3.1

~~5~~ ~~9~~ ~~13~~ ~~17~~ ~~21~~ ~~25~~ ~~29~~ ~~30~~ ~~34~~ ~~35~~ 41 46 47 48 49

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

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

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

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

9. $\frac{\cos x}{1-\sin x} = \sec x + \tan x$

$\frac{1+\sin x}{1+\sin x} \cdot \frac{\cos x}{1-\sin x}$

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

$\frac{1+\sin x}{\cos x} \quad \frac{1}{\cos x} + \frac{\sin x}{\cos x} = \sec x + \tan x$

13. $\frac{1+\tan^3 x}{1+\tan x} = 1 - \tan x + \tan^2 x$

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

$1+\tan x$

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

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

$1 + 2\sin x \cos x$

21. $\csc x = \frac{\cot x + \tan x}{\sec x}$

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

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

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

25. $\sec x - \tan x = \frac{1-\sin x}{\cos x}$

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

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

29. $\frac{1}{\sin^2 x} + \frac{1}{\cos^2 x} = \csc^2 x \sec^2 x$

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

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

$\frac{1}{\sin^2 x \cos^2 x} \Rightarrow \csc^2 x \sec^2 x$

30. $\frac{1}{\tan^2 x} - \frac{1}{\cot^2 x} = \csc^2 x - \sec^2 x$

$\cot^2 x - \tan^2 x$

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

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

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

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

$\csc^2 x - \sec^2 x$

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

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

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

$\frac{\csc x + \sec x}{\csc x \sec x} \quad \frac{(\sin x + \cos x)(\sin x - \cos x)}{(\sin x - \cos x)(\sin x - \cos x)}$

$\frac{\frac{1}{\csc x} + \frac{1}{\sec x}}{\sin x - \cos x} \quad \frac{\sin x}{\sin x - \cos x} + \frac{\cos x}{\sin x - \cos x}$

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

$\sin x - \cos x = \csc x - \sec x$

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

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

$\frac{\cos x + \sin x}{\cos x - \sin x}$

$\frac{\cos x}{\sin x \cos x} + \frac{\sin x}{\sin x \cos x} \Rightarrow \frac{\cos x + \sin x}{\sin x \cos x}$

$\frac{\cos x}{\sin x \cos x} - \frac{\sin x}{\sin x \cos x} \quad \frac{\cos x - \sin x}{\sin x \cos x}$

35. $\sin^4 x - \cos^4 x = 2\sin^2 x - 1$ oder $\sin^2 x - \cos^2 x$

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

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

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

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

$\sin^4 x + \sin^2 x \cos^2 x - \sin^4 x - 2\sin^2 x \cos^2 x - \cos^4 x$

$\sin^2 x \cos^2 x - \cos^4 x$

$\sin^4 x - \sin^2 x \cos^2 x + \cos^2 x \sin^2 x - \cos^4 x$

$\frac{1}{4} + \frac{3}{4} = 1$

$\frac{1}{4} - \frac{3}{4} = -\frac{1}{2}$

$\frac{2+4}{2-4}$

$\frac{2}{2-4} = \frac{2}{4}$

$\frac{2}{2-4} = \frac{2}{-2} = -1$