HW #41 p. 317 33-47, 51-55, 63 odds

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

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

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

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

$= \boxed{\sin x}$ $= \frac{\sin^2 x}{\sin x}$

$(\sec x - \tan x)$

35. $\dfrac{\cos x \cot x}{\sec x + \tan x} + \dfrac{\sin x}{\sec x - \tan x} \dfrac{(\sec x + \tan x)}{(\sec x + \tan x)}$

$(\sec x - \tan x)$

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

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

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

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

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

$$= \boxed{\cot x - \cos x + \tan x + \tan x \sin x}$$

37. a. $I = I_0 - \dfrac{I_0}{\csc^2\theta}$

$I = I_0 - I_0 \sin^2\theta$

$I = I_0 (1 - \sin^2\theta)$

$\boxed{I = I_0 \cos^2\theta}$

b. $I = I_0 \cos^2(30)$

$I = I_0 (\cos 30)^2$

$I = I_0 \left(\frac{\sqrt{3}}{2}\right)^2$

$I = I_0 \frac{3}{4}$

$\boxed{\frac{3}{4}}$

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39. $\frac{\csc x}{1-\sin x}\frac{(1+\sin)}{(1+\sin x)} = \frac{\csc x + \sin x \csc x}{1-\sin^2 x}$

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

$= \boxed{\sec^2 x(\csc x + 1)}$

41. $\frac{\cot x}{1+\sin x}\frac{(1-\sin x)}{(1-\sin x)} = \frac{\cot x - \sin x \cot x}{1-\sin^2 x}$

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

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

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

$$\boxed{\begin{aligned} &= \csc x \sec x - \sec x \\ &= \sec x(\csc x - 1) \end{aligned}}$$

43. $\dfrac{2\sin x}{\cot x + \csc x} = \dfrac{2\sin x}{\frac{\cos}{\sin} + \frac{1}{\sin}} = \dfrac{2\sin x}{\frac{\cos + 1}{\sin}}$

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

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

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

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

$$\boxed{= -2\cos x + 2}$$

45. $\dfrac{\cot^2 x \cos x}{\csc x - 1} \dfrac{(\csc x + 1)}{(\csc x + 1)} = \dfrac{\cot^2 \cos(\csc + 1)}{\csc^2 x - 1}$

$$= \frac{\cancel{\cot^2} \cos(\csc + 1)}{\cancel{\cot^2}} = \boxed{\cos x(\csc x + 1)}$$

47. $\dfrac{\sin x \tan x}{\cos x + 1} \dfrac{(\cos x - 1)}{(\cos x - 1)} = \dfrac{\sin x \tan x(\cos - 1)}{\cos^2 - 1}$

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

$$\frac{\frac{\sin}{\cos} \cdot \frac{\cos}{1} - \tan}{-\sin} = -\frac{\sin}{\sin} + \frac{\tan}{\sin} = -1 + \frac{\sin}{\cos} \cdot \frac{1}{\sin}$$

$$\boxed{-1 + \sec x}$$

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51. $\tan x - \csc x \sec x$

sin / sin $\quad \frac{\sin}{\cos} - \frac{1}{\sin} \cdot \frac{1}{\cos x} = \frac{\sin^2 - 1}{\sin\cos}$

$= \frac{-\cos^2 x}{\sin x \cos x} = -\frac{\cos x}{\sin x} = \boxed{-\cot x}$

53. $\csc x \tan^2 x - \sec^2 x \csc x$

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

$\csc x\,(-1) \quad \boxed{= -\csc x}$

equals -1

55. Omit

Jenelle

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

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

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

true!

Chloe

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

cannot do this!

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

$= \csc^2 x - \tan^2 x$

Wrong!