Must be set = to zero

Dynamics of Trigonometry – Solving Trigonometric Equations by Factoring

Name: Key Date: _____ Block: _____

Solve the following equations for the variable.

1. $\cos x \tan x = \cos x$

$-\cos x \quad -\cos x$

$\cos x \tan x - \cos x = 0$

$\cos x(\tan x - 1) = 0$

$\cos x = 0$ → $x = 90°, 270°$

$\tan x - 1 = 0$

$\tan x = 1$ → $x = 45°, 225°$

2. $\sin^2 x = \sin x$

$-\sin x \quad -\sin x$

$\sin^2 x - \sin x = 0$

$\sin x(\sin x - 1) = 0$

$\sin x = 0$ → $x = 0°, 180°$

$\sin x - 1 = 0$

$\sin x = 1$ → $x = 90°$

3. $2\cos^2 x = \cos x$

$2\cos^2 x - \cos x = 0$

$\cos x(2\cos x - 1) = 0$

$\cos x = 0$ → $x = 90°, 180°$

$2\cos x - 1 = 0$

$\cos x = \frac{1}{2}$ → $x = 60°, 300°$

4. $\sec x \sin x = 2\sin x$

$\sec x \sin x - 2\sin x = 0$

$\sin x(\sec x - 2) = 0$

$\sin x = 0$ → $x = 0°, 180°$

$\sec x - 2 = 0$

$\sec x = 2$ → $x = 60°, 300°$

5. $\tan^2 x = \tan x$

$\tan^2 x - \tan x = 0$

$\tan x(\tan x - 1) = 0$

$\tan x = 0$ → $x = 0°, 180°$

$\tan x - 1 = 0$

$\tan x = 1$ → $x = 45°, 225°$

6. $\tan^2 x = \sqrt{3}\tan x$

$\tan^2 x - \sqrt{3}\tan x = 0$

$\tan x(\tan x - \sqrt{3}) = 0$

$\tan x = 0$ → $x = 0°, 180°$

$\tan x - \sqrt{3} = 0$

$\tan x = \sqrt{3}$ → $x = 60°, 240°$

7. $\sin^2 x + 2\sin x + 1 = 0$

$(\sin x + 1)(\sin x + 1) = 0$

$\sin x + 1 = 0$

$\sin x = -1$

$x = 270°$

8. $\cos^2 x - 2\cos x + 1 = 0$

$(\cos x - 1)(\cos x - 1) = 0$

$\cos x - 1 = 0$

$\cos x = 1$

$x = 0°$

9. $\cot^2 x - \cot^2 x \cos^2 x = 0$

$\cot^2 x(1 - \cos^2 x) = 0$

$\cot^2 x = 0$ → $x = 90°, 270°$

$1 - \cos^2 x = 0$

$-\cos^2 x = -1$

$\cos^2 x = 1$

$\cos x = \pm\sqrt{1}$ → $x = 0°, 180°$

10. $\frac{\cos^2 x - 4}{\cos x - 2} = 1$

$\frac{(\cos x - 2)(\cos x + 2)}{(\cos x - 2)} = 1$

$\cos x + 2 = 1$

$\cos x + 1 = 0$ → $\cos x = -1$

$x = 180°$

11. $\tan^4 x + 2\tan^2 x + 1 = 0$

$(\tan^2 x + 1)(\tan^2 x + 1)$

$\tan^2 x + 1 = 0$

$\tan^2 x = -1$

$\tan x = \sqrt{-1}$ → No solution

12. $1 - 2\sin^2 x + \sin^4 x = 0$

$(1 - \sin^2 x)(1 - \sin^2 x) = 0$

$1 - \sin^2 x = 0$

$-\sin^2 x = -1$

$\sin^2 x = 1$

$\sin x = \pm\sqrt{1}$

$\sin x = \pm 1$

$x = 90°, 270°$