6.4: (More Trigonometric Graphs)

The number of all vertical asymptotes of the function $y = 2\tan\left(3\pi x + \frac{\pi}{4}\right), 0 \le x \le \frac{5}{12}$, is

A) 2

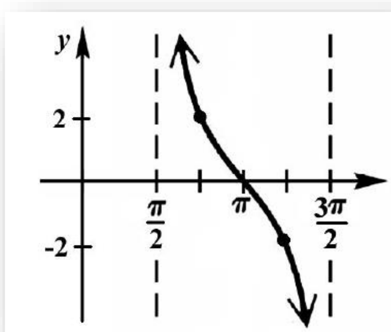
B) 5

C) 4

D) 1

E) 3

The graph in the adjacent figure represents part of the graph of



A) $y = -2\tan(x - 3\pi/2)$

B) $y = 2\cot(x - \pi)$

C) $y = -2\tan(x - \pi/2)$

D) $y = 2\cot x$

E) $y = -2\tan x$

The graph of the function $y = 2\tan\left(2x - \frac{\pi}{2}\right), 0 < x < \pi$, is below the x-axis on

A) $\left(0, \frac{\pi}{4}\right) \cup \left(\frac{\pi}{2}, \frac{3\pi}{4}\right)$

B) $\left(\frac{\pi}{4}, \frac{\pi}{2}\right) \cup \left(\frac{3\pi}{4}, \pi\right)$

C) $\left(\frac{\pi}{4}, \frac{3\pi}{4}\right)$

D) $\left(\frac{\pi}{4}, \frac{\pi}{2}\right)$

E) $\left(0, \frac{\pi}{4}\right) \cup \left(\frac{3\pi}{4}, \pi\right)$

The graph of the function $f(x) = -\tan\left(\frac{\pi}{4}x - \frac{\pi}{2}\right),\ 0 < x < 8$, is completely above the x-axis on

(a) $(0,2) \cup (4,6)$

(b) $(1,3) \cup (5,7)$

(c) $(0,3)$

(d) $(0,4)$

(e) $(2,4) \cup (6,8)$

The number of the x-intercepts of the function $f(x) = -3\tan\left(2x - \frac{\pi}{4}\right)$ over the interval $[-\pi, 2\pi]$ is:

A) 6

B) 5

C) 4

D) 3

E) 2

If the graph of the function $f(x) = a\tan(bx + c)$ has a period of $\frac{1}{4}$, a horizontal shift of $\frac{1}{2}$ to the right, and $f\left(\frac{7}{12}\right) = -\sqrt{3}$, then $\pi a + b =$

A) 3π

B) 5π

C) -2π

D) 7π

E) 2π

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

If 2π is the period of the function $f(x) = a\tan(bx)$ and $f\left(\frac{\pi}{3}\right) = -\sqrt{3}$, then $a + b =$

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

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

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

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

E) $-\frac{7}{2}$

If $f(x) = a\tan(bx), b > 0$, is a tangent function with period 3 and $f(1) = 2\sqrt{3}$, then $f\left(\frac{3}{4}\right) =$

A) 2

B) $\sqrt{3}$

C) 1

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

E) $\frac{\sqrt{3}}{3}$

The number of the x-intercepts of the graph of $f(x) = 2\tan\left(3x - \frac{\pi}{4}\right)$, where $-\frac{\pi}{4} \leq x \leq \frac{3\pi}{4}$, is

A) 4

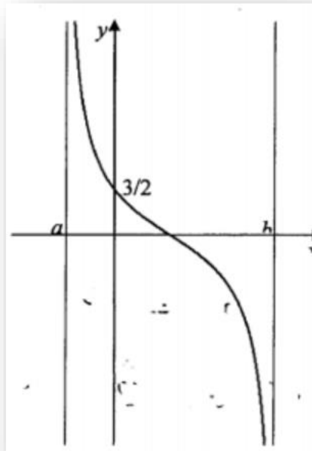
B) 3

C) 1

D) 5

E) 2

If $x = a$ and $x = b$ are two consecutive asymptotes of the graph of $y = \frac{3}{2}\cot(3x + \pi/4)$, then $a + b =$



