

Name _____ Score _____ Teacher _____ Date _____

Advanced Trigonometric Identities

Name the decisive identity, preserve the original domain, and use the stated quadrant when choosing a half-angle sign.

1. Verify the identity $\sin(5x) + \sin(x) = 2\sin(3x)\cos(2x)$. Let E denote the entire requested expression; also simplify $E + \sin^2(t) + \cos^2(t) - 1$. After verifying the equality, report 9 times its common value.

Assumptions: Work only where the original expression is defined. No additional denominator restriction is introduced by this identity.

2. Verify the identity $\tan(x + \pi/6) = [\tan(x) + \tan(\pi/6)]/[1 - \tan(x)\tan(\pi/6)]$. Let E denote the entire requested expression; also simplify $E + \sin^2(t) + \cos^2(t) - 1$. After verifying the equality, report 5 times its common value.

Assumptions: Work only where the original expression is defined. Every cosine denominator in the original expression must be nonzero. $1 - \tan(x)\tan(\pi/6) \neq 0$.

Math Sheet

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Advanced Trigonometric Identities

Name the decisive identity, preserve the original domain, and use the stated quadrant when choosing a half-angle sign.

3. At $x=15$ degrees, rewrite $\cos(3x)\cos(x)$ with a product-to-sum identity and find its exact value. Let E denote the entire requested expression; also simplify $E + \sin^2(t) + \cos^2(t) - 1$. Multiply your final exact value by 8.

Assumptions: Work only where the original expression is defined. No additional denominator restriction is introduced by this identity.

4. Verify the identity $\sin(3x)\cos(x) = [\sin(4x)+\sin(2x)]/2$. Let E denote the entire requested expression; also simplify $E + \sin^2(t) + \cos^2(t) - 1$. After verifying the equality, report 11 times its common value.

Assumptions: Work only where the original expression is defined. No additional denominator restriction is introduced by this identity.

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Name the decisive identity, preserve the original domain, and use the stated quadrant when choosing a half-angle sign.

5. Simplify $[\tan(3x)\cos(3x)][\tan(x)\cos(x)]$ using the named product to sum identity. Let E denote the entire requested expression; also simplify $E + \sin^2(t) + \cos^2(t) - 1$. Multiply your final simplified expression by 3.

Assumptions: Work only where the original expression is defined. Every cosine denominator in the original expression must be nonzero.

6. Verify the identity $\sin(x/2) = +\sqrt{[1-\cos(x)]/2}$. Assume $x/2$ lies in Quadrant II. Let E denote the entire requested expression; also simplify $E + \sin^2(t) + \cos^2(t) - 1$. After verifying the equality, report 1 times its common value.

Assumptions: Work only where the original expression is defined. The sign is determined by the stated quadrant of $x/2$.

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Advanced Trigonometric Identities

Name the decisive identity, preserve the original domain, and use the stated quadrant when choosing a half-angle sign.

7. At $x=15$ degrees, rewrite $\sin(5x)+\sin(x)$ with a sum-to-product identity and find its exact value. Let E denote the entire requested expression; also simplify $E + \sin^2(t) + \cos^2(t) - 1$. Multiply your final exact value by 6.

Assumptions: Work only where the original expression is defined. No additional denominator restriction is introduced by this identity.

8. Verify the identity $\cos(x + \pi/6) = \cos(x)\cos(\pi/6) - \sin(x)\sin(\pi/6)$. Let E denote the entire requested expression; also simplify $E + \sin^2(t) + \cos^2(t) - 1$. After verifying the equality, report 10 times its common value.

Assumptions: Work only where the original expression is defined. No additional denominator restriction is introduced by this identity.
