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4) $\cos t \csc t = (\cos t)\left(\frac{1}{\sin t}\right) = \frac{\cos t}{\sin t} = \underline{\underline{\cot t}}$

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6) $\tan\theta \csc\theta = \left(\frac{\sin\theta}{\cos\theta}\right)\left(\frac{1}{\sin\theta}\right) = \frac{1}{\cos\theta} = \underline{\underline{\sec\theta}}$

---

8) $\frac{\sec x}{\csc x} = \frac{\frac{1}{\cos x}}{\frac{1}{\sin x}} = \left(\frac{1}{\cos x}\right)\left(\frac{\sin x}{1}\right) = \frac{\sin x}{\cos x} = \underline{\underline{\tan x}}$

---

10) $\cos^2\theta(1+\tan^2\theta) = \cos^2\theta\left(1+\frac{\sin^2\theta}{\cos^2\theta}\right)$

$= \cos^2\theta + \cos^2\theta\left(\frac{\sin^2\theta}{\cos^2\theta}\right)$

$= \underline{\underline{\cos^2\theta + \sin^2\theta = \cos(2\theta)}}$

---

12) $\frac{\cot\theta}{\csc\theta - \sin\theta} = \frac{\left(\frac{\cos\theta}{\sin\theta}\right)}{\left(\frac{1}{\sin\theta}\right) - \sin\theta} = \left(\frac{\frac{\cos\theta}{\sin\theta}}{\frac{1}{\sin\theta} - \frac{\sin\theta}{1}}\right)\left(\frac{\frac{\sin\theta}{1}}{\frac{\sin\theta}{1}}\right)$ GLCD $= \sin\theta$

$= \frac{\cos\theta}{1-\sin^2\theta} = \frac{\cos\theta}{\cos^2\theta} = \frac{1}{\cos\theta} = \underline{\underline{\sec\theta}}$

---

14) $\frac{\cos x \sec x}{\cot x} = \frac{(\cos x)\left(\frac{1}{\cos x}\right)}{\left(\frac{\cos x}{\sin x}\right)} = \frac{1}{\left(\frac{\cos x}{\sin x}\right)} = \frac{\sin x}{\cos x} = \underline{\underline{\tan x}}$

16) $$\frac{1+\cot A}{\csc A} = \frac{1+\frac{\cos A}{\sin A}}{\frac{1}{\sin A}} = \left(\frac{\frac{1}{1}+\frac{\cos A}{\sin A}}{\frac{1}{\sin A}}\right)\left(\frac{\frac{\sin A}{1}}{\frac{\sin A}{1}}\right)$$ GLCD = $\sin A$

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

---

18) $$\sin^4\alpha - \cos^4\alpha + \cos^2\alpha = \left\{(\sin^2\alpha)^2 - (\cos^2\alpha)^2\right\} + \cos^2\alpha$$

$$= \left\{(\sin^2\alpha + \cos^2\alpha)(\sin^2\alpha - \cos^2\alpha)\right\} + \cos^2\alpha$$

$$= \left\{(1)(\sin^2\alpha - \cos^2\alpha)\right\} + \cos^2\alpha$$

$$= \sin^2\alpha - \cos^2\alpha + \cos^2\alpha = \underline{\underline{\sin^2\alpha}}$$

---

20) $$\frac{\sec x - \cos x}{\tan x} = \frac{\left(\frac{1}{\cos x}\right) - \cos x}{\left(\frac{\sin x}{\cos x}\right)} = \left(\frac{\frac{1}{\cos x} - \frac{\cos x}{1}}{\frac{\sin x}{\cos x}}\right)\left(\frac{\frac{\cos x}{1}}{\frac{\cos x}{1}}\right)$$ GLCD = $\cos x$

$$= \frac{1-\cos^2 x}{\sin x} = \frac{\sin^2 x}{\sin x} = \underline{\underline{\sin x}}$$

