ILLAWARRA TUTORING

This worksheet focuses on angles of any magnitude. You will learn how to apply trigonometric ratios to angles beyond $90°$, enabling you to solve a wider range of problems by reducing angles to their reference angles, identifying the appropriate quadrants and determining the correct signs of the trigonometric ratios.

Easy Questions

1. Evaluate $\sin(120°)$.

2. Evaluate $\cos(150°)$.

3. Determine the reference angle for $240°$.

4. Evaluate $\sin(270°)$.

5. Evaluate $\sin(360° + 45°)$.

Intermediate Questions

6. Reduce $405°$ to an equivalent angle between $0°$ and $360°$, and evaluate its sine.

7. Reduce $390°$ to an angle in standard position, and evaluate $\cos(390°)$.

8. Evaluate $\sin(-30°)$.

9. Evaluate $\cos(-120°)$.

10. Calculate $\sin(215°)$ to two decimal places.

11. Identify the quadrant in which $330°$ lies and evaluate $\cos(330°)$.

12. Explain in your own words the process to find $\sin(\theta)$ for any angle θ greater than $90°$.

13. Evaluate $\tan(600°)$.

14. Find all angles x (where $0° \leq x < 360°$) such that $\sin(x) = \sin(30°)$.

15. Evaluate $\cos(-450°)$.

16. Determine $\sin(810°)$.

17. Verify that $\sin(\theta) = \sin(180° - \theta)$ for an acute angle θ, and explain why this is true.

18. Draw a diagram (using `tikz`) of an angle $210°$ in standard position. Mark the terminal side, the reference angle, and label the corresponding coordinates of the point where the terminal side meets the unit circle.

19. Describe in detail the process used to evaluate a trigonometric ratio for an angle greater than $90°$.

20. Evaluate $\tan(315°)$.

Hard Questions

21. Evaluate $\sin(-725°)$.

22. Prove that if α and β are angles such that $\alpha = \beta + 360°k$ (where $k \in \mathbb{Z}$), then $\cos(\alpha) = \cos(\beta)$.

23. Evaluate $\sin(1025°)$ and express your answer in terms of the sine of an acute angle.

24. Find a coterminal angle θ with $-820°$ such that $0° \leq \theta < 360°$, and then evaluate $\sin(\theta)$ and $\cos(\theta)$.

25. Express $\tan(1080° + \theta)$ in terms of $\tan(\theta)$.

26. If $3\theta = 405°$, find θ and subsequently evaluate $\sin(\theta)$.

27. Determine the quadrant in which $750°$ terminates and evaluate $\sin(750°)$.

28. Evaluate $\sin(-150°)$ and explain your reasoning regarding the sign.

29. An object rotates through an angle of $12345°$. Compute an equivalent angle θ such that $0° \leq \theta < 360°$, and then approximate $\sin(\theta)$ to three decimal places.

30. Explain why an angle and any of its coterminal angles have the same trigonometric ratios. Support your explanation with an example of your choice.