

Trigonometric Functions MCQs for Entry Test - Exercise 11.1

Introduction

This document contains 20 multiple-choice questions based on Exercise 11.1 of the trigonometry chapter, designed for entry test preparation. Each question tests concepts such as domains, ranges, and periods of trigonometric functions ($\sin x$, $\cos x$, $\tan x$, $\cot x$, $\sec x$, $\csc x$). Solutions with detailed explanations are provided at the end.

Multiple-Choice Questions

1. What is the period of $\sin 3x$?

- A) $\frac{2\pi}{3}$
- B) π
- C) 2π
- D) $\frac{\pi}{3}$

2. What is the period of $\cos 2x$?

- A) 2π
- B) π
- C) $\frac{\pi}{2}$
- D) $\frac{2\pi}{3}$

3. What is the period of $\tan 4x$?

- A) π
- B) $\frac{\pi}{4}$
- C) $\frac{\pi}{2}$
- D) 4π

4. What is the period of $\cot \frac{x}{2}$?

- A) π
- B) 2π
- C) $\frac{\pi}{2}$

D) 4π

5. What is the period of $\sin \frac{x}{3}$?

A) 2π

B) 3π

C) 6π

D) $\frac{2\pi}{3}$

6. What is the period of $\csc \frac{x}{4}$?

A) 2π

B) 4π

C) 8π

D) $\frac{\pi}{4}$

7. What is the period of $\sin \frac{x}{5}$?

A) 5π

B) 10π

C) $\frac{2\pi}{5}$

D) 2π

8. What is the period of $\cos \frac{x}{6}$?

A) 6π

B) 12π

C) $\frac{2\pi}{6}$

D) 2π

9. What is the period of $\tan \frac{x}{7}$?

A) $\frac{\pi}{7}$

B) 7π

C) π

D) $\frac{7\pi}{2}$

10. What is the period of $\cot 8x$?

A) $\frac{\pi}{8}$

B) π

C) 8π

D) $\frac{\pi}{4}$

11. What is the period of $\sec 9x$?

A) $\frac{\pi}{9}$

- B) $\frac{2\pi}{9}$
- C) 2π
- D) 9π

12. What is the period of $\csc 10x$?

- A) $\frac{\pi}{5}$
- B) $\frac{2\pi}{10}$
- C) 2π
- D) $\frac{\pi}{10}$

13. What is the period of $3 \sin x$?

- A) $\frac{2\pi}{3}$
- B) 2π
- C) π
- D) 6π

14. What is the period of $2 \cos x$?

- A) π
- B) 2π
- C) $\frac{\pi}{2}$
- D) 4π

15. What is the period of $3 \cos \frac{x}{5}$?

- A) 2π
- B) 5π
- C) 10π
- D) $\frac{2\pi}{5}$

16. What is the domain of $\tan x$?

- A) \mathbb{R}
- B) $x \neq n\pi, n \in \mathbb{Z}$
- C) $x \neq (2n+1)\frac{\pi}{2}, n \in \mathbb{Z}$
- D) $x \neq \frac{\pi}{2}, n \in \mathbb{Z}$

17. What is the range of $\sin x$?

- A) \mathbb{R}
- B) $[-1, 1]$
- C) $y \geq 1$ or $y \leq -1$
- D) $[0, 1]$

18. What is the domain of $\csc x$?

- A) \mathbb{R}
- B) $x \neq n\pi, n \in \mathbb{Z}$
- C) $x \neq (2n+1)\frac{\pi}{2}, n \in \mathbb{Z}$
- D) $x \neq \frac{\pi}{2}, n \in \mathbb{Z}$

19. What is the range of $\sec x$?

- A) \mathbb{R}
- B) $[-1, 1]$
- C) $y \geq 1$ or $y \leq -1$
- D) $[0, 1]$

20. What is the period of $5 \tan 2x$?

- A) $\frac{\pi}{2}$
- B) π
- C) 2π
- D) $\frac{\pi}{5}$

Solutions and Explanations

1. Solution to Question 1:

$$\sin 3x = \sin(3x + 2\pi) = \sin 3 \left(x + \frac{2\pi}{3} \right), \quad \text{Period} = \frac{2\pi}{3}$$

Answer: A) $\frac{2\pi}{3}$

2. Solution to Question 2:

$$\cos 2x = \cos(2x + 2\pi) = \cos 2(x + \pi), \quad \text{Period} = \frac{2\pi}{2} = \pi$$

Answer: B) π

3. Solution to Question 3:

$$\tan 4x = \tan(4x + \pi) = \tan 4 \left(x + \frac{\pi}{4} \right), \quad \text{Period} = \frac{\pi}{4}$$

