

Show all work on your own paper.

Simplify to a trig function of a single angle and find exact values in simplest form.

1. $\cos^2 90^\circ - \sin^2 90^\circ$

2. $2 \sin 22.5^\circ \cos 22.5^\circ$

3. $1 - 2 \sin^2 \frac{\pi}{3}$

4. $\csc^2 120^\circ - 1$

5. $\sin 60^\circ \cos 90^\circ + \cos 90^\circ \sin 60^\circ$

6. $\cos \frac{\pi}{6} \cos \frac{\pi}{3} - \sin \frac{\pi}{6} \sin \frac{\pi}{3}$

7.
$$\frac{\tan \frac{7\pi}{6} + \tan \frac{\pi}{6}}{1 - \tan \frac{7\pi}{6} \tan \frac{\pi}{6}}$$

8. $\frac{1 - \cos 660^\circ}{\sin 660^\circ}$

9. $\frac{2 \tan 60^\circ}{1 - \tan^2 60^\circ}$

10. $-\sqrt{\frac{1 - \cos 600^\circ}{2}}$

Use a sum or difference identity and find the exact simplified value.

11. $\cos 375^\circ$

12. $\sin 285^\circ$

Use an identity and find the exact simplified value.

13. $\cos 112.5^\circ$

14. $\tan 157.5^\circ$

15. $\tan 75^\circ$

Given: $\tan x = \frac{-4}{3}$, where $\frac{3\pi}{2} < x < 2\pi$ and $\sin y = \frac{15}{17}$, where $\frac{\pi}{2} \leq y \leq \pi$.

Find exact simplified values for:

16. $\cos 2x$

17. $\sin 4x$

18. $\sin(x - y)$

19. $\cos(x + y)$

20. $\tan(y - x)$

21. $\tan 2x$

22. $\tan \frac{y}{2}$

23. $\cos \frac{y}{2}$

Simplify to a single trig function.

24. $(\sec x - \tan x)(\csc x + 1)$

25. $\frac{1}{1 + \sin x} + \frac{1}{1 - \sin x}$

Solve for x , if $0 \leq x < 2\pi$.

26. $\cos\left(x + \frac{\pi}{4}\right) - \cos\left(x - \frac{\pi}{4}\right) = 1$

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

Prove each identity.

28. $\frac{\sec x - 1}{\sin^2 x} \equiv \frac{\sec^2 x}{1 + \sec x}$

29. $\cot x + \tan x \equiv 2 \csc 2x$

30. $\cos 3x \equiv 4 \cos^3 x - 3 \cos x$

Answers:

1. $\cos 180^\circ; -1$

2. $\sin 45^\circ; \frac{\sqrt{2}}{2}$

3. $\cos 120^\circ; \frac{-1}{2}$

4. $\cot^2 120^\circ; \frac{1}{3}$

5. $\sin 150^\circ; \frac{1}{2}$

6. $\cos \frac{\pi}{2}; 0$

7. $\tan 240^\circ; \sqrt{3}$

8. $\tan 330^\circ; \frac{-\sqrt{3}}{3}$

9. $\tan 120^\circ; -\sqrt{3}$

10. $\sin 300^\circ; \frac{-\sqrt{3}}{2}$

11. $\frac{\sqrt{2} + \sqrt{6}}{4}$

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

13. $\frac{-\sqrt{2} - \sqrt{2}}{2}$

14. $-\sqrt{2} + 1$

15. $2 + \sqrt{3}$

16. $\frac{-7}{25}$

17. $\frac{336}{625}$

18. $\frac{-13}{85}$

19. $\frac{36}{85}$

20. $\frac{-13}{84}$

21. $\frac{24}{7}$

22. $\frac{5}{3}$

23. $\frac{3\sqrt{34}}{34}$

24. $\cot x$

25. $2\sec^2 x$

26. $\frac{5\pi}{4}, \frac{7\pi}{4}$

27. $\frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$