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*1-31 odd

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1. $\tan \theta = \frac{7}{5}$

3. $\cot \alpha = 5$

5. $\cot x = \frac{\cos x}{\sin x} = \frac{\frac{1}{6}}{\frac{\sqrt{35}}{6}} = \frac{1}{6} \cdot \frac{6}{\sqrt{35}} = \frac{1}{\sqrt{35}} = \frac{\sqrt{35}}{35}$

7. $\sin \alpha = \frac{3}{7}$

$\cot \alpha = \frac{\cos \alpha}{\sin \alpha}$

$\frac{2\sqrt{10}}{3} = \frac{\cos \alpha}{\frac{3}{7}}$

$\frac{3}{7} \cdot \frac{2\sqrt{10}}{3} = \cos \alpha$

$\frac{2\sqrt{10}}{7} = \cos \alpha$

$\sec \alpha = \frac{7}{2\sqrt{10}} = \frac{7\sqrt{10}}{20}$

9. $\tan^2 \theta + 1 = \sec^2 \theta$

$(-5)^2 + 1 = \sec^2 \theta$

$26 = \sec^2 \theta$

$\sqrt{26} = \sec \theta$

$\cos \theta = \frac{1}{\sqrt{26}} = \frac{\sqrt{26}}{26}$

13. $\cot^2 \theta + 1 = \csc^2 \theta$

$\cot^2 \theta + 1 = \left(\frac{8}{3}\right)^2$

$\cot^2 \theta + 1 = \frac{64}{9}$

$\cot^2 \theta = \frac{55}{9}$

$\cot \theta = \frac{\sqrt{55}}{3}$

$\tan \theta = \frac{3}{\sqrt{55}} = \frac{3\sqrt{55}}{55}$

11. $\tan^2 \theta + 1 = \sec^2 \theta$

$\tan^2 \theta + 1 = (4)^2$

$\tan^2 \theta = 15$

$\tan \theta = \sqrt{15}$

$\cos \theta = \frac{1}{4}$

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

$\sqrt{15} = \frac{\sin \theta}{\frac{1}{4}}$

$\frac{\sqrt{15}}{4} = \sin \theta$

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

$\frac{9}{55} + 1 = \sec^2 \theta$

$\frac{64}{55} = \sec^2 \theta$

$\frac{8}{\sqrt{55}} = \sec \theta$

$\frac{8\sqrt{55}}{55} = \sec \theta$

$\cos \theta = \frac{\sqrt{55}}{8}$

$$15. \tan^2 \theta + 1 = \sec^2 \theta$$

$$\tan^2 \theta + 1 = \left(-\frac{9}{2}\right)^2$$

$$\tan^2 \theta + 1 = \frac{81}{4}$$

$$\tan^2 \theta = \frac{77}{4}$$

$$\tan \theta = \frac{\sqrt{77}}{2}$$

$$\cot \theta = \frac{-2}{\sqrt{77}} = \frac{-2\sqrt{77}}{77}$$

$$\cot^2 \theta + 1 = \csc^2 \theta$$

$$\frac{4}{77} + 1 = \csc^2 \theta$$

$$\frac{81}{77} = \csc^2 \theta$$

$$\frac{9}{\sqrt{77}} = \csc \theta$$

$$\sin \theta = \frac{\sqrt{77}}{9}$$

$$17. \sec\left(\theta - \frac{\pi}{2}\right)$$

$$\sec\left[-\left(\frac{\pi}{2} - \theta\right)\right]$$

$$\sec\left(\frac{\pi}{2} - \theta\right)$$

$$\csc \theta = -1.24$$

$$19. \cot\left(\theta - \frac{\pi}{2}\right)$$

$$\cot\left[-\left(\frac{\pi}{2} - \theta\right)\right]$$

$$-\cot\left(\frac{\pi}{2} - \theta\right)$$

$$-\tan \theta$$

$$-(-1.52) = 1.52$$

$$23. \csc x - \cos x \cot x$$

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

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

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

$$21. \tan\left(x - \frac{\pi}{2}\right)$$

$$\tan\left[-\left(\frac{\pi}{2} - x\right)\right]$$

$$-\tan\left(\frac{\pi}{2} - x\right)$$

$$-\cot(x)$$

$$-(1.35) = -1.35$$

25.

$$\frac{\tan x + \sin x \sec x}{\csc x \tan x}$$

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

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

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

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

$$\frac{2 \tan x}{\frac{1}{\cos x}} = 2 \tan x \cdot \cos x$$

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

27.

$$\frac{\csc x \cos x + \cot x}{\sec x \cot x}$$

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

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

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

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

$$2 \cot x \cdot \sin x$$

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

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

$$31. \cot x - \cos^3 x \csc x$$
$$\frac{\cos x}{\sin x} - \cos^3 x \cdot \frac{1}{\sin x}$$

$$\frac{\cos x - \cos^3 x}{\sin x}$$

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

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