The Weekly Rigor

No. 264 "A mathematician is a machine for turning coffee into theorems." July 13, 2019

28 Problems Solving Simple Trigonometric Equations (Type I)

(Part 1)

Type I Equations: Involving sine or cosine.

PROBLEMS

Solve for θ over the interval $[0,2\pi)$. Show (write out) the use of reference angles and the reference triangles to determine the solution(s), except in cases where θ is a quadrant angle (0, $\frac{\pi}{2}$, π, and $\frac{3\pi}{2}$).

1. $2\sin(\theta) - 1 = 0$

2. $2\sin(\theta) - \sqrt{3} = 0$

3. $2\cos(\theta) - 1 = 0$

4. $2\sin(\theta) + \sqrt{3} = 0$

5. $2\cos(\theta) + 1 = 0$

6. $2\sin(\theta) + \sqrt{2} = 0$

7. $\sqrt{2}\sin(\theta) + 1 = 0$

8. $\sin(\theta) + 1 = 0$

9. $2\cos(\theta) + \sqrt{2} = 0$

10. $\sqrt{2}\cos(\theta) + 1 = 0$

11. $2\sin^2(\theta) - 1 = 0$

12. $4\cos^2(\theta) - 3 = 0$

13. $\sin(\theta) - 1 = 0$

14. $\cos(\theta) = 0$

15. $\sin(\theta) = 0$

16. $\cos(\theta) - 1 = 0$

17. $2\sin(\theta)+1=0$

18. $2\cos(\theta)+\sqrt{3}=0$

19. $\cos(\theta)+1=0$

20. $2\sin(\theta)-\sqrt{2}=0$

21. $\sqrt{2}\sin(\theta)-1=0$

22. $2\cos(\theta)-\sqrt{2}=0$

23. $\sqrt{2}\cos(\theta)-1=0$

24. $4\sin^2(\theta)-1=0$

25. $4\cos^2(\theta)-3=0$

26. $4\sin^2(\theta)-3=0$

27. $4\cos^2(\theta)-1=0$

28. $2\cos(\theta)-\sqrt{3}=0$

ANSWERS

1. $\frac{\pi}{6},\frac{5\pi}{6}$	2. $\frac{\pi}{3},\frac{2\pi}{3}$	3. $\frac{\pi}{3},\frac{5\pi}{3}$	4. $\frac{4\pi}{3},\frac{5\pi}{3}$
5. $\frac{2\pi}{3},\frac{4\pi}{3}$	6. $\frac{5\pi}{4},\frac{7\pi}{4}$	7. $\frac{5\pi}{4},\frac{7\pi}{4}$	8. $\frac{3\pi}{2}$
9. $\frac{3\pi}{4},\frac{5\pi}{4}$	10. $\frac{3\pi}{4},\frac{5\pi}{4}$	11. $\frac{\pi}{4},\frac{3\pi}{4},\frac{5\pi}{4},\frac{7\pi}{4}$	12. $\frac{\pi}{6},\frac{5\pi}{6},\frac{7\pi}{6},\frac{11\pi}{6}$
13. $\frac{\pi}{2}$	14. $\frac{\pi}{2},\frac{3\pi}{2}$	15. $0,\pi$	16. 0
17. $\frac{7\pi}{6},\frac{11\pi}{6}$	18. $\frac{5\pi}{6},\frac{7\pi}{6}$	19. π	20. $\frac{\pi}{4},\frac{3\pi}{4}$
21. $\frac{\pi}{4},\frac{3\pi}{4}$	22. $\frac{\pi}{4},\frac{7\pi}{4}$	23. $\frac{\pi}{4},\frac{7\pi}{4}$	24. $\frac{\pi}{6},\frac{5\pi}{6},\frac{7\pi}{6},\frac{11\pi}{6}$
25. $\frac{\pi}{6},\frac{5\pi}{6},\frac{7\pi}{6},\frac{11\pi}{6}$	26. $\frac{\pi}{3},\frac{2\pi}{3},\frac{4\pi}{3},\frac{5\pi}{3}$	27. $\frac{\pi}{3},\frac{2\pi}{3},\frac{4\pi}{3},\frac{5\pi}{3}$	28. $\frac{\pi}{6},\frac{11\pi}{6}$