

A39

Sect 9.7

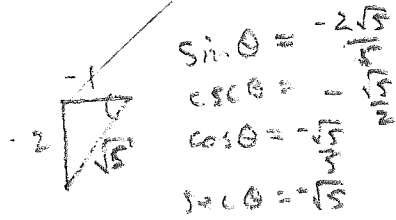
handout 19-63 odd

Key

7. $\sec \phi = -1, \sin \phi = 0$
 $\cos \phi = -1, \csc \phi = \text{undef.}$
 $\tan \phi = 0, \cot \phi = \text{undef.}$

9. $\sin(-x) = -\frac{2}{5}, \tan x = -\frac{2\sqrt{5}}{5}$
 $\sin(x) = \frac{2}{5}, \cot x = \frac{-5}{2\sqrt{5}} = -\frac{\sqrt{5}}{2}$
 $\csc(x) = \frac{5}{2}$
 $\cos(x) = -\frac{3\sqrt{5}}{5}$
 $\sec(x) = -\frac{5}{3\sqrt{5}}$

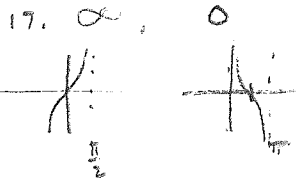
* 11. $\tan \theta = 2, \sin \theta < 0 \Rightarrow \theta \in (3, 4) \Rightarrow \tan \theta = 2$
 $\cot \theta = \frac{1}{2}$



$\sin \theta = -\frac{2}{\sqrt{5}}$
 $\csc \theta = -\frac{\sqrt{5}}{2}$
 $\cos \theta = -\frac{1}{\sqrt{5}}$
 $\sec \theta = -\sqrt{5}$

13. $\sin \theta = -1, \cot \theta = 0$
 $\csc \theta = -1, \tan \theta = \text{undef.}$
 $\cos \theta = 0$
 $\sec \theta = \text{undef.}$

15. 1, 1



17. $\infty, 0$

19. $\sec x \cos x = 1$

19 d

21. $\tan^2 x - \sec^2 x = (1 + \tan^2 x) - (1 + \tan^2 x) = 0$

21 a

23. $\frac{\sin(-x)}{\cos(-x)} = -\frac{\sin(x)}{\cos(x)} = -\tan(x)$

23 e

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

25 b

27. $\sec^4 x - \tan^4 x = (A^2 - B^2) = (\sec^2 x + \tan^2 x)(\sec^2 x - \tan^2 x)$

27 f

29. $\frac{\sec^2 x - 1}{\sin^2 x} = \frac{1}{\cos^2 x} - 1 = \frac{1 - \cos^2 x}{\cos^2 x} = \frac{\sin^2 x}{\cos^2 x} = \tan^2 x$

$-\tan^2 x$

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

29 e

31. $\tan \phi \csc \phi = \frac{\sin \phi}{\cos \phi} \cdot \frac{1}{\sin \phi} = \frac{1}{\cos \phi} = \sec \phi$

33. $\cos \beta \tan \beta = \cos \beta \cdot \frac{\sin \beta}{\cos \beta} = \sin \beta$

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

37. $\sec \alpha \cdot \frac{\sin \alpha}{\tan \alpha} = \frac{1}{\cos \alpha} \cdot \frac{\sin \alpha}{\frac{\sin \alpha}{\cos \alpha}} = \frac{1}{\cos \alpha} \cdot \cos \alpha = 1$

39. $\frac{\sin(-x)}{\cos x} = -\frac{\sin x}{\cos x} = -\tan x$

41. $\cos\left(\frac{\pi}{2} - x\right) \sec x = \sin x \cdot \frac{1}{\cos x} = \tan x$

* 43. $\frac{\cos^2 y}{1 - \sin y} = \frac{1 - \sin^2 y}{(1 - \sin y)(1 + \sin y)} = \frac{(1 - \sin y)(1 + \sin y)}{(1 - \sin y)(1 + \sin y)} = \frac{1 + \sin y}{1 + \sin y} = 1$

