1) If $\left(a, -\frac{3}{4}\right)$ is a point on a **unit circle** on the terminal side of an angle θ, in standard position, in quadrant III, then $\cos\theta =$

A) $-\frac{\sqrt{7}}{4}$

B) $-\frac{\sqrt{7}}{2}$

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

D) $-\frac{a}{2}$

E) $-\frac{5}{4}$

2) The graph of $y = -2\sin\left(\frac{\pi x}{2}\right)$, with $0 < x < 4$, is **increasing** on

A) $[1, 3]$

B) $[0, 1] \cup [3, 4]$

C) $[\pi, 3\pi]$

D) $[0, \pi] \cup [3\pi, 4\pi]$

E) $[0, 4]$

3) The **range** of the function $f(x) = 2 - \left| \cos\left(-\frac{\pi x}{4}\right) \right|$ is equal to

A) [1, 2]

B) [0 , 1]

C) [2 , 3]

D) [− 1 , 0]

E) [− 2 , 0]

4) If P is the period, and S is the horizontal shift for the graph of the function

$f(x) = \frac{1}{2} \sin\left(2x + \frac{\pi}{4}\right), \quad \frac{\pi}{2} \le x \le \pi,$ then P + S =

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

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

C) $-\frac{3\pi}{8}$

D) $-\frac{7\pi}{4}$

E) $\frac{3\pi}{8}$

5) The given graph represents part of the graph of the function

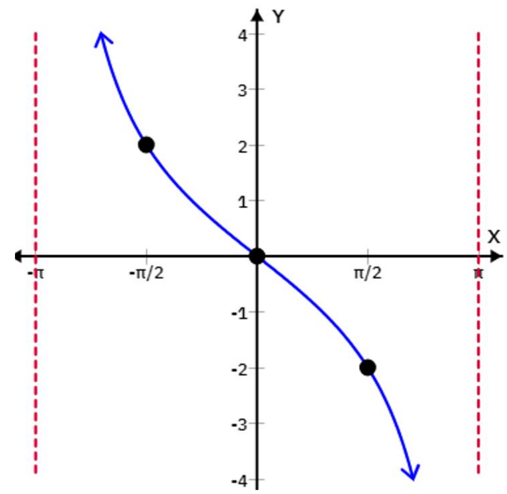
A) $y = -2\tan\left(\frac{1}{2}x\right)$

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

C) $y = 2\cot\left(\frac{1}{2}x\right)$

D) $y = 2\cot\left(\frac{1}{2}x + \pi\right)$

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



6) The graph of $y = -\frac{1}{2}\cot(2x)$, $-\frac{\pi}{4} < x \leq \frac{\pi}{2}$, is **below** the x–axis on

A) $(0, \pi/4)$

B) $(\pi/4, \pi/2)$

C) $(-\pi/4, 0)$

D) $(-\pi/4, \pi/4)$

E) $(0, \pi/2)$

7) The **number** of the vertical asymptotes of the graph of $y = \frac{2}{3} - \frac{3}{2}\csc(2x - \pi)$ in the interval $(-\pi, \pi)$ is

A) 3

B) 2

C) 4

D) 5

E) 6

8) If $[m, n]$ is the **domain** of $f(x) = \frac{1}{2}\cos^{-1}\left(\frac{x}{2} - \frac{2}{3}\right)$, then $n - m =$

A) 4

B) 1

C) 2

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

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

9) If $\cos^{-1} x + \sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \frac{\pi}{2}$, then $x =$

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

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

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

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

E) 1

10) $\sin^4 x - \cos^4 x =$

A) $-\cos 2x$

B) $-\sin 2x$

C) $1 - 2\sin^2 x$

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

E) $\cos^2 x \sin^2 x$

11) If $25\cos^2\theta - 16 = 0$, where $\frac{3\pi}{2} < \theta < 2\pi$, then $\cot\theta =$

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

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

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

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

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

12) $\frac{\tan^2 x}{\sec^2 x} =$

A) $1 - \cos^2 x$

B) $\frac{1}{2}\sin^2 x$

C) $1 - \sin^2 x$

D) $1 + \cot^2 x$

E) $\frac{1}{2}\csc^2 x$

13) The expression $\cos\left(\frac{\pi}{2} - \alpha - \beta\right)$ simplifies to

A) $\sin(\alpha + \beta)$

B) $\sin(\alpha - \beta)$

C) $\cos(\alpha + \beta)$

D) $-\cos(\alpha - \beta)$

E) $-\cos(\alpha + \beta)$

14) $\tan\left(\frac{2\pi}{3} - \frac{\pi}{4}\right) =$

A) $2 + \sqrt{3}$

B) $2 - \sqrt{3}$

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

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

E) -1

15) The expression $\cot 67.5°$, is equal to

A) $-1+\sqrt{2}$

B) $1+\sqrt{2}$

C) $2+\sqrt{2}$

D) $2-\sqrt{2}$

E) $-1-\sqrt{2}$

16) If $\csc\theta = -\dfrac{5}{3}$, $\pi < \theta < \dfrac{3\pi}{2}$, then $\cos\dfrac{\theta}{2} =$

A) $-\dfrac{\sqrt{10}}{10}$

B) $\dfrac{\sqrt{10}}{10}$

C) $-\dfrac{\sqrt{5}}{10}$

D) $\sqrt{10}$

E) $-\sqrt{10}$

17) $\left(\sin\frac{x}{2} - \cos\frac{x}{2}\right)^2 =$

A) $1 - \sin x$

B) $1 + \cos x$

C) $-\cos x$

D) $-\sqrt{1+\cos x}$

E) $\sqrt{1-\sin x}$

18) The **number** of all the **negative** solution(s) of the equation $2\sin\left(x+\frac{2\pi}{3}\right)=\sqrt{3}$

$-\pi \le x < 2\pi$, is

A) 1

B) 0

C) 2

D) 3

E) 4

19) If $0° \leq x < 360°$, then the **number** of all the solution(s) of the equation

$\tan^2 x + \tan x - \sqrt{3} \tan x = \sqrt{3}$, is equal to

A) 4

B) 1

C) 5

D) 6

E) 2

20) The **solution set** of the equation $3\cos^2 x + 2\cos x - 8 = 0$, $0 \leq x < 2\pi$, is

A) $\varnothing$

B) $\{\frac{\pi}{3}, \frac{5\pi}{3}\}$

C) $\{\frac{2\pi}{3}, \frac{4\pi}{3}\}$

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

E) $\{\frac{2\pi}{3}, \frac{5\pi}{3}\}$