7.6 Solving Quadratic Trigonometric Equations

"I can solve for the unknown angle(s) in any quadratic trigonometric equation.
I realize that I may need to apply previously established identities to do so.
I can apply what I have learned in unfamiliar settings."

Ex. 1: Solve on $0 \le x \le 2\pi$. Round all final answers to the nearest hundredth.

$$2\sec^2 x - 5\tan x = 5$$

$2(\tan^2 x + 1) - 5\tan x = 5$

$2\tan^2 x + 2 - 5\tan x - 5 = 0$

$2\tan^2 x - 5\tan x - 3 = 0$

$(2\tan x + 1)(\tan x - 3) = 0$

$\therefore 2\tan x + 1 = 0$ or $\tan x - 3 = 0$

$\tan x = -\frac{1}{2}$ $\quad$ $\tan x = 3$

$A \cdot B = 0$

$\begin{cases} \text{let } y = \tan x \\ 2y^2 - 5y - 3 = 0 \\ (2y+1)(y-3) = 0 \end{cases}$

$\beta = \tan^{-1}(\frac{1}{2})$

$\doteq 0.463$

$\beta = \tan^{-1}(3)$

$\doteq 1.249$

QII QIII QI QIII

$x = \pi - \beta$ $\quad$ $x = 2\pi - \beta$ $\quad$ $x \doteq 1.249$ $\quad$ $x = \pi + \beta$

$\doteq \pi - 0.463$ $\quad$ $\doteq 2\pi - 0.463$ $\quad$ $\doteq 1.25$ $\quad$ $\doteq 4.390$

$\doteq 2.677$ $\quad$ $\doteq 5.819$ $\quad$ $\doteq 4.39$

$\doteq 2.68$ $\quad$ $\doteq 5.82$

$\therefore x \doteq 1.25, 2.68, 4.39, 5.82$

Entertainment : pp. 436-437 #4d*, 5c*, 6b*c*, 7a*, 7e, 8d*, 8f*, 9d *, 14, 17
* means no rounding!!!!