

Interpreting & Analyzing Trig Graphs

Part I — Comparing Sine and Cosine

1. Without graphing technology, determine all values of x on $0 < x < 2\pi$ for which $\sin x = \cos x$. State the quadrants where the graphs intersect and the coordinates of the intersection points.
2. Complete the following identities:
 - a) $\cos x = \sin(x + \underline{\quad})$
 - b) $\sin x = \cos(x - \underline{\quad})$
3. How many units must the graph of $y = \sin x$ be shifted horizontally so that it overlaps $y = \cos x$? State the direction and amount of shift.
4. For which intervals on $0 < x < 2\pi$ is $\sin x > \cos x$? Explain using the graphs of the functions.

Part II — Signs and Inequalities

5. Given that $\sin \theta > 0$ and $\cos \theta < 0$, determine the range of possible values of θ for $0 < \theta < 2\pi$.
6. Indicate TRUE or FALSE. If $\sin \theta > 0$ and $\cos \theta > 0$, then $\tan \theta$ can be either positive or negative. Explain your reasoning.
7. If $0^\circ \leq \theta \leq 180^\circ$ and $\sin \theta \geq \cos \theta$, determine the correct interval.
 - a) $0^\circ \leq \theta \leq 45^\circ$
 - b) $45^\circ \leq \theta \leq 90^\circ$
 - c) $45^\circ \leq \theta \leq 180^\circ$
 - d) $90^\circ \leq \theta \leq 180^\circ$
 - e) $0^\circ \leq \theta \leq 90^\circ$
8. Determine all values of θ for $0 < \theta < 2\pi$ such that $\sin \theta > \cos \theta$

Part III — Intersections and Graph Analysis

9. Determine how many points of intersection exist between $y = \sin x$ and each horizontal line below on $0 \leq x \leq 2\pi$.
 - a) $y = 2$
 - b) $y = 1$
 - c) $y = 0$
 - d) $y = -0.5$
10. Determine all points of intersection between $y = \sin x$ and $y = 0.5$ for $0 < x < 2\pi$. State the quadrants and coordinates of the intersection points.
11. Without graphing technology, determine the number of solutions to $\sin x = 0.8$ on $0 \leq x \leq 2\pi$. Explain how you know.

