

PAGE 359 (OTHER BOOK) ANSWERS

④  $\sin \theta = \frac{3}{5}$       \*  $\csc \theta = \frac{5}{3}$   
 $\cos \theta = \frac{4}{5}$        $\sec \theta = \frac{5}{4}$   
\*  $\tan \theta = \frac{3}{4}$        $\cot \theta = \frac{4}{3}$

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

$$\frac{3/5}{4/5} = \frac{3}{4}$$

$$\frac{3/5}{3/4} = \cos \theta$$

$$\frac{3}{5} \cdot \frac{4}{3} = \frac{4}{5} = \cos \theta$$

⑥ \*  $\sin \phi = \frac{\sqrt{10}}{10}$        $\csc \phi = \sqrt{10}$   
 $\cos \phi = -\frac{3\sqrt{10}}{10}$        $\sec \phi = -\frac{\sqrt{10}}{3}$   
 $\tan \phi = -\frac{1}{3}$       \*  $\cot \phi = -3$

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

$$\frac{\frac{\sqrt{10}}{10}}{-\frac{3\sqrt{10}}{10}} = -\frac{1}{3}$$

$$\frac{\frac{\sqrt{10}}{10}}{-1/3} = \cos \phi$$

$$\frac{\sqrt{10}}{10} \cdot -\frac{3}{1} = -\frac{3\sqrt{10}}{10} = \cos \phi$$

⑧  $\sin x = \frac{3}{5}$        $\csc x = \frac{5}{3}$   
\*  $\cos x = \frac{4}{5}$        $\sec x = \frac{5}{4}$   
 $\tan x = \frac{3}{4}$        $\cot x = \frac{4}{3}$

$$* \cos\left(\frac{\pi}{2} - x\right) = \frac{3}{5} \rightarrow \sin x = \frac{3}{5}$$

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

$$\frac{3/5}{4/5} = \tan x$$

$$\frac{3}{5} \cdot \frac{5}{4} = \frac{3}{4} = \tan x$$

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$$\sin \theta = -\frac{1}{5}$$

$$*\csc \theta = -5$$

$$\cos \theta = -\frac{2\sqrt{6}}{5}$$

$$\sec \theta = -\frac{5\sqrt{6}}{12}$$

$$\tan \theta = \frac{\sqrt{6}}{12}$$

$$\cot \theta = 2\sqrt{6}$$

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

$$\left(-\frac{1}{5}\right)^2 + \cos^2 \theta = 1$$

$$\frac{1}{25} + \cos^2 \theta = 1$$

$$\cos^2 \theta = \frac{24}{25}$$

$$\cos \theta = \frac{\sqrt{24}}{5} = \frac{2\sqrt{6}}{5}$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{-\frac{1}{5}}{-\frac{2\sqrt{6}}{5}} = \frac{-1}{5} \cdot \frac{-5}{2\sqrt{6}}$$

$$= \frac{1}{2\sqrt{6}} = \frac{\sqrt{6}}{12}$$

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$$\sin \theta = 1$$

$$\csc \theta = 1$$

$$\cos \theta = 0$$

$$\sec \theta = \phi$$

$$*\tan \theta = \phi \left(\frac{0}{0}\right)$$

$$\cot \theta = 0$$

15) d

16) a

17) b

18) f

19) e

20) c

21) b

22) c

23) f

24) a

25) e

26) d

$$(27) \cot \theta \sec \theta = \frac{\cos \theta}{\sin \theta} \cdot \frac{1}{\cos \theta} = \frac{1}{\sin \theta} = \boxed{\csc \theta}$$

$$(28) \cos \beta \tan \beta = \frac{\cos \beta}{1} \cdot \frac{\sin \beta}{\cos \beta} = \boxed{\sin \beta}$$

$$(29) \sin \phi (\csc \phi - \sin \phi) = \sin \phi \csc \phi - \sin^2 \phi = \frac{\sin \phi}{1} \cdot \frac{1}{\sin \phi} - \sin^2 \phi \\ = 1 - \sin^2 \phi = \boxed{\cos^2 \phi}$$

$$(30) \sec^2 x (1 - \sin^2 x) = \sec^2 x (\cos^2 x) = \frac{1}{\cos^2 x} \cdot \frac{\cos^2 x}{1} = \boxed{1}$$

