SM 3H

8.6 Solving Equations of Multiple Trig. Functions

2023-2024

SCORE: /

Name _____ Date _____ Period _____

Find <u>all</u> <u>real</u> <u>numbers</u> that satisfy the equation. Write answers in terms of π.

1. $\cos\left(\frac{x}{2}\right)=\frac{1}{2}$

2. $\cos(3x)=1$

3. $\tan(4x)=0$

4. $2\sin(2x)=-\sqrt{2}$

Find all values of α in [0°, 360°) that satisfy each equation.

5. $2\sin(2x)+\sqrt{3}=0$

6. $2\cos(2x)+1=0$

7. $\sqrt{2}\cos(2x)-1=0$

8. $2\sin(2x)-1=0$

Find all real numbers in the interval [0, 2π) that satisfy each equation.

9. $2\cos(2x)-1=0$

10. $\tan(3x)-1=0$

11. $\sqrt{3}\tan\left(\frac{x}{2}\right)-1=0$

12. $\sqrt{2}\sin\left(\frac{x}{3}\right)-1=0$

13. $\sin 2x = 2\sin x$

14. $\cos 2x = \sin x$

15. $\cos 2x + \cos x = 0$

16. The vertical position of a floating ball in an experimental wave tank is given by the equation $x = 2\sin\left(\frac{\pi}{3}t\right)$, where x is the number of feet above sea level and t is the time in seconds. For what values of t is the ball $\sqrt{3}$ ft above sea level?

Find all real numbers on the interval [0, 2π) that satisfy each equation. Round approximate answers to the nearest tenth.

17. $3\sin^2 x = \sin x$

18. $2\cos^2 x + 3\cos x = -1$

19. $5\sin^2 x - \sin x = \cos^2 x$

20. $\cos(x) + \cos(-x) = 1$

Find all values of θ in the interval of [0°, 360°) that satisfy each equation. Round approximate answers to the nearest tenth of a degree.

21. $2\sin\theta = \cos\theta$ Remember: you cannot divide by a variable.

22. $9\sin^2\theta + 12\sin\theta + 4 = 0$

23. $12\cos^2\theta + \cos\theta - 6 = 0$

24. $2\sin^2 x + \sin x = 1$

Find all real numbers on the interval [0, 2π) that satisfy each equation. Round approximate answers to the nearest tenth.

25. $\sin x\cos\left(\frac{\pi}{4}\right) + \cos x\sin\left(\frac{\pi}{4}\right) = \frac{1}{2}$

26. $\sin 2x\cos x - \cos 2x\sin x = -\frac{1}{2}$

27. $\sin\left(\frac{\pi}{6}\right)\cos x + \cos\left(\frac{\pi}{6}\right)\sin x = -\frac{1}{2}$