

120. Exact Values for sin, cos, and tan

Practice Questions

1. What are the exact values of sin, cos, and tan for 30° ?
2. What are the exact values of sin, cos, and tan for 45° ?
3. What are the exact values of sin, cos, and tan for 60° ?
4. Express $\sin 30^\circ$ as a fraction.
5. Express $\cos 45^\circ$ as a fraction.
6. Express $\tan 60^\circ$ as a fraction.
7. Simplify $\sin^2 30^\circ + \cos^2 30^\circ$.
8. Express $\sin 60^\circ \times \cos 30^\circ$ as a fraction.
9. If $\sin x = \frac{1}{2}$, what is x in degrees?
10. If $\cos x = \frac{\sqrt{3}}{2}$, what is x in degrees?

Scenario Questions

1. A bridge is designed with a 30° incline. The engineer wants to check that $\sin 30^\circ = \frac{1}{2}$ before calculating forces. Verify this.
2. A carpenter cuts a 45° angle on a piece of wood and needs to know $\cos 45^\circ$ for a precise fit. Find it.
3. A climbing wall is built at a 60° angle. The designer needs to know $\tan 60^\circ$ to calculate the length needed. Find it.
4. A surveyor measures an angle of 30° from a fixed point. They use $\cos 30^\circ$ to find the distance. Express it as a fraction.
5. A builder checks if $\sin^2 45^\circ + \cos^2 45^\circ = 1$ before proceeding with calculations. Confirm this identity.
6. A footballer kicks a ball at 45° , and they want to compare $\sin 45^\circ$ and $\cos 45^\circ$. What do they notice?
7. A scientist calculates the angle of light refraction and gets $\sin x = \frac{1}{2}$. What angle does this correspond to?
8. A technician uses $\tan 60^\circ$ while adjusting a satellite dish. Express this as a fraction.
9. A roof is designed with an angle of 30° , and an architect checks $\cos 30^\circ$ in their calculations. Express this as a fraction.
10. A trigonometry student wants to prove that $\sin^2 60^\circ + \cos^2 60^\circ = 1$. Verify it.

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Practice Questions

1. $\sin(30^\circ) = \frac{1}{2}$, $\cos(30^\circ) = \frac{\sqrt{3}}{2}$, $\tan(30^\circ) = \frac{1}{\sqrt{3}}$
2. $\sin(45^\circ) = \frac{\sqrt{2}}{2}$, $\cos(45^\circ) = \frac{\sqrt{2}}{2}$, $\tan(45^\circ) = 1$
3. $\sin(60^\circ) = \frac{\sqrt{3}}{2}$, $\cos(60^\circ) = \frac{1}{2}$, $\tan(60^\circ) = \sqrt{3}$
4. $\sin(30^\circ) = \frac{1}{2}$
5. $\cos(45^\circ) = \frac{\sqrt{2}}{2}$
6. $\tan(60^\circ) = \sqrt{3}$
7. $\sin^2(30^\circ) + \cos^2(30^\circ) = 1$
8. $\sin(60^\circ) \times \cos(30^\circ) = \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} = \frac{3}{4}$
9. $x = 30^\circ$
10. $x = 30^\circ$

Scenario Questions

1. Verified: $\sin(30^\circ) = \frac{1}{2}$
2. $\cos(45^\circ) = \frac{\sqrt{2}}{2}$
3. $\tan(60^\circ) = \sqrt{3}$
4. $\cos(30^\circ) = \frac{\sqrt{3}}{2}$
5. Confirmed: $\sin^2(45^\circ) + \cos^2(45^\circ) = 1$
6. $\sin(45^\circ) = \cos(45^\circ) = \frac{\sqrt{2}}{2}$
7. $x = 30^\circ$
8. $\tan(60^\circ) = \sqrt{3}$
9. $\cos(30^\circ) = \frac{\sqrt{3}}{2}$
10. Verified: $\sin^2(60^\circ) + \cos^2(60^\circ) = 1$

Answers