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

$0 \le x \le 2\pi$

8d) $2\cot x + \sec^2 x = 0$

$\frac{2}{\tan x} + 1 + \tan^2 x = 0$ (Multiply by $\tan x$)

$2 + \tan x + \tan^3 x = 0$ let $y = \tan x$

$y^3 + y + 2 = 0$ $p(-1) = 0$

$\therefore -1 \,|\, 1 \;\; 0 \;\; 1 \;\; 2$

$\downarrow \; -1 \;\; 1 \;\; -2$

$1 \;\; -1 \;\; 2 \;\; 0 \; R$

$\therefore y^3 + y + 2 = 0$

$(y+1)(y^2 - y + 2) = 0$

$\hookrightarrow b^2 - 4ac < 0 \therefore$ No Real Solutions

$y + 1 = 0$

$\therefore \tan x = -1$ $\tan\beta = 1$

$\beta = \frac{\pi}{4}$

$\therefore$ QII QIV

$x = \pi - \beta$ $x = 2\pi - \beta$

$= \frac{3\pi}{4}$ $= \frac{7\pi}{4}$

8f) $3\tan^3 x - \tan x = 0$

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

$\therefore \tan x = 0$ or $\tan^2 x = \frac{1}{3}$

$x = 0, \pi, 2\pi$ $\tan x = \frac{\pm 1}{\sqrt{3}}$

$\beta = \frac{\pi}{6}$

$\tan x = \frac{1}{\sqrt{3}}$ $\tan x = \frac{-1}{\sqrt{3}}$

$Q_I; \theta = \frac{\pi}{6}$ $QII; \theta = \frac{5\pi}{6}$

$QIII; \theta = \frac{7\pi}{6}$ $QIV; \theta = \frac{11\pi}{6}$

$\therefore \theta = 0, \frac{\pi}{6}, \frac{5\pi}{6}, \pi, \frac{7\pi}{6}, \frac{11\pi}{6}, 2\pi$

9d) $-2\cos 2x = 2\sin x$

$-2(1 - 2\sin^2 x) = 2\sin x$

$-2 + 4\sin^2 x - 2\sin x = 0$

$2(2\sin^2 x - \sin x - 1) = 0$

$2(2\sin x + 1)(\sin x - 1) = 0$

$\therefore \sin x = \frac{-1}{2}$ or $\sin x = 1$

$\beta = \frac{\pi}{6}$ $x = \frac{\pi}{2}$

$QIII; x = \frac{7\pi}{6}$; $QIV; x = \frac{11\pi}{6}$

$\therefore x = \frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$

14. $6\sin^2 x = 17\cos x + 11$

$6(1 - \cos^2 x) = 17\cos x + 11$

$6 - 6\cos^2 x =$

$0 = 6\cos^2 x + 17\cos x + 11 - 6$

$0 = 6\cos^2 x + 17\cos x + 5$

$0 = (2\cos x + 5)(3\cos x + 1)$

$\therefore \cos x = \frac{-5}{2}$ or $\cos x = \frac{-1}{3}$

$\hookrightarrow$ Not Possible $\beta = \cos^{-1}\left(\frac{1}{3}\right)$

$-1 \le y \le 1$ $\doteq 1.230$

$y = -2.5$

QII QIII

$x = \pi - \beta$ $x = \pi + \beta$

$\doteq 1.91$ $\doteq 4.37$