(24) $\sec^6 x(\sec x \tan x) - \sec^4 x(\sec x \tan x) = \sec^5 x \tan^3 x$

$\sec x \tan x (\sec^4 x - \sec^4 x) = \sec^5 x \tan^3 x$

$\sec x \tan x \cdot \sec^4 x (\sec^2 x - 1) = \sec^5 x \tan^3 x$

$\sec x \cdot \tan x \cdot \sec^4 x \cdot \tan^2 x = \sec^5 x \tan^3 x$

$\sec^5 x \cdot \tan^3 x = \sec^5 x \tan^3 x$

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(25) $\tan\left(\frac{\pi}{2} - x\right)\sec x = \csc x$

$\cot x \sec x = \csc x$

$\frac{\cos x}{\sin x} \cdot \frac{1}{\cos x} = \csc x$

$\frac{1}{\sin x} = \csc x$

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(30) $\frac{1 + \csc(-\theta)}{\cos(-\theta) + \cot(-\theta)} = \sec\theta$

$\frac{1 - \csc\theta}{\cos\theta - \cot\theta} = \sec\theta$

$\frac{1 - \frac{1}{\sin\theta}}{\cos\theta - \frac{\cos\theta}{\sin\theta}} = \sec\theta$

$\frac{\frac{\sin\theta}{\sin\theta} 1 - \frac{1}{\sin\theta}}{\frac{\sin\theta}{\sin\theta}\cos\theta - \frac{\cos\theta}{\sin\theta}} = \sec\theta$

$\frac{\frac{\sin\theta - 1}{\sin\theta}}{\frac{\sin\theta\cos\theta - \cos\theta}{\sin\theta}} = \frac{\sin\theta - 1}{\sin\theta} \cdot \frac{\sin\theta}{\sin\theta\cos\theta - \cos\theta} = \frac{\sin\theta - 1}{\sin\theta} \cdot \frac{\sin\theta}{\cos\theta(\sin\theta - 1)} = \frac{1}{\cos\theta} = \sec\theta$

(42) $\csc x(\csc x - \sin x) + \frac{\sin x - \cos x}{\sin x} + \cot x = \csc^2 x$

$\frac{1}{\sin x}\cdot\frac{1}{\sin x} - \frac{1}{\sin x}\cdot\frac{\sin x}{1} + \frac{\sin x}{\sin x} - \frac{\cos x}{\sin x} + \frac{\cos x}{\sin x} = \csc^2 x$

$\frac{1}{\sin^2 x} - 1 + 1 = \csc^2 x$

$\frac{1}{\sin^2 x} = \csc^2 x$

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(44) $4\tan^4 x + \tan^2 x - 3 = \sec^2 x(4\tan^2 x - 3)$

* $4x^4 + x - 3 = (4x^2 - 3)(x^2 + 1)$

$(4\tan^2 x - 3)(\tan^2 x + 1) = \sec^2 x(4\tan^2 x - 3)$

$(4\tan^2 x - 3)\sec^2 x = \sec^2 x(4\tan^2 x - 3)$

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(46) $\sin x(1 - 2\cos^2 x + \cos^4 x) = \sin^5 x$

$\sin x(\cos^4 x - 2\cos^2 x + 1) = \sin^5 x$

$\sin x(\cos^2 x - 1)(\cos^2 x - 1) = \sin^5 x$

$\sin x \cdot -1(-\cos^2 x + 1)\cdot -1(-\cos^2 x + 1) = \sin^5 x$

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

$\sin x \cdot \sin^2 x \cdot \sin^2 x = \sin^5 x$

OR

$\sin x(1 - 2\cos^2 x + \cos^4 x) = \sin^5 x$

$\sin x(1 - \cos^2 x)(1 - \cos^2 x) = \sin^5 x$

$\sin x \cdot \sin^2 x \cdot \sin^2 x = \sin^5 x$

(48) $\csc^4\theta - \cot^4\theta = 2\csc^2\theta - 1$

$(\csc^2\theta + \cot^2\theta)(\csc^2\theta - \cot^2\theta) = 2\csc^2\theta - 1$

$(\csc^2\theta + \csc^2\theta - 1)$ $\quad 1$

$2\csc^2\theta - 1 = 2\csc^2\theta - 1$

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(50) $\dfrac{\cot\theta}{\csc\theta - 1} = \dfrac{\csc\theta + 1}{\cot\theta}$

$\dfrac{(\csc\theta+1)}{(\csc\theta+1)}\dfrac{\cot\theta}{\csc\theta - 1} = \dfrac{\csc\theta + 1}{\cot\theta}$

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

$\dfrac{(\csc\theta+1)\cot\theta}{\cot^2\theta} = \dfrac{\csc\theta + 1}{\cot\theta}$

$\dfrac{\csc\theta+1}{\cot} = \dfrac{\csc\theta + 1}{\cot\theta}$

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(52) $\dfrac{\sin^3\theta + \cos^3\theta}{\sin\theta + \cos\theta} = 1 - \sin\theta\cos\theta$

$\dfrac{(\sin\theta + \cos\theta)(\sin^2\theta - \sin\theta\cos\theta + \cos^2\theta)}{\sin\theta + \cos\theta} = 1 - \sin\theta\cos\theta$

$\sin^2\theta + \cos^2\theta - \sin\theta\cos\theta = 1 - \sin\theta\cos\theta$

$1 - \sin\theta\cos\theta = 1 - \sin\theta\cos\theta$