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

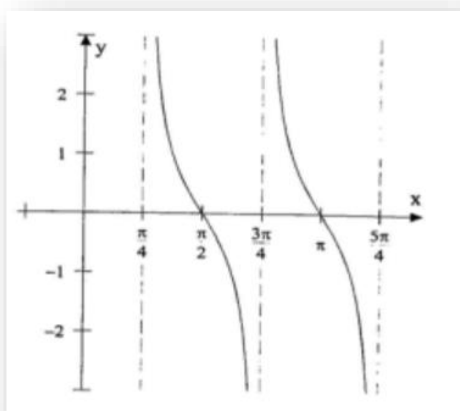
B) $\frac{\pi}{3}$

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

D) $-\frac{\pi}{12}$

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

The equation of the adjacent graph is



A) $y = \cot\left(2x - \frac{3\pi}{2}\right)$

B) $y = \tan\left(2x + \frac{3\pi}{2}\right)$

C) $y = \tan\left(2x + \frac{\pi}{2}\right)$

D) $y = \cot\left(x - \frac{\pi}{4}\right)$

E) $y = \cot\left(2x + \frac{\pi}{4}\right)$

The number of vertical asymptotes of the graph of the function $y = 2\cot\left(\pi x - \frac{\pi}{3}\right), -1 \leq x \leq 1$, is equal to

A) 5

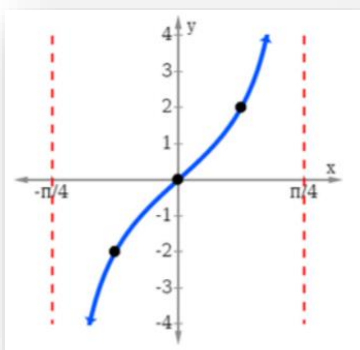
B) 3

C) 4

D) 1

E) 2

The adjacent figure represents part of the graph of



A) $y = -2\cot\left(2x + \frac{\pi}{2}\right)$

B) $y = -2\cot\left(x + \frac{\pi}{4}\right)$

C) $y = 2\tan\left(2x + \frac{\pi}{2}\right)$

D) $y = -2\tan(2x)$

E) $y = 2\tan\left(x + \frac{\pi}{4}\right)$

The number of x-intercepts of the graph of the function $y = -3\cot\left(2x + \frac{\pi}{2}\right)$ over the interval $[-\pi, \pi]$, is equal to

A) 3

B) 2

C) 4

D) 5

E) 1

If $y = 2\cot 2x$, then the number of vertical asymptotes over the interval $\left(-\frac{\pi}{4}, \frac{3\pi}{4}\right)$ is equal to

(a) 2

(b) 1

(c) 3

(d) 4

(e) 0

For $-\frac{7\pi}{2} < x < 0$, the number of vertical asymptotes of the graph of $y = \csc\left(\frac{1}{2}x - \frac{\pi}{4}\right)$ is:

A) 1

B) 4

C) 2

D) 3

E) 6

Which one of the following statements is FALSE about the graph of $y = \frac{3}{2}\csc\left(x - \frac{\pi}{2}\right)$ in the interval $[-\pi, 2\pi]$?

