

1) Which one of the following statements is **FALSE** about the function

$$f(x) = -1 + 2 \cos \left(\pi x - \frac{\pi}{2} \right)$$

A) The range of the function is $[-1, 3]$

B) The period of the function is 2

C) The horizontal shift of the function is $\frac{1}{2}$

D) The amplitude of the function is 2

E) The y -intercept of the function is -1

2) The graph of $y = -2 \sin \frac{1}{2}|x|$, $-2\pi \leq x \leq 2\pi$, is **increasing** on the interval

A) $(-\pi, 0) \cup (\pi, 2\pi)$

B) $(-\pi, \pi) \cup (0, \pi)$

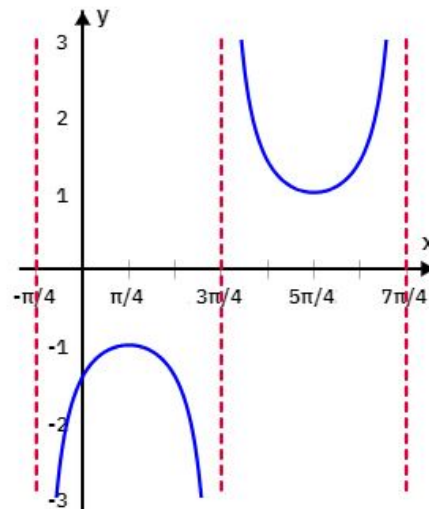
C) $(-2\pi, 2\pi)$

D) $(-2\pi, -\pi) \cup (\pi, 2\pi)$

E) $(-2\pi, -\pi) \cup (0, \pi)$

3) The adjacent graph represents part of the graph of the function

- A) $y = -\sec\left(x - \frac{\pi}{4}\right)$
- B) $y = -\csc\left(x - \frac{\pi}{4}\right)$
- C) $y = \csc\left(x + \frac{\pi}{4}\right)$
- D) $y = \sec\left(x + \frac{5\pi}{4}\right)$
- E) $y = -\csc\left(x - \frac{3\pi}{4}\right)$



4) If the **number** of the vertical asymptotes of $f(x) = 3 \tan\left(\frac{x}{2} - \frac{\pi}{2}\right)$ in the interval $[-2\pi, b]$ is 3, then a possible value of b is

- A) 2π
- B) 3π
- C) π
- D) 0
- E) 5π

5) For the function $f(x) = m \sec(2x) + m^2$, where $m > 0$, if the **range** is $(-\infty, 2] \cup [6, \infty)$, then the value of m is equal to

A) 2

B) 1

C) 3

D) -3

E) -1

6) $\sin^{-1}\left(-\frac{1}{\sqrt{2}}\right) + \cos^{-1}\left(\cos\frac{7\pi}{4}\right) =$

A) 0

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

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

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

E) $-\frac{3\pi}{2}$

7) If $[-6, 2]$ is the **domain** of $f(x) = -3 \sin^{-1}\left(\frac{x}{4} - k\right) - \frac{\pi}{2}$, then $4k =$

A) -2

B) -1

C) 4

D) -6

E) 2

8) For $\frac{\pi}{2} < \theta < \pi$, if $x = 5 \sec \theta$, then $\frac{\sqrt{x^2 - 25}}{x} =$

A) $-\sin \theta$

B) $\sin \theta$

C) $-\cos \theta$

D) $\cos \theta$

E) $-\sin \theta \sec^2 \theta$

9) The expression $\frac{\cot x}{1 - \csc x} + \frac{1 - \csc x}{\cot x}$ simplifies to

A) $-2 \sec x$

B) $-2 \csc x$

C) $2 \sec x$

D) $2 \csc x$

E) $\frac{1}{2} \sin x$

10) If $\frac{2\sin x \cos(-x) - 2\sin(-x) + 2\cos(-x) + 2}{1 + 2\cos x + \cos^2 x - \sin^2 x} = \frac{a + b \sin x}{\cos x}$, then $a + b =$

