MAC 1114 – Spring 2018 – FINAL EXAM

Section # _____ Name _____

UF ID # _____ Signature _____

1. Which of the following angles is NOT coterminal with $-\frac{3\pi}{4}$?

   A. $-\frac{11\pi}{4}$ B. $-\frac{7\pi}{4}$ C. $\frac{5\pi}{4}$ D. $\frac{13\pi}{4}$

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2. Rewrite $75°$ in radian measure. Simplify any fractions **completely**.

   A. $\frac{5}{12}$ B. $\frac{5\pi}{12}$ C. $\frac{25\pi}{60}$ D. $\frac{15\pi}{36}$

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3. Evaluate $\cos\left(-\frac{2\pi}{3}\right)$.

   A. $\frac{1}{2}$ B. $-\frac{1}{2}$ C. $-\frac{\sqrt{3}}{2}$ D. $\frac{\sqrt{3}}{2}$

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4. Which of the following equations is a trigonometric identity?

   A. $1 + \tan x = \sec x$ C. $\sec x = \frac{1}{\sin x}$

   B. $\sin(2x) = 2\sin x \cos x$ D. $\cos(-x) = -\cos x$

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5. State the quadrant in which $\theta$ lies if $\tan\theta < 0$ and $\sin\theta < 0$.

   A. IV B. II C. I D. III

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6. Given $\sec\theta$ is undefined and $\pi \leq \theta \leq 2\pi$, find $\sin\theta$.

   A. 1 C. 0

   B. $\sin\theta$ is undefined D. -1

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7. Describe how to obtain the graph of $y = -4 + \frac{1}{2}\cos\left(x - \frac{\pi}{3}\right)$ from $y = \cos x$.

   A. Multiply all $y$-values by $\frac{1}{2}$, reflect over the $x$-axis, shift right $\frac{\pi}{3}$ units, and shift up 4 units

   B. Multiply all $y$-values by $\frac{1}{2}$, shift left $\frac{\pi}{3}$ units, and shift down 4 units

   C. Multiply all $y$-values by $\frac{1}{2}$, reflect over the $x$-axis, shift left $\frac{\pi}{3}$ units, and shift up 4 units

   D. Multiply all $y$-values by $\frac{1}{2}$, shift right $\frac{\pi}{3}$ units, and shift down 4 units

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8. Where are the vertical asymptotes of $y = \sec x$ located?

   A. $x = 0, \pm\pi, \pm 2\pi, \pm 3\pi, \ldots$

   B. $x = -\pi, 0, \pi$

   C. $x = \pm\frac{\pi}{2}, \pm\frac{3\pi}{2}, \pm\frac{5\pi}{2}, \ldots$

   D. $x = -\frac{3\pi}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$

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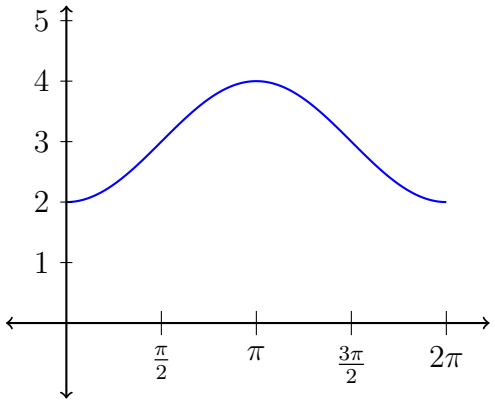
9. Find $a$ and $d$ for the function $f(x) = d + a\cos x$ such that the graph of $f$ matches the figure.




   A. $a = -2, d = 3$

   B. $a = 1, d = 3$

   C. $a = -1, d = 2$

   D. $a = -1, d = 3$

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10. Evaluate $\arctan\left(-\frac{1}{\sqrt{3}}\right)$.

A. $\frac{5\pi}{6}$ B. $-\frac{\pi}{3}$ C. $-\frac{\pi}{6}$ D. $\frac{2\pi}{3}$

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11. Evaluate $\arctan\left(\tan\frac{3\pi}{4}\right)$.

A. $\frac{3\pi}{4}$

B. The expression cannot be evaluated.

C. $-1$

D. $-\frac{\pi}{4}$

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12. Find the exact value of $\cos\left(\arcsin\frac{3}{7}\right)$.

A. $\frac{2\sqrt{10}}{3}$ B. $\frac{2\sqrt{10}}{7}$ C. $\frac{40}{7}$ D. $\frac{\sqrt{58}}{7}$

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13. A swimming pool is 5 meters long. The bottom of the pool is slanted so that it is 2 meters deep at the shallow end and 12 meters deep at the deep end. Which of the following is the angle of depression of the bottom of the pool?

A. $\arccos\frac{5}{13}$ B. $\arctan\frac{12}{5}$ C. $\arctan 2$ D. $\arctan\frac{1}{2}$

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14. Factor the expression.

$$2\cos^2 x + 9\sin x + 3$$

A. $(\sin x - 5)(2\sin x + 1)$

B. $-(2\sin x + 1)(\sin x - 5)$

C. The expression cannot be factored.

D. -$(\sin x - 10)(\sin x + 1)$

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15. Use identities to rewrite the expression.

$$\frac{\tan x \cdot \sin x}{\cot x}$$

A. $\sin x$

B. $\tan x \cdot \sec x \cdot \sin^2 x$

C. $\dfrac{\sin x}{\cos^2 x}$

D. $\sin^3 x \cdot \csc^2 x$

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16. Which of the following expressions is equal to $\sec^2 x + \csc^2 x$?

