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19) $\csc\theta \cdot \cos\theta = \boxed{\cot\theta}$

$\frac{1}{\sin\theta} \cdot \cos\theta$	Recip. I.D.
$\frac{\cos\theta}{\sin\theta}$	multiplication
$\boxed{\cot\theta}$	Quotient I.D.

25) $\tan u \cot u - \cos^2 u = \boxed{\sin^2 u}$

$\frac{\sin u}{\cos u} \cdot \frac{\cos u}{\sin u} - \cos^2 u$	Quotient I.D.
$1 - \cos^2 u$	Mult. ID
$\boxed{\sin^2 u}$	Pythag. I.D.

28) $(\csc\theta - 1)(\csc\theta + 1) = \boxed{\cot^2\theta}$

$\csc^2\theta - 1$	Distrib.
$\boxed{\cot^2\theta}$	Pythag. I.D.

29) $(\sec\theta + \tan\theta)(\sec\theta - \tan\theta) = \boxed{1}$

$\left(\frac{1}{\cos\theta} + \frac{\sin\theta}{\cos\theta}\right)\left(\frac{1}{\cos\theta} - \frac{\sin\theta}{\cos\theta}\right)$	Recip/Quot. I.D.
$\frac{1}{\cos^2\theta} - \frac{\sin^2\theta}{\cos^2\theta}$	Distribute
$\sec^2\theta - \tan^2\theta$	Diff of Fractions
$\boxed{1}$	Pythag. I.D.

36) $\csc^4\theta - \csc^2\theta = \boxed{\cot^4\theta + \cot^2\theta}$

$\csc^2\theta(\csc^2\theta - 1)$	Distribute
$1+\cot^2\theta(\cot^2\theta)$	Pythag. I.D.
$\cot^2\theta + \cot^4\theta$	Distribute
$\boxed{\cot^4\theta + \cot^2\theta}$	Commutative Prop. =

37) $\sec u - \tan u = \dfrac{\cos u}{1+\sin u}$

$\dfrac{1}{\cos u} - \dfrac{\sin u}{\cos u}$	Recip./Quotient
$\dfrac{1-\sin u}{\cos u}$	Diff. of Fractions
$\dfrac{\cos u(1-\sin u)}{\cos^2 u}$	mult. ID
$\dfrac{\cos u(1-\sin u)}{1-\sin^2\theta}$	Pythag.
$\dfrac{\cos u(1-\sin u)}{(1-\sin u)(1+\sin u)}$	Dist. Prop.
$\dfrac{\cos u}{1+\sin u}$	mult. ID

40) $9\sec^2\theta - 5\tan^2\theta = 5 + 4\sec^2\theta$

$\frac{9}{\cos^2\theta} - \frac{5\sin^2\theta}{\cos^2\theta}$	Recip/Quot.
$\frac{9 - 5\sin^2\theta}{\cos^2\theta}$	Diff. of Fract.
$\frac{9 - 5(1-\cos^2\theta)}{\cos^2\theta}$	Pythag.
$\frac{9 - 5 + 5\cos^2\theta}{\cos^2\theta}$	Distributive
$\frac{4 + 5\cos^2\theta}{\cos^2\theta}$	CLT
$\frac{4}{\cos^2\theta} + \frac{5\cos^2\theta}{\cos^2\theta}$	Add. of Fract.
$4\sec^2\theta + 5$	Recip.
$5 + 4\sec^2\theta$	Commut.

49) $\frac{1-\sin v}{\cos v} + \frac{\cos v}{1-\sin v} = \boxed{2\sec v}$

$\frac{1-\sin v}{\cos v} + \frac{\cos v}{1-\sin v}\left(\frac{1+\sin v}{1+\sin v}\right)$	mult. ID
$\frac{1-\sin v}{\cos v} + \frac{\cos v\,(1+\sin v)}{1-\sin^2 v}$	Distrib.
$\frac{1-\sin v}{\cos v} + \frac{\cos v\,(1+\sin v)}{\cos^2 v}$	Pythag.
$\frac{1-\sin v + 1 + \sin v}{\cos v}$	simplify
$\frac{2}{\cos v} = \boxed{2\sec v}$	Recip. ID

63) $\dfrac{\tan u - \cot u}{\tan u + \cot u} + 1 = \boxed{2\sin^2 u}$

$\dfrac{\tan u - \cot u}{\tan u + \cot u}\left(\dfrac{\tan u - \cot u}{\tan u - \cot u}\right) + 1$ — Mult. ID (conjugate)

$\dfrac{\tan^2 u - 2\cot u \tan u + \cot^2 u}{\tan^2 u - \cot^2 u} + 1$ — Distributive

$\dfrac{\tan^2 u + \cot^2 u - 2}{\tan^2 u - \cot^2 u} + 1$ — Reciprocal

$\dfrac{\tan^2 u + \cot^2 u - 2}{\tan^2 u - \cot^2 u} + \dfrac{\tan^2 u - \cot^2 u}{\tan^2 u - \cot^2 u}$ — Mult. I.D.

$\dfrac{2\tan^2 u - 2}{\tan^2 u - \cot^2 u}$ — CD ADD FRACT.

$\dfrac{\frac{2\sin^2 u}{\cos^2 u} - 2}{\frac{\sin^2 u}{\cos^2 u} - \frac{\cos^2 u}{\sin^2 u}}\left(\dfrac{\cos^2 u \sin^2 u}{\cos^2 u \sin^2 u}\right)$ — Quotient

$\dfrac{2\sin^4 u - 2\cos^2 u \sin^2 u}{\sin^4 u - \cos^4 u}$ — Mult. I.D.

$\dfrac{2\sin^2 u(\sin^2 u - \cos^2 u)}{(\sin^2 u - \cos^2 u)(\sin^2 u + \cos^2 u)}$ — Distributive

$\dfrac{2\sin^2 u}{\sin^2 u + \cos^2 u} = \boxed{2\sin^2 u}$ — Mult. I.D.

69) $\dfrac{\sec\theta - \csc\theta}{\sec\theta\csc\theta} = \boxed{\sin\theta - \cos\theta}$

$\dfrac{\sec\theta}{\sec\theta\csc\theta} - \dfrac{\csc\theta}{\sec\theta\csc\theta}$	C.D. Diff. of Fract.
$\dfrac{1}{\csc\theta} - \dfrac{1}{\sec\theta}$	Mult. ID
$\boxed{\sin\theta - \cos\theta}$	Recip. I.D.