The Weekly Rigor

No. 269 "A mathematician is a machine for turning coffee into theorems." August 17, 2019

30 Problems Solving Simple Trigonometric Equations (Type II)

(Part 1)

Type II Equations: Involving secant or cosecant.

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. $\csc(\theta) - 2 = 0$

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

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

4. $\csc(\theta) + 2 = 0$

5. $3\sec(\theta) + 2\sqrt{3} = 0$

6. $\sqrt{3}\sec(\theta) + 2 = 0$

7. $3\csc(\theta) - 2\sqrt{3} = 0$

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

9. $3\csc(\theta) + 2\sqrt{3} = 0$

10. $\sqrt{3}\csc(\theta) + 2 = 0$

11. $\sec(\theta) - 2 = 0$

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

13. $\sec^2(\theta) - 4 = 0$

14. $\sec(\theta) + 1 = 0$

15. $\csc(\theta) + \sqrt{2} = 0$

16. $\sqrt{2}\csc(\theta) + 2 = 0$

17. $\sec(\theta) + \sqrt{2} = 0$

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

19. $\sec(\theta) - 1 = 0$

20. $\csc(\theta) - 1 = 0$

21. $\csc^2(\theta) - 4 = 0$

22. $3\sec^2(\theta) - 4 = 0$

23. $\sec(\theta) + 2 = 0$

24. $\csc(\theta) + 1 = 0$

25. $\csc(\theta) - \sqrt{2} = 0$

26. $\sqrt{2}\csc(\theta) - 2 = 0$

27. $\sec(\theta) - \sqrt{2} = 0$

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

29. $\csc^2(\theta) - 2 = 0$

30. $\sec^2(\theta) - 2 = 0$

ANSWERS

1. $\frac{\pi}{6}, \frac{5\pi}{6}$	2. $\frac{\pi}{6}, \frac{11\pi}{6}$	3. $\frac{\pi}{6}, \frac{11\pi}{6}$	4. $\frac{7\pi}{6}, \frac{11\pi}{6}$
5. $\frac{5\pi}{6}, \frac{7\pi}{6}$	6. $\frac{5\pi}{6}, \frac{7\pi}{6}$	7. $\frac{\pi}{3}, \frac{2\pi}{3}$	8. $\frac{\pi}{3}, \frac{2\pi}{3}$
9. $\frac{4\pi}{3}, \frac{5\pi}{3}$	10. $\frac{4\pi}{3}, \frac{5\pi}{3}$	11. $\frac{\pi}{3}, \frac{5\pi}{3}$	12. $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$
13. $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$	14. π	15. $\frac{5\pi}{4}, \frac{7\pi}{4}$	16. $\frac{5\pi}{4}, \frac{7\pi}{4}$
17. $\frac{3\pi}{4}, \frac{5\pi}{4}$	18. $\frac{3\pi}{4}, \frac{5\pi}{4}$	19. $0, \pi$	20. $\frac{\pi}{2}$
21. $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$	22. $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$	23. $\frac{2\pi}{3}, \frac{4\pi}{3}$	24. $\frac{3\pi}{2}$
25. $\frac{\pi}{4}, \frac{3\pi}{4}$	26. $\frac{\pi}{4}, \frac{3\pi}{4}$	27. $\frac{\pi}{4}, \frac{7\pi}{4}$	28. $\frac{\pi}{4}, \frac{7\pi}{4}$
29. $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$	30. $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$		