---

22) $$\frac{1+\sin y}{1+\csc y} = \frac{1+\sin y}{1+\left(\frac{1}{\sin y}\right)} = \left(\frac{\frac{1}{1}+\frac{\sin y}{1}}{\frac{1}{1}+\frac{1}{\sin y}}\right)\left(\frac{\frac{\sin y}{1}}{\frac{\sin y}{1}}\right)$$ GLCD = $\sin y$

$$= \underline{\underline{\frac{1+\sin^2 y}{\sin y + 1}}}$$

24) $\dfrac{\sin t}{1-\cos t} - \csc t = \dfrac{\sin t}{(1-\cos t)} - \dfrac{1}{\sin t}$ LCD $= \sin t(1-\cos t)$

$$= \left(\frac{\sin t}{(1-\cos t)}\right)\left(\frac{\sin t}{\sin t}\right) - \left(\frac{1}{\sin t}\right)\left(\frac{1-\cos t}{1-\cos t}\right)$$

$$= \frac{\sin^2 t - (1-\cos t)}{\sin t\,(1-\cos t)} = \frac{\sin^2 t - 1 + \cos t}{\sin t\,(1-\cos t)}$$

$$= \frac{(1-\cos^2 t) - 1 + \cos t}{\sin t\,(1-\cos t)} = \frac{1-\cos^2 t - 1 + \cos t}{\sin t\,(1-\cos t)} = \frac{\cos t - \cos^2 t}{\sin t\,(1-\cos t)}$$

$$= \frac{\cos t\,(1-\cos t)}{\sin t\,(1-\cos t)} = \frac{\cos t}{\sin t} = \underline{\underline{\cot t}}$$

---

26) $\dfrac{\cot A - 1}{1+\tan(-A)} = \dfrac{\cot A - 1}{1-\tan A} = \dfrac{\left(\frac{\cos A}{\sin A}\right) - 1}{1 - \left(\frac{\sin A}{\cos A}\right)}$ GLCD $= \sin A \cos A$

$$= \left(\frac{\frac{\cos A}{\sin A} - \frac{1}{1}}{\frac{1}{1} - \frac{\sin A}{\cos A}}\right)\left(\frac{\frac{\sin A \cos A}{1}}{\frac{\sin A \cos A}{1}}\right) = \frac{\cos^2 A - \sin A \cos A}{\sin A \cos A - \sin^2 A}$$

$$= \frac{\cos A\,(\cos A - \sin A)}{\sin A\,(\cos A - \sin A)} = \frac{\cos A}{\sin A} = \underline{\underline{\cot A}}$$

28) $\dfrac{2+\tan^2 x}{\sec^2 x} - 1 = \dfrac{1+1+\tan^2 x}{\sec^2 x} - 1$

$\dfrac{\cos^2 x}{\cos^2 x} + \dfrac{\sin^2 x}{\cos^2 x} = \dfrac{1}{\cos^2 x}$

$1 + \tan^2 x = \sec^2 x$

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

$= \dfrac{1}{\sec^2 x} + \dfrac{(\sec^2 x)}{\sec^2 x} - 1 = \dfrac{1}{\sec^2 x} + 1 - 1 = \dfrac{1}{\sec^2 x} = \underline{\underline{\cos^2 x}}$

---

32) $\dfrac{\tan x}{\sec x} = \sin x$

$\dfrac{\tan x}{\sec x} = \dfrac{\left(\dfrac{\sin x}{\cos x}\right)}{\left(\dfrac{1}{\cos x}\right)} = \left(\dfrac{\sin x}{\cos x}\right)\left(\dfrac{\cos x}{1}\right) = \sin x$

---

34) $\dfrac{\cot x \sec x}{\csc x} = 1$

$\dfrac{\cot x \sec x}{\csc x} = \dfrac{\left(\dfrac{\cos x}{\sin x}\right)\left(\dfrac{1}{\cos x}\right)}{\left(\dfrac{1}{\sin x}\right)} = \dfrac{\dfrac{1}{\sin x}}{\dfrac{1}{\sin x}} = 1$

---

36 $\dfrac{\cos^2 v}{\sin v} \stackrel{?}{=} \csc v - \sin v$

$\dfrac{1-\sin^2 v}{\sin v} = \dfrac{1}{\sin v} - \dfrac{\sin^2 v}{\sin v} = \csc v - \sin v$

