Practice Problems for Math Success

Trignometric Identities and Equations

This problem set focuses on trigonometric identities and equations. Show all your work and provide clear explanations where necessary. You may use a calculator for basic arithmetic, but you should know the unit circle and be able to find exact values of trigonometric functions. Try to complete the problems without relying on external resources first, then check your answers or seek help if needed.

1. A student was asked to simplify the expression $\dfrac{\sec(x) - \cos(x)}{\tan(x)}$. Their answer was $\sin(x)$. Is the student correct? Justify your answer.

2. Verify the identity: $\cos^2(x) - \sin^2(x) = 1 - 2\sin^2(x)$

3. Use the sum or difference identity to find the exact value of $\cos(75°)$.

4. Express $\sin(3x) + \sin(x)$ as a product.

5. Express $\cos(2x)\cos(x)$ as a sum.

6. Find the exact value of $\sin(15^\circ)$ using a half-angle formula.

7. Verify the identity: $\frac{1-\cos(2x)}{\sin(2x)} = \tan(x)$

8. Solve the equation $2\sin(x) - \sqrt{3} = 0$ for x in the interval $[0, 2\pi)$.

9. Solve the equation $\sin(2x) = \cos(x)$ for x in the interval $[0, 2\pi)$.

10. Solve the equation $2\cos^2(x) + \cos(x) - 1 = 0$ for x in the interval $[0, 2\pi)$.

11. Solve the equation $\tan^2(x) - 1 = 0$ for x in the interval $[0, 2\pi)$.