$\sin^2 x + \cos^2 x = 1$

$\cos^2 x = 1 - \sin^2 x$

33. $\cos^2 x + 2\sin x - 2 = 0$

$1 - \sin^2 x + 2\sin x - 2 = 0$

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

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

$x^2 - 2x + 1 = 0$

$(x-1)(x-1) = 0$

$\sin^2 x - 2\sin x + 1 = 0$

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

$\sin x - 1 = 0$

$\sin x = 1$

Find a numerical

29. $\dfrac{\csc x}{\cot x} = \sqrt{2}$

$\dfrac{\frac{1}{\sin x}}{\frac{\cos x}{\sin x}} = \sqrt{2}$

$\frac{1}{\sin x} \cdot \frac{\sin x}{\cos x} = \sqrt{2}$

$\frac{1}{\cos x} = \sqrt{2}$

$\sec x = \sqrt{2}$

19. $(\sin A + \cos A)^2 = \dfrac{2 + \sec A \csc A}{\sec A \csc A}$

$$= \frac{2}{\sec A \csc A} + \frac{\sec A \csc A}{\sec A \csc A}$$

$$= \frac{2}{\frac{1}{\cos A} \cdot \frac{1}{\sin A}} + 1$$

$$= \frac{2}{\frac{1}{\cos A \sin A}} + 1$$

$(\sin A + \cos A)^2 = 2\cos A \sin A + 1$

$= 2\cos A \sin A + \sin^2 A + \cos^2 A$

$= \sin^2 A + 2\sin A \cos A + \cos^2 A$

$= (\sin A + \cos A)(\sin A + \cos A)$

$(\sin A + \cos A)^2 = (\sin A + \cos A)^2$

$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

35. If $\dfrac{\tan^3\theta - 1}{\tan\theta - 1} - \sec^2\theta - 1 = 0$,

$a = \tan\theta$
$b = 1$

$\dfrac{(\tan\theta - 1)(\tan^2\theta + \tan\theta + 1)}{\tan\theta - 1} - \sec^2\theta - 1 = 0$

$\tan^2\theta + \tan\theta + 1 - \sec^2\theta - 1 = 0$

$\tan^2\theta + \tan\theta + 1 - (\tan^2\theta + 1) - 1 = 0$

$\tan^2\theta + \tan\theta + 1 - \tan^2\theta - 1 - 1 = 0$

$\tan\theta - 1 = 0$

$\tan\theta = 1 \longrightarrow \cot\theta = 1$

Section 7.2

25, 31

cos 735°. $= \cos 375^\circ = \cos 15^\circ$

$$\begin{array}{r} 735 \\ -360 \\ \hline 375 \\ -360 \\ \hline 15 \end{array}$$

$$\cos(375^\circ) = \cos(\underbrace{330^\circ}_{\alpha} + \underbrace{45^\circ}_{\beta}) = \cos 330^\circ \cos 45^\circ - \sin 330^\circ \sin 45^\circ$$

$$= \left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2}\right) - \left(-\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right)$$

$$= \frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4}$$

$$= \frac{\sqrt{6}+\sqrt{2}}{4}$$