38) $\cot(-\alpha)\cos(-\alpha) + \sin(-\alpha) = -\csc\alpha$

$$\cot(-\alpha)\cos(-\alpha) + \sin(-\alpha) = \left(\frac{\cos(-\alpha)}{\sin(-\alpha)}\right)\left(\cos(-\alpha)\right) + \sin(-\alpha)$$

$$= \frac{\cos^2(-\alpha)}{\sin(-\alpha)} + \sin(-\alpha) = \frac{1-\sin^2(-\alpha)}{\sin(-\alpha)} + \sin(-\alpha)$$

$$= \frac{1}{\sin(-\alpha)} - \frac{\sin^2(-\alpha)}{\sin(-\alpha)} + \sin(-\alpha) = \frac{1}{\sin(-\alpha)} - \sin(-\alpha) + \sin(-\alpha)$$

$$= \frac{1}{\sin(-\alpha)} = \frac{1}{-\sin\alpha} = -\csc\alpha$$

---

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

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

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

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

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

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42) $\dfrac{\cos x}{\sec x} + \dfrac{\sin x}{\csc x} = 1$

$$\frac{\cos x}{\sec x} + \frac{\sin x}{\csc x} = \frac{\cos x}{\left(\frac{1}{\cos x}\right)} + \frac{\sin x}{\left(\frac{1}{\sin x}\right)} = (\cos x)\left(\frac{\cos x}{1}\right) + (\sin x)\left(\frac{\sin x}{1}\right)$$

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

---

44) $\csc x - \sin x$ | $\cos x \cot x$

$$\frac{1}{\sin x} - \sin x \qquad \cos x\left(\frac{\cos x}{\sin x}\right)$$

LCD = $\sin x$

$$\frac{1}{\sin x} - (\sin x)\left(\frac{\sin x}{\sin x}\right) \qquad \frac{\cos^2 x}{\sin x}$$

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

---

46) $\tan^2 x - \cot^2 x$ | $\sec^2 x - \csc^2 x$

$$\frac{\sin^2 x}{\cos^2 x} - \frac{\cos^2 x}{\sin^2 x} \qquad \frac{1}{\cos^2 x} - \frac{1}{\sin^2 x}$$

$$\frac{(1-\cos^2 x)}{\cos^2 x} - \frac{(1-\sin^2 x)}{\sin^2 x}$$

$$\left(\frac{1}{\cos^2 x} - \frac{\cos^2 x}{\cos^2 x}\right) - \left(\frac{1}{\sin^2 x} - \frac{\sin^2 x}{\sin^2 x}\right)$$

$$\left(\frac{1}{\cos^2 x} - 1\right) - \left(\frac{1}{\sin^2 x} - 1\right)$$

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

48) $$\frac{2\sin x\cos x}{(\sin x+\cos x)^2-1} = \frac{2\sin x\cos x}{(\sin^2 x+2\sin x\cos x+\cos^2 x)-1}$$

$$= \frac{2\sin x\cos x}{(\sin^2 x+\cos^2 x+2\sin x\cos x)-1} = \frac{2\sin x\cos x}{(1+2\sin x\cos x)-1}$$

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

---

50) $\cot^2 t - \cos^2 t$ $\qquad$ $\cot^2 t\cos^2 t$

LCD $= \sin^2 t$ $\qquad$ $\dfrac{\cos^2 t}{\sin^2 t} - \cos^2 t$ $\qquad$ $\left(\dfrac{\cos^2 t}{\sin^2 t}\right)\cos^2 t$

$$\frac{\cos^2 t}{\sin^2 t} - (\cos^2 t)\left(\frac{\sin^2 t}{\sin^2 t}\right) \qquad \frac{\cos^4 t}{\sin^2 t}$$

$$\frac{\cos^2 t - \sin^2 t\cos^2 t}{\sin^2 t}$$

$$\frac{\cos^2 t(1-\sin^2 t)}{\sin^2 t}$$

$$\frac{\cos^2 t(\cos^2 t)}{\sin^2 t}$$

$$\frac{\cos^4 t}{\sin^2 t} = \frac{\cos^4 t}{\sin^2 t}$$

52) $(\sin x + \cos x)^4$ $\quad (1 + 2\sin x \cos x)^2$

$((\sin x + \cos x)^2)^2$

$(\sin^2 x + 2\sin x \cos x + \cos^2 x)^2$

$(\sin^2 x + \cos^2 x + 2\sin x \cos x)^2$

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

---

54) $(\cot x - \csc x)(\cos x + 1) = \left(\frac{\cos x}{\sin x} - \frac{1}{\sin x}\right)(\cos x + 1)$