A) the graph has four vertical asymptotes

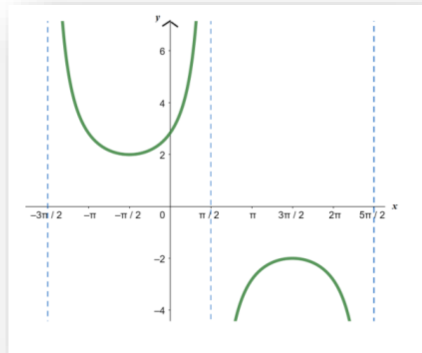
B) the graph has a period of 2π

C) the graph has no x-intercept

D) the graph has one y-intercept

E) the range of the graph is $(-\infty, -3/2] \cup [3/2, \infty)$

The equation of the graph below is



A) $y = 2\sec\left(2x - \frac{\pi}{4}\right)$

B) $y = -2\csc\left(2x - \frac{\pi}{4}\right)$

C) $y = 2\csc\left(\frac{1}{2}x - \frac{\pi}{4}\right)$

D) $y = -2\sec\left(\frac{1}{2}x - \frac{\pi}{4}\right)$

E) $y = -2\csc\left(\frac{1}{2}x - \frac{\pi}{4}\right)$

The graph of $y = -\csc(2x + \pi) + 2$, where $-\frac{3\pi}{4} \leq x \leq \frac{3\pi}{4}$, has

A) three x - intercepts.

B) four vertical asymptotes.

C) one y - intercept.

D) two vertical asymptotes.

E) four x - intercepts.

The range of the graph of the function $f(x) = 1 - 2\csc x$ is

(a) $(-\infty, -1] \cup [3, \infty)$

(b) $(-\infty, -2] \cup [2, \infty)$

(c) $(-\infty, -3] \cup [2, \infty)$

(d) $[1, \infty)$

(e) $[-1,3]$

The sum of all the vertical asymptotes of the graph of $y = -\csc\left(\frac{x}{3} - \frac{\pi}{6}\right)$ in the interval $[-4\pi, 2\pi]$, is

A) -2π

B) 4π

C) 2π

D) $-\pi$

E) π

The graph of the function $f(x) = \csc\left(\frac{\pi x}{2}\right), -2 < x < 2$, intersects the line $y = -2$ at

A) 2 points

B) 5 points

C) 1 point

D) 4 points

E) 3 points

For $0 < x < \frac{5\pi}{4}$, the line $y = -3$ intersects the graph of $y = \tan(2x - \pi)$ at:

A) 2 points.

B) 4 points.

C) 5 points.

D) one point.

E) 3 points.

Which one of the following statements is TRUE?

A) The domain of $y = \sec(4x + \pi)$ is $x \neq \frac{n\pi}{4} - \frac{\pi}{8}$, where n is an integer.

B) $\sec x = -\sec(-x)$

C) The graph of $y = \sec x$ intersects x-axis at $x = n\pi$ where n is an integer.

D) $\sec 30^\circ = \frac{\sqrt{3}}{3}$

E) $\sec^2 x = 1 - \tan^2 x$

The graph of the function $f(x) = -2\sec\left(\pi x + \frac{\pi}{3}\right), -\frac{1}{3} < x < \frac{5}{3}$, is completely above the x-axis on the interval

A) $\left(\frac{1}{6}, \frac{7}{6}\right)$

B) $\left(-\frac{1}{3}, \frac{1}{6}\right)$

C) $\left(\frac{7}{6}, \frac{5}{3}\right)$

D) $\left(0, \frac{1}{6}\right)$

E) $\left(-\frac{1}{3}, \frac{1}{6}\right) \cup \left(\frac{7}{6}, \frac{5}{3}\right)$

If (a, b) is the minimum point on the graph of $f(x) = -2\sec\left(\frac{1}{2}\pi x + \pi\right), 3 < x < 5$, then $a + b =$

A) 6

B) 2

C) -2

D) π

E) 0

If the range of the function $f(x) = -3\sec(2x + 1) + 2$ is $(-\infty, m] \cup [n, \infty)$, then $m + n =$

A) 4

B) 6

C) -4

D) 0

E) 3

The graph of the function $f(x) = -\sec(\pi x), -\frac{1}{2} < x < 1$ is increasing on the interval

A) $\left(0, \frac{1}{2}\right)$

B) $\left(-\frac{1}{2}, 0\right)$

C) $\left(-\frac{1}{2}, \frac{1}{2}\right)$

D) $(0,1)$

E) $\left(\frac{1}{2}, 1\right)$

On the interval $[-\pi/4, 5\pi/4]$, if the the graph of $y = 2 + 3\sec(2x - \pi)$ has four vertical asymptotes at $x = a_1, a_2, a_3$ and a_4, then $a_1 + a_2 + a_3 + a_4 =$

