

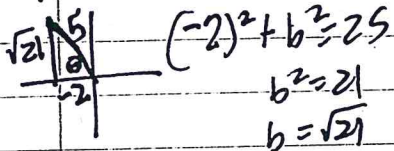
HW# 9 p 353: 1-4, 7-11 odd, 13-18, 19-23, 25, 27, 43, 44,
49-50, 53-56, 71.

1) $\frac{\sin u}{\cos u} = \tan u$ 4) $\sec(\frac{\pi}{2}-u) = \csc u$ Cofunction

2) $\frac{1}{\sin u} = \csc u$ 5) $\sin^2 u + \cos^2 u = 1$

3) $\frac{1}{\tan u} = \cot u$ 6) $\sin(-u) = -\sin(u)$ odd

7) $\sec x = -\frac{5}{2}$ $\tan x < 0$



$\cos x = -\frac{2}{5}$ $\sec x = -\frac{5}{2}$

$\sin x = \frac{\sqrt{21}}{5}$

$\csc x = \frac{5}{\sqrt{21}} = \frac{5\sqrt{21}}{21}$

$\tan x = -\frac{\sqrt{21}}{2}$

$\cot x = -\frac{2}{\sqrt{21}} = -\frac{2\sqrt{21}}{21}$

9) $\sin \theta = -\frac{3}{4}$, $\cos \theta > 0$

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

$\cos^2 \theta = 1 - \frac{9}{16} = \frac{7}{16}$

$\cos \theta = \pm \frac{\sqrt{7}}{4}$ adj positive

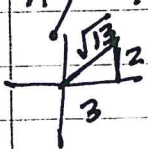
$\sec \theta = \frac{4}{\sqrt{7}} = \frac{4\sqrt{7}}{7}$

$\csc \theta = -\frac{4}{3}$ (rec of $\sin \theta$)

$\tan \theta = -\frac{3}{\sqrt{7}} = -\frac{3\sqrt{7}}{7}$

$\cot \theta = \frac{\sqrt{7}}{-3}$

11) $\tan x = \frac{2}{3}$ $\cos x > 0$



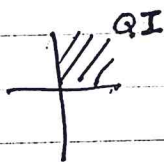
$\cot x = \frac{3}{2}$

$\cos x = \frac{3}{5} = \frac{3\sqrt{13}}{13}$

$\sec x = \frac{5}{3}$

$\sin x = \frac{2}{5} = \frac{2\sqrt{13}}{13}$

$\csc x = \frac{5}{2}$



13) $\sec x \cos x = \frac{1}{\cos x} \cdot \cos x = 1$

14) $\cot^2 x - \csc^2 x$
 $\cot^2 x - (1 + \cot^2 x) = -1$ B

15) $\cos x (1 + \tan^2 x)$
 $\cos x \cdot \sec^2 x$
 $\cos x \cdot \frac{1}{\cos^2 x} = \frac{1}{\cos x} = \sec x$ F

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

17) $\frac{\sec^2 x - 1}{\sin^2 x} = \frac{\tan^2 x \sin^2 x}{\sin^2 x} = \frac{1}{\cos^2 x} = \sec^2 x$ E

18) D

New Method

$\sec x = \frac{1}{\cos x}$

$\cos x = -\frac{2}{5}$ adj hyp

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

$\sin^2 x = 1 - \frac{4}{25} = \frac{21}{25}$

$\sin x = \pm \frac{\sqrt{21}}{5}$ opp hyp $\frac{21}{25}$

but $\tan < 0$ and $\sec < 0$ Q II adj = neg

$\csc = \frac{5}{\sqrt{21}} = \frac{5\sqrt{21}}{21}$

$\tan = \frac{\sqrt{21}}{-2}$ $\cot = \frac{-2}{\sqrt{21}} = -\frac{2\sqrt{21}}{21}$

