

Trigonometric Functions MCQs for Entry Test - Exercise 11.2

Introduction

This document contains 20 multiple-choice questions based on Exercise 11.2 of the trigonometry chapter, designed for entry test preparation. Each question tests concepts such as graphing trigonometric functions ($\sin x$, $\cos x$, $\tan x$), identifying periods, ranges, asymptotes, and solving equations graphically. Solutions with detailed explanations are provided at the end.

Multiple-Choice Questions

1. What is the period of $y = -\sin x$?

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

2. What is the range of $y = 2 \cos x$?

- A) $[-1, 1]$
- B) $[-2, 2]$
- C) $[0, 2]$
- D) R

3. What is the period of $y = \tan 2x$?

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

4. What is the period of $y = \sin \frac{x}{2}$?

- A) 2π
- B) 4π

- C) π
- D) $\frac{2\pi}{3}$

5. What is the range of $y = -\sin x$?

- A) $[-1, 1]$
- B) $[0, 1]$
- C) $[-2, 2]$
- D) R

6. Where are the vertical asymptotes of $y = \tan 2x$?

- A) $x = n\pi, n \in Z$
- B) $x = (2n + 1)\frac{\pi}{2}, n \in Z$
- C) $x = (2n + 1)\frac{\pi}{4}, n \in Z$
- D) $x = \frac{n\pi}{2}, n \in Z$

7. What is the period of $y = \cos \frac{x}{2}$?

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

8. What is the value of $y = 2 \cos x$ at $x = 90^\circ$?

- A) 2
- B) 0
- C) -2
- D) 1

9. What is the value of $y = -\sin x$ at $x = 270^\circ$?

- A) 1
- B) -1
- C) 0
- D) 0.5

10. What is the value of $y = \sin \frac{x}{2}$ at $x = 180^\circ$?

- A) 0
- B) 1
- C) 0.5
- D) -1

11. What is the period of $y = \sin 2x$?

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

12. What is the range of $y = \tan x$?

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

13. What is the solution to $\sin x = \cos x$ in $[0, \pi]$?

- A) $x = 0$
- B) $x = \frac{\pi}{2}$
- C) $x = \frac{\pi}{4}$
- D) $x = \pi$

14. What is the solution to $\sin x = x$ in $[0, \pi]$?

- A) $x = \frac{\pi}{4}$
- B) $x = 0$
- C) $x = \frac{\pi}{2}$
- D) $x = \pi$

15. What is the value of $y = \cos \frac{x}{2}$ at $x = 60^\circ$?

- A) 1
- B) 0.8
- C) 0.5
- D) 0

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

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

17. Where are the vertical asymptotes of $y = \tan x$?

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

D) $x = (2n + 1)\pi, n \in \mathbb{Z}$

18. What is the range of $y = 3 \cos x$?

A) $[-1, 1]$

B) $[-3, 3]$

C) $[0, 3]$

D) \mathbb{R}

19. What is the value of $y = \tan 2x$ at $x = 30^\circ$?

A) 0

B) 1.7

C) ∞

D) -1.7

20. What is the period of $2 \cos 3x$?

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

B) π

C) 2π

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

Solutions and Explanations

1. Solution to Question 1:

Period of $\sin x = 2\pi$. Negation does not affect period, so period of $-\sin x = 2\pi$.

Answer: B) 2π

2. Solution to Question 2:

Range of $\cos x = [-1, 1]$. For $2 \cos x$, range is $[-2, 2]$.

Answer: B) $[-2, 2]$

3. Solution to Question 3:

Period of $\tan x = \pi$. For $\tan 2x$, period $= \frac{\pi}{2}$.

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

4. Solution to Question 4:

Period of $\sin x = 2\pi$. For $\sin \frac{x}{2}$, period $= \frac{2\pi}{\frac{1}{2}} = 4\pi$.

Answer: B) 4π

5. Solution to Question 5:

Range of $\sin x = [-1, 1]$. For $-\sin x$, range remains $[-1, 1]$.

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

6. Solution to Question 6:

$\tan 2x$ is undefined when $2x = (2n + 1)\frac{\pi}{2} \implies x = (2n + 1)\frac{\pi}{4}, n \in \mathbb{Z}$.

Answer: C) $x = (2n + 1)\frac{\pi}{4}, n \in \mathbb{Z}$

7. Solution to Question 7:

Period of $\cos x = 2\pi$. For $\cos \frac{x}{2}$, period $= \frac{2\pi}{\frac{1}{2}} = 4\pi$.

Answer: C) 4π

8. Solution to Question 8:

$$\cos 90^\circ = 0 \implies 2 \cos 90^\circ = 2 \cdot 0 = 0.$$

Answer: B) 0

9. Solution to Question 9:

$$\sin 270^\circ = -1 \implies -\sin 270^\circ = -(-1) = 1.$$

Answer: A) 1

10. Solution to Question 10:

$$x = 180^\circ \implies \frac{x}{2} = 90^\circ. \sin 90^\circ = 1 \implies \sin \frac{180^\circ}{2} = 1.$$

Answer: B) 1

11. Solution to Question 11:

Period of $\sin x = 2\pi$. For $\sin 2x$, period $= \frac{2\pi}{2} = \pi$.

Answer: A) π

12. Solution to Question 12:

$\tan x$ has range \mathbb{R} due to vertical asymptotes at $x = (2n + 1)\frac{\pi}{2}$.

Answer: B) \mathbb{R}

13. Solution to Question 13:

$\sin x = \cos x \implies \tan x = 1 \implies x = \frac{\pi}{4}$ in $[0, \pi]$. Graphically, intersection at $x = 45^\circ = \frac{\pi}{4}$.

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

14. Solution to Question 14:

$\sin x = x$ intersects at $x = 0$ in $[0, \pi]$. For $x > 0$, $\sin x < x$ (since $\sin x \leq 1$ and x grows faster in

Answer: B) 0

15. Solution to Question 15:

$$x = 60^\circ \implies \frac{x}{2} = 30^\circ. \cos 30^\circ = \frac{\sqrt{3}}{2} \approx 0.866 \approx 0.8.$$

Answer: B) 0.8

16. Solution to Question 16:

Period of $\sin x = 2\pi$. For $\sin \frac{x}{3}$, period $= \frac{2\pi}{\frac{1}{3}} = 6\pi$. Coefficient 3 does not affect period.

Answer: B) 6π

17. Solution to Question 17:

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

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

18. Solution to Question 18:

Range of $\cos x = [-1, 1]$. For $3 \cos x$, range $= [-3, 3]$.

Answer: B) $[-3, 3]$

19. Solution to Question 19:

$$x = 30^\circ \implies 2x = 60^\circ. \tan 60^\circ = \sqrt{3} \approx 1.7.$$

Answer: B) 1.7

20. Solution to Question 20:

Period of $\cos x = 2\pi$. For $\cos 3x$, period $= \frac{2\pi}{3}$. Coefficient 3 does not affect period.

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