Answer: B) $\frac{\pi}{4}$

4. Solution to Question 4:

$$\cot \frac{x}{2} = \cot \left(\frac{x}{2} + \pi \right) = \cot \frac{1}{2}(x + 2\pi), \quad \text{Period} = \frac{\pi}{\frac{1}{2}} = 2\pi$$

Answer: B) 2π

5. Solution to Question 5:

$$\sin \frac{x}{3} = \sin \left(\frac{x}{3} + 2\pi \right) = \sin \frac{1}{3}(x + 6\pi), \quad \text{Period} = \frac{2\pi}{\frac{1}{3}} = 6\pi$$

Answer: C) 6π

6. Solution to Question 6:

$$\csc \frac{x}{4} = \csc \left(\frac{x}{4} + 2\pi \right) = \csc \frac{1}{4}(x + 8\pi), \quad \text{Period} = \frac{2\pi}{\frac{1}{4}} = 8\pi$$

Answer: C) 8π

7. Solution to Question 7:

$$\sin \frac{x}{5} = \sin \left(\frac{x}{5} + 2\pi \right) = \sin \frac{1}{5}(x + 10\pi), \quad \text{Period} = \frac{2\pi}{\frac{1}{5}} = 10\pi$$

Answer: B) 10π

8. Solution to Question 8:

$$\cos \frac{x}{6} = \cos \left(\frac{x}{6} + 2\pi \right) = \cos \frac{1}{6}(x + 12\pi), \quad \text{Period} = \frac{2\pi}{\frac{1}{6}} = 12\pi$$

Answer: B) 12π

9. Solution to Question 9:

$$\tan \frac{x}{7} = \tan \left(\frac{x}{7} + \pi \right) = \tan \frac{1}{7}(x + 7\pi), \quad \text{Period} = \frac{\pi}{\frac{1}{7}} = 7\pi$$

Answer: B) 7π

10. Solution to Question 10:

$$\cot 8x = \cot(8x + \pi) = \cot 8 \left(x + \frac{\pi}{8} \right), \quad \text{Period} = \frac{\pi}{8}$$

Answer: A) $\frac{\pi}{8}$

11. Solution to Question 11:

$$\sec 9x = \sec(9x + 2\pi) = \sec 9 \left(x + \frac{2\pi}{9} \right), \quad \text{Period} = \frac{2\pi}{9}$$

Answer: B) $\frac{2\pi}{9}$

12. Solution to Question 12:

$$\csc 10x = \csc(10x + 2\pi) = \csc 10 \left(x + \frac{2\pi}{10} \right), \quad \text{Period} = \frac{2\pi}{10} = \frac{\pi}{5}$$

Answer: A) $\frac{\pi}{5}$

13. Solution to Question 13:

$$3 \sin x = 3 \sin(x+2\pi), \quad \text{Period} = 2\pi \quad (\text{constant coefficient does not affect period})$$

Answer: B) 2π

14. Solution to Question 14:

$$2 \cos x = 2 \cos(x+2\pi), \quad \text{Period} = 2\pi \quad (\text{constant coefficient does not affect period})$$

Answer: B) 2π

15. Solution to Question 15:

$$3 \cos \frac{x}{5} = 3 \cos \left(\frac{x}{5} + 2\pi \right) = 3 \cos \frac{1}{5}(x + 10\pi), \quad \text{Period} = \frac{2\pi}{\frac{1}{5}} = 10\pi$$

Answer: C) 10π

16. Solution to Question 16:

$$\tan x \text{ is undefined at } x = (2n+1)\frac{\pi}{2}, n \in Z, \quad \text{so domain is } x \neq (2n+1)\frac{\pi}{2}$$

Answer: C) $x \neq (2n+1)\frac{\pi}{2}, n \in Z$

17. Solution to Question 17:

$$\sin x \text{ has values between } -1 \text{ and } 1, \quad \text{so range is } [-1, 1]$$

Answer: B) $[-1, 1]$

18. Solution to Question 18:

$$\csc x = \frac{1}{\sin x} \text{ is undefined at } x = n\pi, n \in Z, \quad \text{so domain is } x \neq n\pi$$

Answer: B) $x \neq n\pi, n \in Z$

19. Solution to Question 19:

$$\sec x = \frac{1}{\cos x} \text{ has values } \geq 1 \text{ or } \leq -1, \quad \text{so range is } y \geq 1 \text{ or } y \leq -1$$

Answer: C) $y \geq 1 \text{ or } y \leq -1$

20. Solution to Question 20:

$$5 \tan 2x = 5 \tan(2x+\pi) = 5 \tan 2 \left(x + \frac{\pi}{2} \right), \quad \text{Period} = \frac{\pi}{2} \quad (\text{constant coefficient does not affect period})$$

Answer: A) $\frac{\pi}{2}$