Examples 1, 2, 3, 4,
5, 6, 7, 8

$$19) \frac{\tan \theta \cot \theta}{\sec \theta} = \frac{1}{\sec \theta} = \cos \theta$$

$$20) \sin x \cdot \frac{1}{\cos x} = \tan x$$

$$21) \frac{\cancel{\tan^2 x} \cdot \sin^2 x \cdot \cancel{\sin^2 x}}{\cancel{\cos^2 x} \cdot \cos^2 x} =$$

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

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

$$22) \frac{\sin^2 x \sec^2 x - \sin^2 x}{\sin^2 x \cdot \tan^2 x} = \frac{\sin^2 x (\sec^2 x - 1)}{\sin^2 x \cdot \tan^2 x}$$

$$23) \frac{\sec^2 x - 1}{\sec x - 1} = \frac{(\sec x + 1)(\sec x - 1)}{\cancel{\sec x - 1}}$$

$$= \sec x + 1$$

$$25) \frac{1 - 2\cos^2 x + \cos^4 x}{(1 - \cos^2 x)^2} = \frac{(\sin^2 x)^2}{(\sin^2 x)^2} = \sin^4 x$$

$$27) \frac{\cot^3 x + \cot^2 x + \cot x + 1}{\csc^2 x (\cot x + 1)} = \frac{\cot^2 x (\cot x + 1) + 1(\cot x + 1)}{(\cot^2 x + 1)(\cot x + 1)}$$

~~29)~~

$$43) \frac{1}{1 + \cos x} + \frac{1}{1 - \cos x}$$

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

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

$$44) \frac{1}{\sec x + 1} - \frac{1}{\sec x - 1}$$

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

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

$$49) \frac{\sin^2 y}{1 - \cos y} \cdot \frac{1 + \cos y}{1 + \cos y}$$

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

$$\frac{\cancel{\sin^2 y} (1 + \cos y)}{\cancel{\sin^2 y}} = 1 + \cos y$$

$$50) \frac{5}{\tan x + \sec x} \cdot \frac{\tan x - \sec x}{\tan x - \sec x}$$

$$\frac{5(\tan x - \sec x)}{\tan^2 x - \sec^2 x} = \frac{5(\tan x - \sec x)}{\tan^2 x - 1 - \tan^2 x}$$

$$= -5(\tan x - \sec x)$$

$$\text{or } 5(\sec x - \tan x)$$

$$53) \sqrt{9-x^2} \quad x=3\cos\theta$$

$$\sqrt{9-(3\cos\theta)^2}$$

$$\sqrt{9-9\cos^2\theta}$$

$$\sqrt{9(1-\cos^2\theta)}$$

$$\sqrt{9(\sin^2\theta)} = 3\sin\theta$$

$$54) \sqrt{49-x^2} \quad x=7\sin\theta$$

$$\sqrt{49-(7\sin\theta)^2}$$

$$\sqrt{49-49\sin^2\theta}$$

$$\sqrt{49(1-\sin^2\theta)}$$

$$\sqrt{49(\cos^2\theta)}$$

$$7\cos\theta$$

$$55) \sqrt{(2\sec\theta)^2-4} = \sqrt{4\sec^2\theta-4}$$

$$= \sqrt{4(\sec^2\theta-1)} = \sqrt{4\tan^2\theta}$$

$$= 2\tan\theta$$

$$56) \sqrt{9(5\sec\theta)^2+25}$$

$$\sqrt{9-25\sec^2\theta+25} \quad 3x=5\sec\theta$$

$$\sqrt{25}$$

$$\sqrt{(3x)^2+25}$$

$$\sqrt{(5\tan\theta)^2+25} = \sqrt{25\tan^2\theta+25}$$

$$= \sqrt{25(\tan^2\theta+1)}$$

$$= \sqrt{25\sec^2\theta} = 5\sec\theta$$

$$71) \frac{\sin\theta}{\cos(-\theta)}$$

$$\cos(-\theta) = \cos\theta$$

even

$$\frac{\sin\theta}{\cos\theta} = \tan\theta$$