$= \left(\frac{\cos x - 1}{\sin x}\right)\left(\frac{\cos x + 1}{1}\right) = \frac{\cos^2 x - 1}{\sin x} = \frac{-1 + \cos^2 x}{\sin x}$

$= \frac{-(1 - \cos^2 x)}{\sin x} = \frac{-(\sin^2 x)}{\sin x} = -\sin x$

---

56) $2\cos^2 x - 1 = 2(1 - \sin^2 x) - 1 = 2 - 2\sin^2 x - 1$

$= 1 - 2\sin^2 x$

---

58) $(1 - \cos^2 x)(1 + \cot^2 x) = (\sin^2 x)(\csc^2 x)$

$= (\sin^2 x)\left(\frac{1}{\sin^2 x}\right) = 1$

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

$\cot^2 x + 1 = \csc^2 x$

60) $\sec t \csc t \left(\tan t + \cot t\right) = \left(\frac{1}{\cos t}\right)\left(\frac{1}{\sin t}\right)\left(\frac{\sin t}{\cos t} + \frac{\cos t}{\sin t}\right)$

$$= \frac{\sin t}{\sin t \cos^2 t} + \frac{\cos t}{\sin^2 t \cos t} = \frac{1}{\cos^2 t} + \frac{1}{\sin^2 t} = \sec^2 t + \csc^2 t$$

---

62) $\frac{1+\sec^2 x}{1+\tan^2 x} = \frac{1+\sec^2 x}{\sec^2 x} = \frac{1}{\sec^2 x} + \frac{\sec^2 x}{\sec^2 x}$

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

$1 + \tan^2 x = \sec^2 x$

$$= \frac{1}{\sec^2 x} + 1 = \cos^2 x + 1 = 1 + \cos^2 x$$

---

64) $\frac{\sin x + \cos x}{\sec x + \csc x} = \frac{\sin x + \cos x}{\left(\frac{1}{\cos x}\right) + \left(\frac{1}{\sin x}\right)}$ GLCD $= \sin x \cos x$

$$= \left(\frac{\frac{\sin x}{1} + \frac{\cos x}{1}}{\frac{1}{\cos x} + \frac{1}{\sin x}}\right)\left(\frac{\frac{\sin x \cos x}{1}}{\frac{\sin x \cos x}{1}}\right) = \frac{(\sin x + \cos x)\sin x \cos x}{\sin x + \cos x}$$

$$= \sin x \cos x$$

---

66) $\frac{\csc x - \cot x}{\sec x - 1} = \frac{\left(\frac{1}{\sin x}\right) - \left(\frac{\cos x}{\sin x}\right)}{\left(\frac{1}{\cos x}\right) - 1}$ GLCD $= \sin x \cos x$

$$= \left(\frac{\frac{1}{\sin x} - \frac{\cos x}{\sin x}}{\frac{1}{\cos x} - \frac{1}{1}}\right)\left(\frac{\frac{\sin x \cos x}{1}}{\frac{\sin x \cos x}{1}}\right) = \frac{(1-\cos x)(\cos x)}{\sin x - \sin x \cos x} = \frac{(1-\cos x)(\cos x)}{(\sin x)(1-\cos x)}$$

$$= \frac{\cos x}{\sin x} = \cot x$$

68)

$$\sec^4 x - \tan^4 x$$

$$(\sec^2 x)^2 - (\tan^2 x)^2$$

$$(\sec^2 x + \tan^2 x)(\sec^2 x - \tan^2 x)$$

$$(\sec^2 x + \tan^2 x)(1)$$

$$\sec^2 x + \tan^2 x = \sec^2 x + \tan^2 x$$

$\sec^2 x + \tan^2 x$

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

$1 + \tan^2 x = \sec^2 x$

$1 = \sec^2 x - \tan^2 x$

---

70)

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

$$\frac{\sin\theta - \csc\theta}{\cos\theta - \cot\theta}$$

$$\frac{\sin\theta - \left(\frac{1}{\sin\theta}\right)}{\cos\theta - \left(\frac{\cos\theta}{\sin\theta}\right)}$$

GLCD $= \sin\theta$

$$\left(\frac{\frac{\sin\theta}{1} - \frac{1}{\sin\theta}}{\frac{\cos\theta}{1} - \frac{\cos\theta}{\sin\theta}}\right)\left(\frac{\frac{\sin\theta}{1}}{\frac{\sin\theta}{1}}\right)$$

$$\frac{\sin^2\theta - 1}{\sin\theta\cos\theta - \cos\theta} = \frac{-1 + \sin^2\theta}{-\cos\theta + \sin\theta\cos\theta}$$