$A^2 - B^2 = (A+B)(A-B)$

$$\begin{aligned}
 45. \quad & \frac{\tan^2 x - \tan^2 x \sin^2 x}{\tan^2 x} \\
 & \downarrow \\
 & = \tan^2 x (1 - \sin^2 x) \\
 & = \frac{\sin^2 x}{\cos^2 x} \cdot \frac{\cos^2 x}{1} \\
 & = \sin^2 x
 \end{aligned}$$

$$\begin{aligned}
 49. \quad & \tan^4 x + 2 \tan^2 x + 1 \\
 & \quad \quad \quad \begin{array}{c} 1 \\ \diagdown \quad \diagup \\ 1 \quad \quad 1 \\ \diagup \quad \diagdown \\ 2 \end{array} \\
 & = (\tan^2 x + 1)(\tan^2 x + 1) \\
 & = \sec^4 x
 \end{aligned}$$

$$\begin{aligned}
 53. \quad & (\sin x + \cos x)^2 \\
 & = \sin^2 x + 2 \sin x \cos x + \cos^2 x \\
 & = 1 + 2 \sin x \cos x
 \end{aligned}$$

$$\begin{aligned}
 57. \quad & \frac{1}{1 + \cos x} + \frac{1}{1 - \cos x} \\
 & = \frac{1}{1 + \cos x} \cdot \frac{1 - \cos x}{1 - \cos x} + \frac{1}{1 - \cos x} \cdot \frac{1 + \cos x}{1 + \cos x} \\
 & = \frac{1 - \cos x + 1 + \cos x}{\text{LCD } (1 - \cos^2 x)} \\
 & = \frac{2}{\sin^2 x} \\
 & = 2 \csc^2 x
 \end{aligned}$$

$$\begin{aligned}
 61. \quad & \frac{\sin^2 y}{1 - \cos y} \\
 & = \frac{1 - \cos^2 y}{1 - \cos y} \\
 & = \frac{(1 + \cos y)(1 - \cos y)}{1 - \cos y} \\
 & = 1 + \cos y
 \end{aligned}$$

$$\begin{aligned}
 47. \quad & \frac{\sin^2 x \sec^2 x - \sin^2 x}{\sin^2 x} \\
 & \downarrow \\
 & = \sin^2 x (\sec^2 x - 1) \\
 & = \sin^2 x \tan^2 x
 \end{aligned}$$

$$\begin{aligned}
 51. \quad & \sin^4 x - \cos^4 x \\
 & = (\sin^2 x + \cos^2 x)(\sin^2 x - \cos^2 x) \\
 & = \sin^2 x - \cos^2 x \\
 & \quad \quad \quad \vdots
 \end{aligned}$$

$$\begin{aligned}
 55. \quad & (\sec x + 1)(\sec x - 1) \\
 & = \sec^2 x - 1 \\
 & = \tan^2 x
 \end{aligned}$$

$$\begin{aligned}
 59. \quad & \frac{\cos x}{1 + \sin x} + \frac{1 + \sin x}{\cos x} \\
 & = \frac{\cos x}{1 + \sin x} \cdot \frac{\cos x}{\cos x} + \frac{1 + \sin x}{\cos x} \cdot \frac{1 + \sin x}{1 + \sin x} \\
 & = \frac{\cos^2 x + 1 + 2 \sin x + \sin^2 x}{\text{LCD } \cos x (1 + \sin x)} \\
 & = \frac{2(1 + \sin x)}{\cos x (1 + \sin x)} \\
 & = 2 \sec x
 \end{aligned}$$

$$\begin{aligned}
 63. \quad & \frac{3}{\sec x - \tan x} \cdot \frac{\sec x + \tan x}{\sec x + \tan x} \\
 & = \frac{3(\sec x + \tan x)}{\sec^2 x - \tan^2 x} \\
 & = 3(\sec x + \tan x)
 \end{aligned}$$