

Advanced Trigonometric Analysis

Trigonometry · Answer Key · 12 Questions

1. What is the exact value of $\cos(7\pi/12)$?

- A) $(\sqrt{2} - \sqrt{6})/4$
- B) $(\sqrt{6} - \sqrt{2})/4$
- C) $(-\sqrt{6} - \sqrt{2})/4$**
- D) $(\sqrt{2} + \sqrt{6})/4$

2. Given $\sin(\theta) = 3/5$ and θ is in the second quadrant, what is the exact value of $\tan(2\theta)$?

- A) $-24/7$**
- B) $24/7$
- C) $7/24$
- D) $-7/24$

3. What is the period of the function $f(x) = 3\tan(2x - \pi/4)$?

- A) $\pi/4$
- B) $\pi/2$**
- C) π
- D) 2π

4. Which expression is equivalent to $(1 - \cos(2\theta)) / \sin(2\theta)$?

- A) $\sin(\theta)$
- B) $\cos(\theta)$
- C) $\tan(\theta)$**
- D) $\cot(\theta)$

5. What is the range of the function $f(x) = 4\arcsin(x/2) - \pi$?

- A) $[-3\pi/2, \pi/2]$**
- B) $[-\pi, \pi]$
- C) $[-2\pi, 2\pi]$
- D) $[-5\pi/2, \pi/2]$

6. For the equation $\cos^2(\theta) + \sin(\theta) = 1$, what is the sum of all solutions in the interval $[0, 2\pi]$?

- A) π
- B) 2π
- C) 3π**
- D) 4π

7. If $\sec(\theta) = -5/3$ and $\theta < \theta < 3\pi/2$, what is the value of $\sin(\theta)$?

A) $4/5$

B) $-4/5$

C) $3/5$

D) $-3/5$

8. What is the exact value of $\sin(\arctan(1/2) + \arctan(1/3))$?

A) $1/2$

B) 1

C) $1/2$

D) $3/2$

9. What is the general solution for $\sin(x) = \cos(x)$?

A) $n\pi + \pi/4$

B) $n\pi - \pi/4$

C) $2n\pi + \pi/4$

D) $n\pi + \pi/2$

10. Which of the following is equivalent to $\cos(A + B)\cos(A - B)$?

A) $\cos^2 A - \sin^2 B$

B) $\cos^2 A + \sin^2 B$

C) $\sin^2 A - \cos^2 B$

D) $\sin^2 A + \cos^2 B$

11. If $f(x) = 2\sin(x)\cos(x)$, what is the derivative $f'(x)$ at $x = \pi/6$?

A) -1

B) 0

C) $1/2$

D) 1

12. What is the value of $\arccos(\cos(5\pi/4))$?

A) $5\pi/4$

B) $3\pi/4$

C) $\pi/4$

D) $-\pi/4$