2} = \underline{-\frac{2}{7}}_{2}$