Section 7.5
Solutions and Hints

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for the book:

Precalculus, Mathematics for Calculus 4th Edition
by James Stewart, Lothar Redlin and Saleem Watson.

40. Find all solutions on [0, 2π) for: $3*\csc^2 x = 4$

$3*\csc^2(x) = 4 \rightarrow 3*\frac{1}{\sin^2(x)} = 4$

$\rightarrow 3 = 4*\sin^2(x)$

$\rightarrow \frac{3}{4} = \sin^2(x)$

$\rightarrow \sin(x) = \pm\sqrt{\frac{3}{4}} = \pm\frac{\sqrt{3}}{2}$

$\rightarrow x = \sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$ or $x = \sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

$x = \pi/3$ or $x = -\pi/3$

$\rightarrow x = 2\pi - \pi/3 = (5/3)\pi$

Thus **$x = \pi/3$ or $x = (5/3)\pi$**

46. Find all solutions on [0, 2π) for: $3*\sec^2 x + 4*\cos^2 x = 7$

$3*\sec^2 x + 4*\cos^2 x = 7$ → $3*\frac{1}{\cos^2 x} + 4*\cos^2 x = 7$, multiply both sides by $\cos^2 x$

→ $3 + 4*\cos^4 x = 7\cos^2 x$

→ $4*\cos^4 x - 7\cos^2 x + 3 = 0$, let $y = \cos^2 x$

→ $4*y^2 - 7y + 3 = 0$, factor

→ $(4y - 3)(y - 1) = 0$, put $\cos^2 x$ back in for y

→ $(4\cos^2 x - 3)(\cos^2 x - 1) = 0$

Solve $(4\cos^2 x - 3) = 0$:

$4*\cos^2 x - 3 = 0$ → $4*\cos^2 x = 3$

→ $\cos^2 x = ¾$

→ $\cos x = \pm\frac{\sqrt{3}}{2}$

→ $x = \pi/6$ or $x = 2\pi - \pi/6 = (11/6)\pi$

Solve $(\cos^2 x - 1) = 0$:

$\cos^2 x - 1 = 0$ → $\cos^2 x = 1$

→ $\cos x = \pm 1$

→ $x = 0$ or $x = \pi$

So the answer is **$x = 0, \pi/6, \pi, (11/6)\pi$.**