A. 2

B. 1

C. $(\sec^2 x)(\csc^2 x)$

D. $\dfrac{2}{(\cos^2 x)(\sin^2 x)}$

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17. Fred and George try to solve the equation $\sin^2 x = \dfrac{1}{2}$. Fred gets $x = \dfrac{\pi}{4} + 2n\pi, \dfrac{3\pi}{4} + 2n\pi, \dfrac{5\pi}{4} + 2n\pi, \dfrac{7\pi}{4} + 2n\pi$; George gets $x = \dfrac{\pi}{4} + n\pi, \dfrac{3\pi}{4} + n\pi$. Which of them is correct?

A. Both of them are correct

B. Fred

C. Neither of them is correct

D. George

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18. Find all solutions in the interval $[0, 2\pi)$.

$$\tan^3 x - 3\tan x = 0$$

A. $x = 0, \frac{\pi}{3}, \frac{2\pi}{3}, \pi, \frac{4\pi}{3}, \frac{5\pi}{3}$

C. $x = 0, \frac{\pi}{6}, \pi, \frac{7\pi}{6}$

B. $x = 0, \frac{\pi}{3}, \pi, \frac{4\pi}{3}$

D. $x = 0, \frac{\pi}{6}, \frac{5\pi}{6}, \pi, \frac{7\pi}{6}, \frac{11\pi}{6}$

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19. Find the general solution.

$$4\sin x \cos x + 2\cos x - 2\sin x - 1 = 0$$

A. $x = \frac{\pi}{3} + 2n\pi, \frac{5\pi}{3} + 2n\pi, \frac{7\pi}{6} + 2n\pi, \frac{11\pi}{6} + 2n\pi$

B. $x = \frac{\pi}{6} + 2n\pi, \frac{11\pi}{6} + 2n\pi, \frac{4\pi}{3} + 2n\pi, \frac{5\pi}{3} + 2n\pi$

C. $x = \frac{\pi}{3} + 2n\pi, \frac{4\pi}{3} + 2n\pi, \frac{7\pi}{6} + 2n\pi, \frac{11\pi}{6} + 2n\pi$

D. $x = \frac{\pi}{6} + 2n\pi, \frac{7\pi}{6} + 2n\pi, \frac{4\pi}{3} + 2n\pi, \frac{5\pi}{3} + 2n\pi$

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20. Evaluate $\sin 195°$.

A. $\frac{\sqrt{2} + \sqrt{6}}{4}$

C. $\frac{-\sqrt{2} - \sqrt{6}}{4}$

B. $\frac{\sqrt{2} - \sqrt{6}}{4}$

D. $\frac{\sqrt{6} - \sqrt{2}}{4}$

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21. Evaluate $\cos\frac{7\pi}{12}\cos\frac{\pi}{12} + \sin\frac{7\pi}{12}\sin\frac{\pi}{12}$.

A. 0 B. $-\frac{1}{2}$ C. 1 D. $\frac{\sqrt{3}}{2}$

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22. Write $\sin(\arcsin x + \arccos 3x)$ as an algebraic expression.

A. $3x^2 - (\sqrt{1-x^2})(\sqrt{1-9x^2})$

B. $3x^2 + (\sqrt{1-x^2})(\sqrt{1-3x^2})$

C. $3x^2 + (\sqrt{1-x^2})(\sqrt{1-9x^2})$

D. $3x\sqrt{1-x^2} - x\sqrt{1-9x^2}$

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23. Find the exact value of $\sin 2x$ if $\tan x = -\frac{1}{2}$ and $\frac{3\pi}{2} < x < 2\pi$.

A. $-\frac{4}{5}$ B. $\frac{4}{5}$ C. $-\frac{2}{\sqrt{5}}$ D. $-\frac{2}{5}$

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24. Use double-angle formulas to rewrite $\cos(4x)$ in terms of $\cos(x)$.

A. $2\cos^2(x) - 1$

B. $4\cos^2(x) - 2$

C. $2(2\cos^2(x) - 1)^2 - 1$

D. $4\cos^2(x) - 3$

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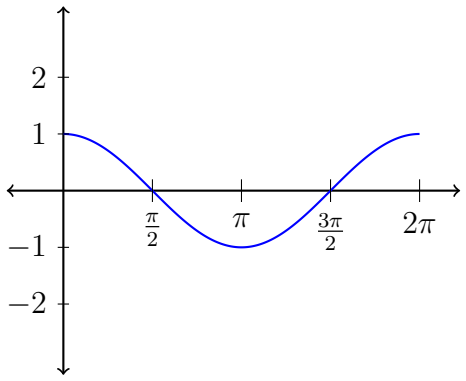
25. Which of the following is the graph of $y = -\cos\left(x - \frac{\pi}{2}\right)$?

A.

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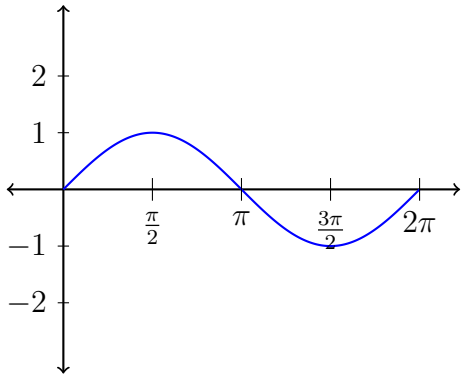
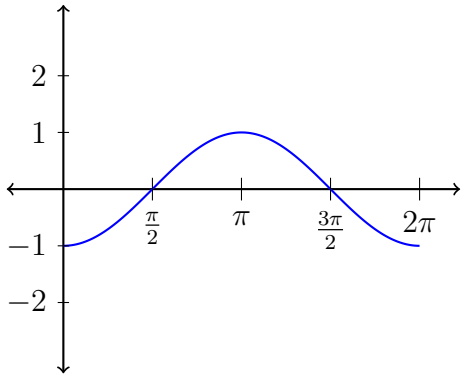



C.




D.