A) 2π

B) 3π

C) $5\pi/2$

D) $5\pi/4$

E) $9\pi/4$

The range of the graph of $y = 2 - 2\sec(x + \pi)$ is

A) $(-\infty, 0] \cup [4, \infty)$

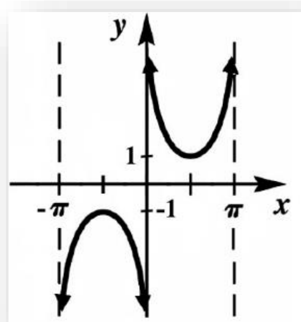
B) $(-\infty, -2] \cup [2, \infty)$

C) $(-\infty, 1] \cup [2, \infty)$

D) $[-2,2]$

E) $[0,4]$

The given graph in the adjacent figure represents part of the graph of the function



A) $y = \sec(x + \pi)$

B) $y = \csc(x + \pi/2)$

C) $y = \csc(x - \pi/2)$

D) $y = \sec(x - \pi)$

E) $y = \sec(x - \pi/2)$

The graph of the function $f(x) = -\sec\left(\frac{\pi}{2}x\right)$, over the interval $[0,4]$, intersects the line $y = 1$ at

A) 1 point

B) 2 points

C) 5 points

D) 3 points

E) 4 points

If P is the period of the graph of $f(x) = 5\sec 2\left(x - \frac{\pi}{4}\right)$ and A is the amplitude of $y = -\pi\sin\left(\frac{x}{3}\right)$, then $\mathrm{A} + \mathrm{P} =$

A) 2π

B) 0

C) 4π

D) π

E) 3π

The number of vertical asymptotes of the graph of $y = \csc\left(\frac{1}{2}x - \frac{\pi}{4}\right)$ over the interval $\left(0, \frac{9\pi}{2}\right)$ is

A) 2

B) 1

C) 3

D) 4

E) 5

The number of vertical asymptotes of the graph of the function $f(x) = 2 + 3\csc(2x - \pi)$, on the interval $[-\pi, \pi]$ is equal to

(a) 5

(b) 6

(c) 4

(d) 3

(e) 2

The number of x-intercepts of the graph of $y = \frac{2}{3}\tan\left(\frac{3x}{4} - \pi\right)$ over the interval $\left(0, \frac{10\pi}{3}\right)$ is

A) 2

B) 1

C) 3

D) 4

E) 5

In which one of the following intervals is the graph of $y = \sec\left(2x + \frac{\pi}{3}\right)$ below the x-axis?

A) $\left(\frac{\pi}{12}, \frac{7\pi}{12}\right)$

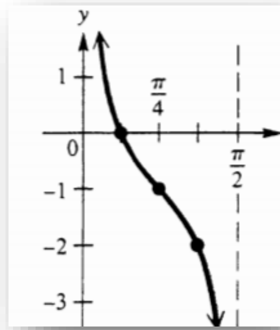
B) $\left(\frac{7\pi}{12}, \frac{13\pi}{12}\right)$

C) $\left(\frac{7\pi}{12}, \frac{5\pi}{6}\right)$

D) $\left(\frac{5\pi}{6}, \frac{13\pi}{12}\right)$

E) $\left(\frac{\pi}{3}, \frac{5\pi}{6}\right)$

An equation for the given graph is



A) $y = -1 - \tan(2x - \pi/2)$

B) $y = -1 - \tan(x - \pi/4)$

C) $y = -1 + \cot(x/2)$

D) $y = 1 + \cot 2x$

E) $y = 1 - \cot(x - \pi/4)$

The graph of $y = -\csc(2x + \pi) + 2$, where $-\frac{3\pi}{4} \leq x \leq \frac{3\pi}{4}$, has

A) three x - intercepts.

