5.1-5.3 Quiz Review – Check Yo' Skills/Review

Write the expression as the sine, cosine, or tangent of an angle.

1. $2\sin 100^\circ \cos 100^\circ$

sin 200

2. $\dfrac{\tan 40^\circ - \tan 5^\circ}{1+\tan 40^\circ \tan 5^\circ}$

tan 35

Simplify the expression to a single term.

3. $(1-2\sin^2\beta)^2 + 4\sin^2\beta\cos^2\beta$

$\cos^2 2\beta + 2\sin^2 2\beta$

4. $\dfrac{\tan x}{\csc^2 x} + \dfrac{\tan x}{\sec^2 x}$

$\tan x \sin^2 x + \tan x \cos^2 x$

$\tan x(\sin^2 x + \cos^2 x)$

$\tan x$

Prove the identity.

5. $\tan^2 x - \sin^2 x = \sin^2 x \tan^2 x$

$\dfrac{\sin^2 x}{\cos^2 x} - \sin^2 x$

$\dfrac{\sin^2 x - \sin^2 x\cos^2 x}{\cos^2 x}$

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

$\sin^2 x(\sin^2 x)\cdot\sec^2 x$

$\sin^2 x \tan^2 x$

6. $2\sin\alpha\cos^3\alpha + 2\sin^3\alpha\cos\alpha = \sin 2\alpha$

$2\sin a\cos a(\cos^2 a + \sin^2 a)$

$2\sin a\cos a \cdot 1$

$\sin 2a$

7. $\tan\left(u+\dfrac{3\pi}{4}\right) = \dfrac{\tan u - 1}{1+\tan u}$

8. $\dfrac{\cos x}{1+\sin x} = \dfrac{1-\sin x}{\cos x}$

$\dfrac{\cos x(1-\sin x)}{1+\sin x(1-\sin x)}$

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

$1-\sin x/\cos x$

Find the exact value of each expression using a sum or difference identity.

9. $\tan(-15^\circ) = \dfrac{\sin(30-45)}{\cos(30-45)}$

$\sin 30\cos 45 - \cos 30\sin 45$

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

$\dfrac{1-\sqrt{3}}{1+\sqrt{3}}$

$\cos 30\cos 45 + \sin 30\sin 45$

$\frac{\sqrt{3}}{2}\ \frac{1}{2}\qquad \frac{1}{2}\ \frac{1}{\sqrt{2}}$

10. $\sin\left(\dfrac{7\pi}{12}\right) = \sin\left(\frac{3\pi}{12}+\frac{4\pi}{12}\right) = \sin\left(\frac{\pi}{4}+\frac{\pi}{3}\right)$

$\sin\frac{\pi}{4}\cos\frac{\pi}{3} + \cos\frac{\pi}{4}\sin\frac{\pi}{3}$

$\frac{1}{\sqrt{2}}\ \frac{1}{2}\qquad \frac{1}{\sqrt{2}}\ \frac{\sqrt{3}}{2}$

$\dfrac{1+\sqrt{3}}{2\sqrt{2}}$

Find all solutions in the interval $[0,2\pi)$ without using a calculator. Give exact answers.

11. $2\cos x = 1$

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

$x = \frac{\pi}{3}, \frac{5\pi}{3}$

$x = \frac{\pi}{3} + \underline{2k\pi}, \frac{5\pi}{3} + 2k\pi$

12. $\sin^2 x - 2\sin x - 3 = 0$

$(\sin x - 3)(\sin x + 1) = 0$

$\sin x = 3$ none

$\sin x = -1$

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

$x = \frac{3\pi}{2} + 2k\pi$

13. $\sin x \tan^2 x = \sin x$

$\sin x(\tan^2 x - 1) = 0$

$\sin x = 0 \quad \tan x = \pm 1$

$x = 0, \pi \quad x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

$x = k\pi, \frac{\pi}{4} + \frac{k\pi}{2}$

Verify the identity.

14. $\cos\Theta + \sin\Theta\tan\Theta = \sec\Theta$

$\cos\theta + \frac{\sin\theta \sin\theta}{\cos\theta}$

$\frac{\cos^2\theta + \sin^2\theta}{\cos\theta}$

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

$\sec\theta$

15. $\frac{\tan\alpha}{\sec\alpha - 1} = \frac{\sec\alpha + 1}{\tan\alpha}$

$\frac{\tan a(\sec a + 1)}{(\sec a - 1)(\sec a + 1)}$

$\frac{\tan a(\sec a + 1)}{\tan^2 a}$

$\frac{\sec a + 1}{\tan a}$

16. $\sin(360° - x) = -\sin x$

$\sin 360 \cos x - \cos 360 \sin x$

$0 \cdot \cos x \quad 1 \cdot \sin x$

$-\sin x = -\sin x$

17. $\frac{\csc^2\Theta - 1}{\csc^2\Theta} = \cos^2\Theta$

$\frac{\csc^2\theta}{\csc^2\theta} - \frac{1}{\csc^2\theta}$

$1 - \sin^2\theta$

$\cos^2\theta$

or

$\frac{\cot^2\theta}{\csc^2\theta}$

$\cot^2\theta \sin^2\theta$

$\frac{\cos^2\theta}{\sin^2\theta} \cdot \sin^2\theta$

$\cos^2\theta$

18. $\frac{1}{1-\cos x} + \frac{1}{1+\cos x} = 2\csc^2 x$

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

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

$2\csc^2 x$

19. $(\cot^2\Theta + 1)(\sin^2\Theta - 1) = -\cot^2\Theta$

$\csc^2\theta(-\cos^2\theta)$

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

$-\cot^2\theta$