1) If A is the amplitude of $y = -\dfrac{2}{3}\sin\dfrac{\pi}{4}x$ and P is the period of

$y = -\dfrac{3}{2}\tan\dfrac{\pi}{4}x$, then $3A + P =$

A) 6

B) 2

C) 10

D) -2

E) -8

2) The graph in the figure is part of the graph of:

A) $y = -3\cos\dfrac{\pi}{2}x$

B) $y = 3\cos\dfrac{\pi}{2}x$

C) $y = 3\cos 2\pi x$

D) $y = -3\cos 2\pi x$

E) $y = 3\sin\dfrac{\pi}{2}x$

1

3) The number of x - intercepts of the graph of $y = \tan\left(\dfrac{x}{2} + \pi\right)$

in the interval $(-3\pi, 3\pi)$ is:

A) 3

B) 1

C) 2

D) 4

E) 5

4) $\cos 465° =$

A) $\dfrac{\sqrt{2} - \sqrt{6}}{4}$

B) $\dfrac{\sqrt{6} - \sqrt{2}}{4}$

C) $\dfrac{\sqrt{2} - \sqrt{6}}{2}$

D) $\dfrac{\sqrt{3} - \sqrt{6}}{4}$

E) $\dfrac{\sqrt{6} - \sqrt{2}}{2}$

5) $\dfrac{\tan \dfrac{5\pi}{12} + \tan \dfrac{\pi}{4}}{1 - \tan \dfrac{5\pi}{12} \tan \dfrac{\pi}{4}} + \dfrac{1}{\sqrt{3}} =$

A) $-\dfrac{2\sqrt{3}}{3}$

B) $-\sqrt{3}$

C) 0

D) $\sqrt{3}$

E) $-\dfrac{3\sqrt{2}}{2}$

6) $\cos\left[\sin^{-1}\dfrac{3}{5} + \cos^{-1}\dfrac{5}{13}\right] =$

A) $-\dfrac{16}{65}$

B) $\dfrac{56}{65}$

C) $\dfrac{16}{65}$

D) $-\dfrac{56}{65}$

E) $\dfrac{63}{65}$

3

7) If $\cos^{-1} x + 2\sin^{-1}\dfrac{\sqrt{3}}{2} = \pi$ then $2x + 1$

  A) 2

  B) $-\dfrac{1}{2}$

  C) $\dfrac{\sqrt{3}}{2}$

  D) $-\dfrac{\sqrt{3}}{2}$

  E) $\dfrac{\sqrt{2}}{2}$

8) If the system of the linear equations
   $-4x + 4y + 3 = 0$
   $2x - ky + 2 + k = 0$,   is INCOSISTENT , then $k =$

  A) 2

  B) 3

  C) 4

  D) -2

  E) 5

4

9) If (a, b) is the solution of the system of equations

$3x + 4y = 4$

$x - y = 13$ then $2a + b =$

A) 11

B) 6

C) 5

D) 3

E) 21

10) $\dfrac{\sin x}{1 + \cot(-x)} + \dfrac{\cos(-x)}{1 - \tan x}$ simplifies to

A) $\sin x + \cos x$

B) $\sin 2x$

C) $\sin x - \cos x$

D) $\cos x - \sin x$

E) $\tan x \sec x$

11) The number of solutions of the equation $\sin x = \sin 2x$, for

$-\dfrac{\pi}{2} \le x \le \dfrac{\pi}{2}$, is equal to :

  A) 3

  B) 2

  C) 1

  D) 4

  E) 0

12) The number of vertical asymptotes of the graph of $f(x) = \csc\left(x - \dfrac{\pi}{4}\right)$

  in the interval $\left(-2\pi, 2\pi\right]$ is

  A) 4

  B) 2

  C) 1

  D) 3

  E) 5

6

13) If α is the smallest angle between the vectors $\vec{u} = \langle 3 , -2 \rangle$ and $\vec{v} = \langle 2 , -2 \rangle$, then $\cos^2\alpha$ =

A) $\dfrac{25}{26}$

B) $\dfrac{1}{26}$

C) $\dfrac{1}{13}$

D) $\dfrac{2}{13}$

E) $\dfrac{7}{13}$

14) The range of the function $f(x) = 1 + \sec\dfrac{x}{3}$ is :

A) $(-\infty , 0] \cup [2 ,\infty)$

B) $(0 , 2)$

C) $(-\infty , 0) \cup (2 , \infty)$

D) $(-\infty ,-1] \cup [1 ,\infty)$

E) $[-2 , 2]$

15) If the function $y = \dfrac{1}{\csc x} - \dfrac{1}{\sec x}$ is written as $y = k\,\sin(x + \theta)$, $k > 0$, $\dfrac{3\pi}{2} < \theta < 2\pi$, then $4\sqrt{2}\,k + 4\,\theta =$

A) $7\pi + 8$

B) $9\pi + 8$

C) $8\pi + 8$

D) $11\pi + 8$

E) $10\pi + 8$

16) $\tan\left[2\,\sin^{-1}\dfrac{3}{5}\right] =$

A) $\dfrac{24}{7}$

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

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

D) $\dfrac{12}{7}$

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

17) $\dfrac{\sin^3 x - \cos^3 x}{\sin x - \cos x}$ simplifies to :

A) $1 + \dfrac{1}{2} \sin 2x$

B) $1 + \dfrac{1}{2} \cos 2x$

C) $1 + 2 \sin x \cos x$

D) $1 - 2\sin x \cos x$

E) $1 + 2 \cos x$

18) $\dfrac{\sin 160°}{1 + \cos 160°}$ is equal to :

A) $\cot 10°$
B) $\tan 10°$
C) $\sin 80°$
D) $\cos 80°$
E) $1 - \tan 10°$

19) If $\pi < x < \dfrac{3\pi}{2}$, then $\sec x =$

A) $\quad -\dfrac{\sqrt{1 - \sin^2 x}}{1 - \sin^2 x}$

B) $\quad \dfrac{\sqrt{1 - \sin^2 x}}{1 - \sin^2 x}$

C) $\quad \sqrt{1 - \sin^2 x}$

D) $\quad -\sqrt{1 - \sin^2 x}$

E) $\quad 1 + \sin^2 x$

20) The number of solutions of the equation $\tan^2 x + \tan x - \sqrt{3} = \sqrt{3}\tan x$ over the interval $[0 , 2\pi)$ is

A) 4

B) 3

C) 2

D) 1

E) 5