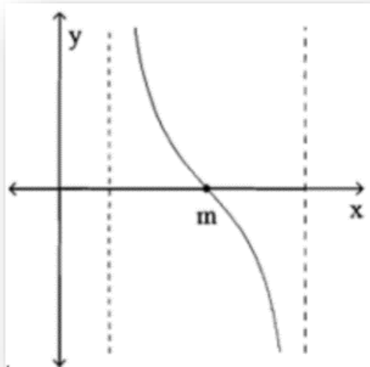
B) four vertical asymptotes.

C) one y - intercept.

D) two vertical asymptotes.

E) four x - intercepts.

$y = \cot\left(\frac{x}{2} - \frac{\pi}{4}\right)$, then $m =$



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

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

C) $\frac{5\pi}{4}$

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

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

The graph of $y = \cot\left(3x + \frac{\pi}{4}\right)$ over the interval $\left(-\frac{\pi}{12}, \frac{7\pi}{12}\right)$ intersects the x-axis at:

A) $\frac{\pi}{12}$ and $\frac{5\pi}{12}$

B) $-\frac{\pi}{8}$ and $\frac{\pi}{8}$

C) $-\frac{\pi}{8}$ and $\frac{5\pi}{12}$

D) $\frac{5\pi}{12}$ and $\frac{7\pi}{12}$

E) $\frac{\pi}{12}$ and $\frac{\pi}{8}$

The number of vertical asymptotes of $y = \frac{3}{2}\csc\left(x - \frac{\pi}{2}\right)$ over the interval $\left(-\frac{3\pi}{2}, \frac{5\pi}{2}\right)$ is:

A) 3

B) 2

C) 4

D) 1

E) 5

The number of the x - intercepts of the function $f(x) = -3\tan\left(2x - \frac{\pi}{4}\right)$ over the interval $[-\pi, 2\pi]$ is:

A) 6

B) 5

C) 4

D) 3

E) 2

For $0 < x < \frac{2}{3}$, the graph of the function $y = 2\csc 3\pi x$ is decreasing on

A) $\left(0, \frac{1}{6}\right) \cup \left(\frac{1}{2}, \frac{2}{3}\right)$

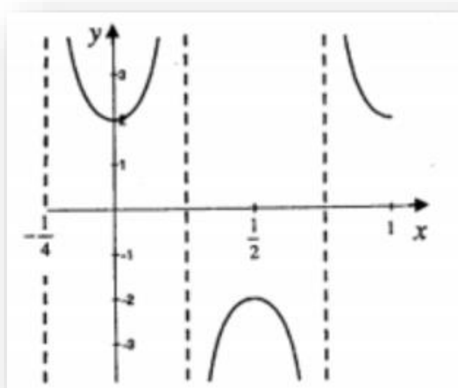
B) $\left(\frac{1}{6}, \frac{1}{3}\right) \cup \left(\frac{1}{3}, \frac{1}{2}\right)$

c) $\left(0, \frac{1}{3}\right)$

D) $\left(\frac{1}{3}, \frac{2}{3}\right)$

E) $\left(\frac{1}{6}, \frac{1}{3}\right) \cup \left(\frac{1}{2}, \frac{2}{3}\right)$

The figure below, represents part of the graph of



A) $y = 2\sec(2\pi x)$

B) $y = 2\csc(2\pi x)$

C) $y = 2\sec\left(\frac{\pi}{2}x\right)$

D) $y = -2\sec(2\pi x)$

E) $y = -2\csc\left(\frac{\pi}{2}x\right)$

The equation of a tangent function with period 2π and phase shift $\frac{\pi}{2}$ is

A) $y = \tan\left(\frac{x-\pi}{4}\right)$

B) $y = \tan\left(\frac{2t-\pi}{2}\right)$

C) $y = \tan\left(\frac{x-2\pi}{2}\right)$

D) $y = \tan\left(\frac{2x-\pi}{4}\right)$

E) $y = \tan\left(\frac{x-2\pi}{4}\right)$

Over the interval $\left[-\frac{3\pi}{2}, 3\pi\right]$, the graph of $y = \tan\frac{2x}{3}$ has

A) four vertical asymptotes

B) three vertical asymptotes

C) five x-intercepts

D) five vertical asymptotes

E) no y-intercept

The graph of $y = -2\csc\frac{\pi x}{2}, -4 < x < 0$, is increasing on

A) $(-4, -3) \cup (-1, 0)$

B) $(-2,0)$

C) $(-3, -1)$

D) $(-3, -2)$

E) $(-4, -2)$

Let $f(x) = 1 + \csc\left(2x + \frac{\pi}{6}\right)$. Then which one of the following statements is TRUE?

