ILLAWARRA TUTORING

In this worksheet, you will learn how to apply trigonometric ratios to angles beyond 90°. You will practise reducing large and negative angles, determining coterminal angles, finding reference angles, and evaluating trigonometric functions using these concepts.

Easy Questions

1. Determine the quadrant in which the terminal side of the angle 135° lies.
2. Find the reference angle of 150°.
3. Using the concept of reference angles, evaluate $\sin(210°)$.
4. Evaluate $\cos(-30°)$.
5. Explain why $\tan(270°)$ is undefined.

Intermediate Questions

6. Find the values of $\sin(225°)$, $\cos(225°)$ and $\tan(225°)$.
7. Evaluate $\sin(300°)$ and $\cos(300°)$ exactly.
8. The angle 405° is given. Reduce it to an equivalent angle between 0° and 360° and then evaluate $\sin(405°)$.
9. Express $\cos(-150°)$ in terms of a cosine of a positive angle and evaluate it.
10. Sketch the terminal side of 135° on the unit circle and label the coordinates of the point where the terminal side intersects the circle.
11. Determine the reference angle of 135° and then evaluate $\tan(135°)$.
12. Express $\sin(-210°)$ as the sine of a positive angle and evaluate it.
13. Calculate $\cos(720° + 30°)$.
14. Compute $\sin(810°)$.
15. Find the value of $\sin(-420°)$.
16. If $\theta = 390°$, reduce it to an equivalent angle between 0° and 360° and then evaluate $\cos\theta$.

17. Show that $\sin(180^\circ + 30^\circ) = -\sin(30^\circ)$ by drawing the appropriate unit circle diagram.

18. Evaluate $\tan(-135^\circ)$.

19. For $\theta = -600^\circ$, find a positive coterminal angle between 0° and 360° and then compute $\cos\theta$.

20. Determine $\sin(510^\circ)$.

Hard Questions

21. Show that $\cos(360^\circ - \theta) = \cos\theta$ for $\theta = 150^\circ$ by computing both sides and discussing the result.

22. A rotated angle is given by -735°. Find a coterminal angle between 0° and 360° and then evaluate tan of this angle.

23. Given $\theta = 1230^\circ$, determine its reference (acute) angle and state whether $\sin(\theta)$ is positive or negative.

24. Compute $\cos(-1125^\circ)$ by finding its equivalent angle between 0° and 360°.

25. Evaluate $\tan(405^\circ - 720^\circ)$ by first simplifying the angle.

26. For $\theta = -845^\circ$, determine a positive coterminal angle and then compute $\cos\theta$.

27. Draw the terminal side of 260° on a unit circle and label the coordinates of the intersection point.

28. If an angle θ satisfies $\sin\theta = -0.5$ and it is given that θ does not lie in the third quadrant, determine all possible values of θ between 0° and 360°.

29. For $\theta = 670^\circ$, determine the reference angle and then evaluate $\cos\theta$, explaining the sign based on the quadrant in which the terminal side lies.

30. A beam of light rotates through -810°. Find the positive coterminal angle and then determine sin of the resulting angle.