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

A) 5

B) 3

C) 4

D) 1

E) 2

2) $\cos\left(\frac{\pi}{2} - \sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right) =$

A) $-\frac{1}{2}$

B) $\frac{1}{2}$

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

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

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

3) The equation of the graph below is

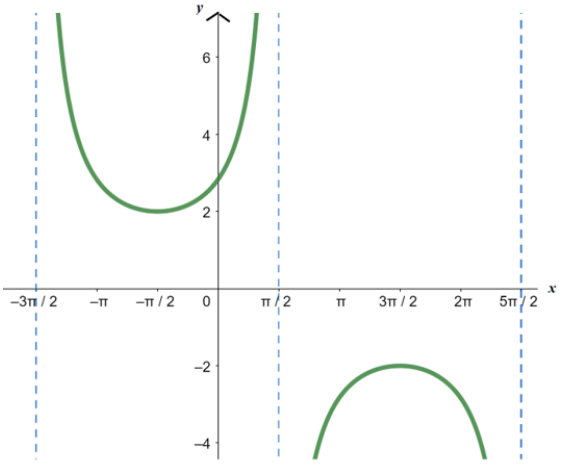
A) $y = 2 \sec\left(2x - \frac{\pi}{4}\right)$

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



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

5) $9\sqrt{2}\sin\left(2\cos^{-1}\left(-\frac{1}{3}\right)\right) =$

A) - 4

B) - 6

C) 8

D) 6

E) - 8

6) If system of equations $\begin{cases} \frac{x}{3} - \frac{y}{2} = \frac{3}{2} \\ \frac{2x}{3} + ky = \frac{3}{2} \end{cases}$, is inconsistent, then $k =$

A) - 1

B) - 2

C) 1

D) 2

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

7) $\dfrac{\cot^2 \theta}{1 + \csc \theta} =$

A) $\cos \theta - \sin \theta$

B) $\dfrac{1 + \cos \theta}{\sin \theta}$

C) $\dfrac{1 + \sin \theta}{\sin \theta}$

D) $\dfrac{1 - \sin \theta}{\sin \theta}$

E) $\dfrac{1 - \cos \theta}{\cos \theta}$

8) If $u = \langle -2\sqrt{3}, 4 \rangle$ and $v = \sqrt{3}\, i + j$, then the direction angle of the vector $u - v$ is

A) 150°

B) 135°

C) 30°

D) 60°

E) 120°

9) The sum of all the solutions of $\sin 2x \cos x + \cos 2x \sin x = 0$, $0 \le x < \pi$ is equal to

A) 5π

B) π

C) 4π

D) 2π

E) 3π

10) $\cos^{-1}\left(\cos\left(\frac{8\pi}{7}\right)\right) =$

A) $\frac{4\pi}{7}$

B) $\frac{5\pi}{11}$

C) $\frac{8\pi}{7}$

D) $\frac{6\pi}{7}$

E) $\frac{3\pi}{7}$

11) If $\cos 2\theta = \frac{7}{25}$ and $\frac{\pi}{2} < \theta < \pi$, then $\tan \theta =$

A) $-\frac{3}{4}$

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

C) $-\frac{4}{3}$

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

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

12) If (a,b) is a point of intersection between the curves $2^x + 2^y = 10$ and $4^x + 4^y = 68$, then $a + b =$

A) 1

B) 3

C) 2

D) 4

E) 0

13) The number of solutions of $(\cos x)(\cos x + 1) = 2$, $0 \le x < 2\pi$ is equal to

A) 4

B) 1

C) 2

D) 3

E) 5

14) If $\cos\left(\frac{17\pi}{12}\right) = \frac{\sqrt{a} - \sqrt{b}}{4}$, then $a + b =$

A) 4

B) 5

C) 8

D) 7

E) 6

15) $\dfrac{\sin x\,(\tan x + 1) - 2\tan x \cos x}{\sin x - \cos x} =$

A) $-\tan x$

B) $\tan x$

C) $\sec x$

D) $-\sec x$

E) $\sin x$

16) The smallest positive angle between the vectors $u = \langle 2, -2\sqrt{3} \rangle$ and $v = -2\sqrt{3}\,i + 2j$ is

A) 120°

B) 135°

C) 30°

D) 60°

E) 150°

17) If the range of the function $f(x) = 2 + \cos(3x) + \dfrac{\sqrt{3}}{\csc(3x)}$ is $[m, n]$, then $m + n =$

A) 8

B) 3

C) 0

D) 4

E) 6

18) If $\sin\theta = -\dfrac{3}{5}$ and $\tan\theta > 0$, then $\tan\dfrac{\theta}{2} =$

A) - 3

B) $-\dfrac{3}{2}$

C) $-\dfrac{4}{3}$

D) $-\dfrac{1}{3}$

E) $-\dfrac{3}{4}$

19) If $\begin{bmatrix} 1 & -3 & 1 & 5 \\ 3 & -7 & 2 & 12 \\ 2 & -6 & k & 10 \end{bmatrix}$ is the augmented matrix of a dependent system of linear equations, then $k =$

A) 2

B) 4

C) 7

D) 1

E) 3

20) Let u and v be two vectors. If $|u| = 4$, $|v| = 4$ and $|u + v| = 5\sqrt{2}$, then $u \cdot v =$

A) 7

B) 8

C) 16

D) 9

E) 6

Answer Key
Testname: MAJOR #2 MATH 002 --212-- CODE 001

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