A) the graph of f has infinitely many x-intercepts

B) the range of f is $(-\infty, -1] \cup [1, \infty)$

C) the period of f is 2π

D) the phase shift is $-\frac{\pi}{6}$

E) the graph of f has no y-intercept

If $f(x) = -a\tan bx, a > 0, b > 0$, is a function of period 3, then $f\left(\frac{3}{4}\right)$ is

A) equal to $-\frac{a}{b}$

B) undefined

C) equal to $\frac{a}{b}$

D) equal to $-a$

E) equal to b

The number of vertical asymptotes of $y = 3 + 2\cot\frac{\pi x}{3}$ over the interval $[-4,4]$ is

A) 6

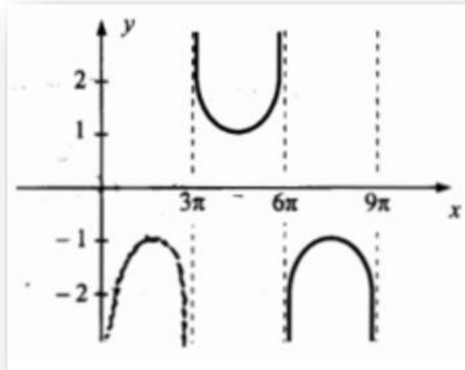
B) 3

C) 2

D) 1

E) 4

The adjacent graph represents part of the graph of



A) $y = \sec 9x$

B) $y = -\sec\frac{x}{3}$

C) $y = -\csc\frac{x}{3}$

D) $y = -\csc\frac{x}{9}$

E) $y = 2\csc\frac{x}{3}$

The graph of the function $y = \left|3\sec\frac{2x}{3}\right|$ over the interval $\left[0, \frac{3\pi}{2}\right]$ intersects the line $y = 4$ at

A) 1 point

B) 2 points

C) 3 points

D) 4 points

E) no point

The period P and the phase shift S of the function $f(x) = -2\sec\left(\frac{\pi}{3} - \frac{x}{4}\right) + 5$ are

(a) $P = 2\pi, S = \frac{2\pi}{3}$

(b) $P = 8\pi,\ S = \frac{4\pi}{3}$

(c) $P = 4\pi, S = \frac{\pi}{3}$

(d) $P = 8\pi, S = -\frac{4\pi}{3}$

(e) $P = -8\pi, S = \frac{4\pi}{3}$

If $y = 2\cot 2x$, then the number of vertical asymptotes over the interval $\left(-\frac{\pi}{4}, \frac{3\pi}{4}\right)$ is equal to

(a) 2

(b) 1

(c) 3

(d) 4

(e) 0

The number of the vertical asymptotes of the graph of $y = -3\cot\left(\frac{2x}{3}\right)$ on the interval $\left[-\frac{3\pi}{4}, \frac{15\pi}{4}\right]$ is

(a) 3

(b) 2

(c) 4

(d) 5

(e) 6

Which statement about the graph of the function $f(x) = -3\sec\frac{\pi}{4}x$ over the interval $\left[\frac{5}{2}, 5\right]$ is true?

A) There is a minimum but no maximum for the function.

B) The maximum value of the function is $f\left(\frac{5}{2}\right)$

C) The maximum value of the function is f (5)

D) The graph has neither a minimum not a maximum for the function.

E) The maximum value of the function is $f(4)$

The number of vertical asymptotes of $f(x) = 2\cot\frac{3x}{2}$ in the interval $\left(-\frac{\pi}{6}, 3\pi\right)$ is

A) 5

B) 9

C) 3

D) 2

E) 4