Precalculus – Exam 5 Review

Use identities to simplify each expression:

1. $\dfrac{\tan x \csc x}{\sec x}$

2. $\tan^2 x - \dfrac{\sin(-x)}{\sin x}$

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

4. $\dfrac{1}{1+\sin\alpha} + \dfrac{\sin\alpha}{\cos^2\alpha}$

5. $\dfrac{2\tan(2\theta)}{1-\tan^2 2\theta}$

6. $\sin\theta\cos\theta(\tan\theta + \cot\theta)$

7. $\sin^2 x \tan^2 x + \sin^2 x$

8. $\cos 75° \cos 60° + \sin(-75°)\sin 60°$

9. $\sin 80° \cos(-50°) - \sin 10° \sin 50°$

10. $\dfrac{\sin(4y)}{1+\cos(4y)}$

Verify each identity:

11. $\dfrac{\sin x \cos x}{\tan x} = 1 - \sin^2 x$

12. $\cot(-y) = \dfrac{1 - \sin^2 y}{\cos(-y)\sin(-y)}$

13. $\dfrac{\sin 2\beta}{2\csc \beta} = \sin^2 \beta \cos \beta$

14. $\dfrac{1}{\sec \theta - 1} - \dfrac{1}{\sec \theta + 1} = 2\cot^2 \theta$

15. $\cos(3x) = \cos x\left(1 - 4\sin^2 x\right)$

16. $\sin^2\left(\dfrac{x}{2}\right) = \dfrac{\csc^2 x - \cot^2 x}{2\csc^2 x + 2\csc x \cot x}$

17. $\dfrac{\sin(2\alpha)}{1 + \cos(2\alpha)} = \tan(\alpha)$

18. $\sec(2\theta) = \dfrac{1 + \tan^2 \theta}{1 - \tan^2 \theta}$

Find the exact value by using a sum or difference identity:

19. $\cos\left(\dfrac{7\pi}{12}\right)$

20. $\sin\left(-\dfrac{5\pi}{12}\right)$

21. $\tan 195°$

Find the exact value by using a half-angle identity.

22. $\sin\left(-\dfrac{\pi}{8}\right)$

23. $\cos 75°$

24. $\tan\left(\dfrac{5\pi}{8}\right)$

Use the given information to find the exact value of the trigonometric function(s).

25. Find $\sin(A+B)$ if $\sin A = -5/13$ and $\cos B = 3/5$, with A in quadrant III and B in quadrant I.

Use the given information to find the exact value of the trigonometric function(s).

26. Find $\cos(\alpha+\beta)$ if $\sin\alpha=15/17$ and $\sin\beta=-1/3$, with α in quadrant II and β in quadrant IV.

27. Find $\cos\alpha/2$ if $\sin\alpha=-1/4$, and α is in quadrant IV.

28. Find $\sin 2\theta$ if $\cos\theta=-12/13$, and θ is in quadrant II.

29. Find $\sin\beta$, $\cos\beta$, and $\tan\beta$ if $\cos(2\beta)=24/25$ and $180°<2\beta<360°$.

30. Find $\sin\alpha$, $\cos\alpha$, and $\tan\alpha$ if $\sin(\alpha/2)=-2/7$ and $\pi<\alpha/2<5\pi/4$.