A) 2

B) -2

C) 0

D) 1

E) -1

11) $\tan\left(\frac{11\pi}{12}\right) =$

A) $\sqrt{3} - 2$

B) $2 - \sqrt{3}$

C) $\sqrt{3} + 2$

D) $1 - \sqrt{3}$

E) $\sqrt{3} - 1$

12) If $\cos \theta = \frac{3}{5}$, where θ is in the 4th quadrant, and $\cot \beta = -\frac{4}{3}$, where β is in the 2nd quadrant, then $\sec(\theta - \beta) =$

A) $-\frac{25}{24}$

B) $\frac{25}{24}$

C) 0

D) $-\frac{24}{25}$

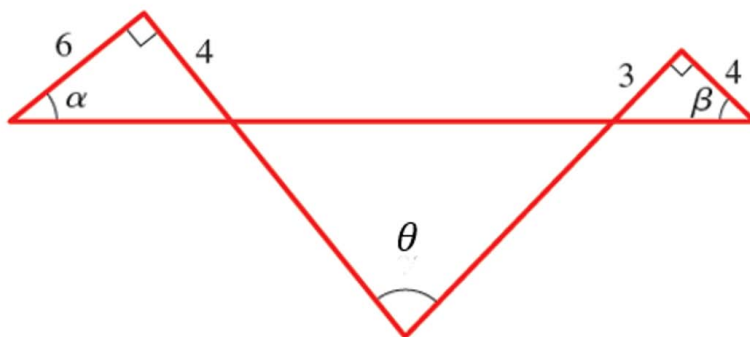
E) $\frac{24}{25}$

13) The **horizontal shift** for the graph of $f(x) = 3 - \sin 2x - \sqrt{3} \cos 2x$, is

- A) $-\frac{2\pi}{3}$
- B) $-\frac{4\pi}{3}$
- C) $-\frac{\pi}{6}$
- D) $-\frac{7\pi}{6}$
- E) $-\frac{3\pi}{2}$

14) In the adjacent figure, $\tan \theta =$

- A) $\frac{17}{6}$
- B) $-\frac{1}{18}$
- C) $\frac{17}{12}$
- D) $-\frac{1}{12}$
- E) $-\frac{1}{6}$



15) If $\sin \left[\cos^{-1} \left(-\frac{1}{2} \right) + \tan^{-1} \left(\frac{4}{3} \right) \right] = \frac{a\sqrt{3} - b}{c}$, then $a + b + c =$

A) 17

B) 15

C) 9

D) 3

E) 5

16) $\sqrt{\frac{1 - \sin \frac{3\pi}{5}}{2}} =$

A) $\sin \frac{\pi}{20}$

B) $-\sin \frac{\pi}{20}$

C) $\cos \frac{\pi}{20}$

D) $-\cos \frac{\pi}{20}$

E) $\cos \frac{3\pi}{10}$

17) If the **amplitude** of $y = \frac{4}{\csc 2x \sec 2x}$ is a and the **period** is b , then $a + \frac{b}{\pi} =$

A) $\frac{5}{2}$

B) 3

C) $\frac{3}{2}$

D) $\frac{3}{4}$

E) 5

18) The **sum** of the solutions of the equation $\cos 2x + \sin x = 0$, $0 \leq x \leq 2\pi$, is

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

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

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

D) 3π

E) $-\frac{\pi}{3}$

19) The **number** of the solution(s) of the equation $\sin x - \cos x = 1$, in the interval $(0^\circ, 180^\circ]$, is

- A) 2
- B) 3
- C) 1
- D) 4
- E) 5

20) The **sum** of all the solutions of the equation $2 \cos^2 x + |\cos x| - 1 = 0$, $0 < x \leq 2\pi$, is

- A) 4π
- B) 3π
- C) $\frac{5\pi}{4}$
- D) π
- E) 5π

Answer Key

Testname: MATH012_E2_241

- 1) A
- 2) A
- 3) A
- 4) A, B
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A
- 11) A
- 12) A
- 13) A
- 14) A
- 15) A
- 16) A
- 17) A
- 18) A
- 19) A
- 20) A