

Trigonometry Revision 2

1. Solve the equation

a. $\sec x = 7$ for $0^\circ < x < 360^\circ$

b. $\sec^2 x = 49$ for $0^\circ < x < 360^\circ$

2. Solve the equation $8 \cot x - 5 = 7$ for $0^\circ < x < 360^\circ$

3. Solve the equation $7 + \operatorname{cosec} \theta = 4$ for $0 < \theta < 2\pi$

4. Solve each of these equations for $0^\circ \leq x \leq 360^\circ$

a. $\sec 2x = 1$

b. $\operatorname{cosec} 2x = 4$

c. $6 \cot 3x + 5 = 13$

5. Solve each of these equations for $0^\circ < x < 360^\circ$

a. $\operatorname{cosec} (2x + 90) = 1$

b. $4 - 3 \cot \frac{1}{2}x = 3$

c. $2 \sec 3x - 5 = \sqrt{2}$

6. Sketch these graphs on separate axes

a. $y = \operatorname{cosec} 3x$ for $0^\circ \leq x \leq 360^\circ$

b. $y = \sec 2x$ for $0^\circ \leq x \leq 360^\circ$

c. $y = \cot \frac{1}{2}x$ for $-360^\circ \leq x \leq 360^\circ$

d. $y = 2 \operatorname{cosec} x$ for $0^\circ \leq x \leq 180^\circ$

e. $y = \cot(x + 90^\circ)$ for $0^\circ \leq x \leq 360^\circ$

f. $y = 3 \sec 2x$ for $0^\circ \leq x \leq 360^\circ$

7. Sketch on separate sets of axes, the graphs of the following functions for

$-2\pi \leq x \leq 2\pi$

a. $y = 6 \operatorname{cosec} x$

b. $y = \cot\left(x - \frac{\pi}{4}\right)$

c. $y = \frac{1}{2} \sec\left(x + \frac{\pi}{2}\right)$

d. $y = \operatorname{cosec}(2x - \pi)$

8. Prove the identity $(\tan \theta + \cot \theta)^2 = \sec^2 \theta + \operatorname{cosec}^2 \theta$

9. Solve the equation $\sec^2 \theta + \tan \theta - 1 = 0$ for $0^\circ \leq x \leq 360^\circ$

10. Simplify the following expressions

a. $\sec^2 \theta - \tan^2 \theta$

b. $\frac{\sin \theta}{\operatorname{cosec} \theta - \cos \theta \cot \theta}$

c. $\frac{\tan \theta}{\sqrt{1 + \tan^2 \theta}}$

d. $\tan \theta \cot \theta$

e. $\frac{\sin \theta}{1 + \cot^2 \theta}$

f. $\frac{1 + \tan^2 \theta}{1 + \cot^2 \theta}$

11. Solve the equation $2\sec^2 \theta + 3\tan \theta - 4 = 0$ for $0^\circ \leq x \leq 360^\circ$

12. Solve the equation $\sec \theta \tan \theta = 1$ for $0 < \theta < 2\pi$

13. Solve the equation $\tan^2 \theta - \sec \theta - 5 = 0$ for $0^\circ \leq x \leq 360^\circ$

14. Prove the identity $\operatorname{cosec} \theta + \cot \theta = \frac{1}{\operatorname{cosec} \theta - \cot \theta}$

15. Prove the identity $\frac{\tan \theta}{1 + \sec \theta} + \frac{1 + \sec \theta}{\tan \theta} = \frac{2}{\sin \theta}$

16. Prove the identity $(\sec \theta - \tan \theta)^2 = \frac{1 - \sin \theta}{1 + \sin \theta}$

17. Prove the identity $\frac{\cot \theta}{1 + \cot^2 \theta} = \sin \theta \cos \theta$

18. Prove the identity $\sec^2 \theta + \operatorname{cosec}^2 \theta = \sec^2 \theta \operatorname{cosec}^2 \theta$

19. Solve the equation $4 \cot^2 \theta - 2 \cot \theta = 3 \operatorname{cosec}^2 \theta$ for $0^\circ \leq x \leq 360^\circ$

20. Solve the equation $\sec \theta = 3 \cos \theta + 1$ for $0^\circ \leq x \leq 360^\circ$

21. Solve the equation $\operatorname{cosec}^2 \theta + 2 \cot \theta = 0$ for $0 \leq \theta \leq 2\pi$

22. Prove the identity $\tan \theta + \cot \theta = \sec \theta \operatorname{cosec} \theta$

23. Solve the equation $3 \cot \theta + 2 \tan \theta = 5$ for $0^\circ \leq x \leq 360^\circ$

24. Solve the equation $\tan^2 \theta = \sec \theta$ for $0^\circ \leq x \leq 360^\circ$

25. Prove the identity $\cot^2 \theta \cos^2 \theta - \sin^2 \theta = \cot^2 \theta - 1$