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

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

72) $$\frac{\cos^2 t + \tan^2 t - 1}{\sin^2 t} = \frac{\tan^2 t - 1 + \cos^2 t}{\sin^2 t} = \frac{\tan^2 t - (1-\cos^2 t)}{\sin^2 t}$$

$$= \frac{\tan^2 t - (\sin^2 t)}{\sin^2 t} = \frac{\left(\frac{\sin^2 t}{\cos^2 t}\right) - \sin^2 t}{\sin^2 t} = \frac{\sin^2 t\left(\frac{1}{\cos^2 t} - 1\right)}{\sin^2 t}$$

$$= \frac{1}{\cos^2 t} - 1 = \frac{1}{\cos^2 t} - 1\left(\frac{\cos^2 t}{\cos^2 t}\right) = \frac{1-\cos^2 t}{\cos^2 t} = \frac{\sin^2 t}{\cos^2 t} = \tan^2 t$$

---

74) $$\frac{\tan x + \tan y}{\cot x + \cot y} = \frac{\left(\frac{\sin x}{\cos x}\right) + \left(\frac{\sin y}{\cos y}\right)}{\left(\frac{\cos x}{\sin x}\right) + \left(\frac{\cos y}{\sin y}\right)}$$

numerator: LCD = $\cos x \cos y$

denominator: LCD = $\sin x \sin y$

$$= \frac{\left(\frac{\sin x}{\cos x}\right)\left(\frac{\cos y}{\cos y}\right) + \left(\frac{\sin y}{\cos y}\right)\left(\frac{\cos x}{\cos x}\right)}{\left(\frac{\cos x}{\sin x}\right)\left(\frac{\sin y}{\sin y}\right) + \left(\frac{\cos y}{\sin y}\right)\left(\frac{\sin x}{\sin x}\right)} = \frac{\frac{\sin x \cos y + \sin y \cos x}{\cos x \cos y}}{\frac{\sin y \cos x + \sin x \cos y}{\sin x \sin y}}$$

$$= \left(\frac{\sin x \cos y + \sin y \cos x}{\cos x \cos y}\right)\left(\frac{\sin x \sin y}{\sin y \cos x + \sin x \cos y}\right)$$

$$= \left(\frac{\sin x \cos y + \sin y \cos x}{\cos x \cos y}\right)\left(\frac{\sin x \sin y}{\sin x \cos y + \sin y \cos x}\right)$$

$$= \frac{\sin x \sin y}{\cos x \cos y} = \left(\frac{\sin x}{\cos x}\right)\left(\frac{\sin y}{\cos y}\right) = \tan x \tan y$$

76) $$\frac{\tan v - \cot v}{\tan^2 v - \cot^2 v} = \frac{(\tan v - \cot v)}{(\tan v + \cot v)(\tan v - \cot v)}$$

$$= \frac{1}{\tan v + \cot v} = \frac{1}{\left(\frac{\sin v}{\cos v}\right) + \left(\frac{\cos v}{\sin v}\right)}$$

GLCD = $\sin v \cos v$

$$= \left(\frac{\frac{1}{1}}{\frac{\sin v}{\cos v} + \frac{\cos v}{\sin v}}\right)\left(\frac{\frac{\sin v \cos v}{1}}{\frac{\sin v \cos v}{1}}\right) = \frac{\sin v \cos v}{\sin^2 v + \cos^2 v} = \frac{\sin v \cos v}{1} = \sin v \cos v$$

---

78) $$\frac{\sin x - 1}{\sin x + 1}$$

$$\frac{-\cos^2 x}{(\sin x + 1)^2}$$

$$\frac{-(1 - \sin^2 x)}{(\sin x + 1)^2}$$

$$\frac{-1 + \sin^2 x}{(\sin x + 1)^2}$$

$$\frac{\sin^2 x - 1}{(\sin x + 1)^2}$$

$$\frac{(\sin x + 1)(\sin x - 1)}{(\sin x + 1)(\sin x + 1)}$$

$$\frac{\sin x - 1}{\sin x + 1} = \frac{\sin x - 1}{\sin x + 1}$$

80) $\dfrac{\sin A}{1-\cos A} - \cot A = \dfrac{\sin A}{(1-\cos A)} - \left(\dfrac{\cos A}{\sin A}\right)$ LCD $= \sin A(1-\cos A)$