$$(31) \frac{\cot x}{\csc x} = \frac{\frac{\cos x}{\sin x}}{\frac{1}{\sin x}} = \frac{\cos x}{\sin x} \cdot \frac{\sin x}{1} = \boxed{\cos x}$$

$$(32) \frac{\csc \theta}{\sec \theta} = \frac{\frac{1}{\sin \theta}}{\frac{1}{\cos \theta}} = \frac{1}{\sin \theta} \cdot \frac{\cos \theta}{1} = \frac{\cos \theta}{\sin \theta} = \boxed{\cot \theta}$$

$$(33) \frac{1 - \sin^2 x}{\csc^2 x - 1} = \frac{\cos^2 x}{\cot^2 x} = \frac{\frac{\cos^2 x}{1}}{\frac{\cos^2 x}{\sin^2 x}} = \frac{\cos^2 x}{1} \cdot \frac{\sin^2 x}{\cos^2 x} = \boxed{\sin^2 x}$$

$$(34) \frac{1}{\tan^2 x + 1} = \frac{1}{\sec^2 x} = \boxed{\cos^2 x}$$

$$(35) \sec \alpha \cdot \frac{\sin \alpha}{\tan \alpha} = \frac{1}{\cos \alpha} \cdot \frac{\frac{\sin \alpha}{1}}{\frac{\sin \alpha}{\cos \alpha}} = \frac{1}{\cos \alpha} \cdot \frac{\sin \alpha}{1} \cdot \frac{\cos \alpha}{\sin \alpha} = \boxed{1}$$

$$(36) \frac{\tan^3 \theta}{\sec^2 \theta} = \frac{\frac{\sin^3 \theta}{\cos^3 \theta}}{\frac{1}{\cos^2 \theta}} = \frac{\sin^3 \theta}{\cos^3 \theta} \cdot \frac{\cos^2 \theta}{1} = \boxed{\sin^2 \theta}$$

$$(37) \cos\left(\frac{\pi}{2} - x\right) \sec x = \sin x \sec x = \sin x \cdot \frac{1}{\cos x} = \boxed{\tan x}$$

$$(38) \cot\left(\frac{\pi}{2} - x\right) \cos x = \tan x \cos x = \frac{\sin x}{\cos x} \cdot \frac{\cos x}{1} = \boxed{\sin x}$$

$$(39) \frac{\cos^2 y}{1 - \sin y} = \frac{1 - \sin^2 y}{1 - \sin y} = \frac{(1 - \sin y)(1 + \sin y)}{1 - \sin y} = \boxed{1 + \sin y}$$

$$(40) \cos t (1 + \tan^2 t) = \cos t (\sec^2 t) = \cos t \cdot \frac{1}{\cos^2 t} = \frac{1}{\cos t} = \boxed{\sec t}$$

$$(41) \sin \beta \tan \beta + \cos \beta = \frac{\sin \beta}{1} \cdot \frac{\sin \beta}{\cos \beta} + \frac{\cos \beta}{1} = \frac{\sin^2 \beta}{\cos \beta} + \frac{\cos \beta}{1} \rightarrow$$

$$= \frac{\sin^2 \beta}{\cos \beta} + \frac{\cos^2 \beta}{\cos \beta} = \frac{\sin^2 \beta + \cos^2 \beta}{\cos \beta} = \frac{1}{\cos \beta} = \boxed{\sec \beta}$$

$$(42) \csc \phi \tan \phi + \sec \phi = \frac{1}{\sin \phi} \cdot \frac{\sin \phi}{\cos \phi} + \frac{1}{\cos \phi} = \frac{1}{\cos \phi} + \frac{1}{\cos \phi} \rightarrow$$

$$= \sec \phi + \sec \phi = \boxed{2 \sec \phi}$$

$$(43) \cot u \sin u + \tan u \cos u = \frac{\cos u}{\sin u} \cdot \frac{\sin u}{1} + \frac{\sin u}{\cos u} \cdot \frac{\cos u}{1} \rightarrow$$

$$= \boxed{\cos u + \sin u}$$

$$(44) \sin \theta \sec \theta + \cos \theta \csc \theta = \frac{\sin \theta}{1} \cdot \frac{1}{\cos \theta} + \frac{\cos \theta}{1} \cdot \frac{1}{\sin \theta} \rightarrow$$

$$= \boxed{\tan \theta + \cot \theta}$$