Lessons 4-3 thru 4-5 Quiz Practice Answer Key

1 $\frac{\tan x + \tan 3\pi}{1 - \tan y(\tan 3x)} = \tan x$ ✓

$\frac{\tan x + 0}{1 - \tan x(0)} =$

$\frac{\tan x}{1} =$

$\tan x$ ✓

2. $\cos\left(\frac{\pi}{2} - x\right) = \sin x$ ✓

$\cos\frac{\pi}{2}\cos x + \sin\frac{\pi}{2}\sin x =$

$0 \cdot \cos x + 1 \cdot \sin x =$

$\sin x =$ ✓

3. $\frac{\sin 2\alpha}{\sin\alpha} - \frac{\cos 2\alpha}{\cos\alpha} = \sec\alpha$ ✓

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

$2\cos\alpha - \frac{2\cos^2\alpha}{\cos\alpha} + \frac{1}{\cos\alpha} =$

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

$\frac{1}{\cos\alpha} =$

$\sec\alpha =$ ✓

4. $2\cos 2x = 4\cos^2 x - 2$ ✓

$2(2\cos^2 x - 1) =$

$4\cos^2 x - 2 =$ ✓

5. $\cos(150° + 45°) =$

$\cos 150°\cos 45° - \sin 150°\sin 45° =$

$-\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} - \frac{1}{2} \cdot \frac{\sqrt{2}}{2} =$

$-\frac{\sqrt{6} - \sqrt{2}}{4}$

6. $\tan(30° + 45°) =$

$\frac{\tan 30° + \tan 45°}{1 - (\tan 30°)(\tan 45°)} =$

$\frac{\sqrt{3}\left(\frac{1}{\sqrt{3}} + 1\right)}{\sqrt{3}\left(1 - \frac{1}{\sqrt{3}} \cdot 1\right)} = \frac{1 + \sqrt{3}}{\sqrt{3} - 1}$

7. $\sin\left(\frac{9\pi}{12} + \frac{8\pi}{12}\right) =$

$\sin\left(\frac{3\pi}{4}\right)\cos\left(\frac{2\pi}{3}\right) + \cos\left(\frac{3\pi}{4}\right)\sin\left(\frac{2\pi}{3}\right) =$

$\frac{\sqrt{2}}{2} \cdot \frac{-1}{2} + -\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} =$

$-\frac{\sqrt{2} - \sqrt{6}}{4}$

8. $\sin(42 - 12) = \sin(30°) = \frac{1}{2}$

9. $\cos(45° - 60°) = \cos(-45°) = \frac{\sqrt{2}}{2}$

10. $\sin\left(\frac{\pi}{12} + \frac{3\pi}{12}\right) = \sin\left(\frac{\pi}{3}\right) = \frac{\sqrt{3}}{2}$

11. $\cos\left(\frac{\pi}{16} - \frac{3\pi}{16}\right) = \cos\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$

12. $\tan(26+110) = \tan(135^\circ) = -1$

13. $\tan\left(\frac{15\pi}{12} - \frac{\pi}{12}\right) = \tan\left(\frac{14\pi}{12}\right) = \tan\frac{7\pi}{6} = \frac{1}{\sqrt{3}}$

14. $\cos(2 \cdot 15^\circ) = \cos(30^\circ) = \frac{\sqrt{3}}{2}$

15. $(2\sin x + 1)(\sin x - 1) = 0$

$\sin x = -\frac{1}{2}$ $\quad \sin x = 1$

$x = \frac{2\pi}{6}, \frac{11\pi}{6}$ $\quad x = \frac{\pi}{2}$

16. $2\cos(2x+30^\circ) = 1$

$u = 2x + 30^\circ$

$2\cos u = 1$

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

$u = 60^\circ$ $\quad u = 300^\circ$

$2x+30 = 60^\circ + 360n$ $\quad 2x+30 = 300^\circ + 360n$

$\frac{2x}{2} = \frac{30^\circ}{2} + \frac{360n}{2}$ $\quad \frac{2x}{2} = \frac{270^\circ}{2} + \frac{360n}{2}$

$x = 15^\circ + 180^\circ n$ $\quad x = 135^\circ + 180n$

$x = 15^\circ, 195^\circ$ $\quad x = 135^\circ, 315^\circ$

17. $\sqrt{3}\tan 3x = 1$

$\tan u = \frac{1}{\sqrt{3}}$

$u = 30^\circ, 150^\circ$

$\frac{3x}{3} = \frac{30^\circ}{3} + \frac{180^\circ n}{3}$ $\quad \frac{3x}{3} = \frac{210^\circ}{3} + \frac{180^\circ n}{3}$

$x = 10^\circ + 60^\circ n$ $\quad x = 70^\circ + 60^\circ n$

same

$x = 10^\circ, 70^\circ, 130^\circ, 190^\circ, 250^\circ, 310^\circ$

18. $2\cos x = -\sin 2x$

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

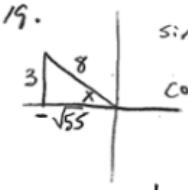
$2\cos x - 2\sin x \cos x = 0$

$2\cos x(1 - \sin x) = 0$

$2\cos x = 0$ $\quad \sin x = 1$

$x = \frac{\pi}{2}, \frac{3\pi}{2}$

19.



$\sin 2x = 2\left(\frac{3}{8}\right)\left(\frac{-\sqrt{55}}{8}\right) = \frac{-3\sqrt{55}}{32}$

$\cos 2x = 2\left(\frac{-\sqrt{55}}{8}\right)^2 - 1 =$

$= 2 \cdot \frac{55}{64} - 1 = \frac{23}{32}$

$\tan 2x = \frac{-3\sqrt{55}}{23}$

Quadrant IV

$(+, -)$

20. $\cos 3x = \cos(2x + x) =$

$= (\cos 2x)(\cos x) - (\sin 2x)(\sin x)$

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

$= 2\cos^3 x - \cos x - 2\sin^2 x \cos x$

$= 2\cos^3 x - \cos x - 2(1 - \cos^2 x)(\cos x)$

$= 2\cos^3 x - \cos x - 2(\cos x - \cos^3 x)$

$= 2\cos^3 x - \cos x - 2\cos x + 2\cos^3 x$

$= 4\cos^3 x - 3\cos x$