$= \left(\dfrac{\sin A}{(1-\cos A)}\right)\left(\dfrac{\sin A}{\sin A}\right) - \left(\dfrac{\cos A}{\sin A}\right)\left(\dfrac{1-\cos A}{1-\cos A}\right) = \dfrac{\sin^2 A - \cos A(1-\cos A)}{\sin A\,(1-\cos A)}$

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

$= \dfrac{1-\cos A}{\sin A(1-\cos A)} = \dfrac{1}{\sin A} = \csc A$

---

82) $\sec v - \tan v = \dfrac{1}{\sec v + \tan v}$

$\dfrac{(\sec v - \tan v)}{1} = \dfrac{1}{(\sec v + \tan v)}$

$(\sec v - \tan v)(\sec v + \tan v) = 1$

$\sec^2 v - \tan^2 v = 1$

$1 = 1$

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

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

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

84) $\dfrac{\tan v \sin v}{\tan v + \sin v} = \dfrac{\tan v - \sin v}{\tan v \sin v}$

$(\tan v \sin v)(\tan v \sin v) = (\tan v - \sin v)(\tan v + \sin v)$

$\tan^2 v \sin^2 v = \tan^2 v - \sin^2 v$

$\left(\dfrac{\sin^2 v}{\cos^2 v}\right)\sin^2 v = \left(\dfrac{\sin^2 v}{\cos^2 v}\right) - \sin^2 v$ LCD $= \cos^2 v$

$\dfrac{\sin^4 v}{\cos^2 v} = \dfrac{\sin^2 v}{\cos^2 v} - \left(\dfrac{\sin^2 v}{1}\right)\left(\dfrac{\cos^2 v}{\cos^2 v}\right)$

$\dfrac{\sin^2 v}{\cos^2 v} - \dfrac{\sin^2 v \cos^2 v}{\cos^2 v}$

$\dfrac{\sin^2 v - \sin^2 v \cos^2 v}{\cos^2 v}$

$\dfrac{\sin^2 v (1 - \cos^2 v)}{\cos^2 v}$

$\dfrac{\sin^2 v (\sin^2 v)}{\cos^2 v}$

$\dfrac{\sin^4 v}{\cos^2 v} = \dfrac{\sin^4 v}{\cos^2 v}$

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86) $\dfrac{1+\sin x}{1-\sin x}$

conjugate of denominator

$$\left(\frac{1+\sin x}{1-\sin x}\right)\left(\frac{1+\sin x}{1+\sin x}\right)$$

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

$$\frac{1+2\sin x+\sin^2 x}{\cos^2 x}$$

$$\frac{1}{\cos^2 x}+\frac{2\sin x}{\cos^2 x}+\frac{\sin^2 x}{\cos^2 x}$$

$$\sec^2 x+2\left(\frac{1}{\cos x}\right)\left(\frac{\sin x}{\cos x}\right)+\tan^2 x$$

$$(\tan x+\sec x)^2$$

$$(\tan x+\sec x)(\tan x+\sec x)$$

$$\tan^2 x+2\sec x\tan x+\sec^2 x$$

$$\sec^2 x+2\sec x\tan x+\tan^2 x$$

$$\sec^2 x+2\sec x\tan x+\tan^2 x=\sec^2 x+2\sec x\tan x+\tan^2 x$$

88) $\dfrac{\sec u - 1}{\sec u + 1}$ $\qquad$ $\dfrac{\tan u - \sin u}{\tan u + \sin u}$

$$\frac{\left(\frac{1}{\cos u} - 1\right)}{\left(\frac{1}{\cos u} + 1\right)} \qquad \frac{\left(\frac{\sin u}{\cos u}\right) - \sin u}{\left(\frac{\sin u}{\cos u}\right) + \sin u}$$

$$\frac{\sin u\left(\frac{1}{\cos u} - 1\right)}{\sin u\left(\frac{1}{\cos u} + 1\right)}$$

$$\frac{\frac{1}{\cos u} - 1}{\frac{1}{\cos u} + 1} = \frac{\frac{1}{\cos u} - 1}{\frac{1}{\cos u} + 1}$$