MA 15400 Exam 2 Spring 2009

Covers Lessons 10-22, Sections 6.5, 6.7, 7.2, 7.3, 7.4, and 7.6 to question 34

1. Find the exact value of the expression $\cos^{-1}\left(\frac{-\sqrt{2}}{2}\right)$ whenever it is defined.

A. $\frac{5\pi}{4}$

B. $\frac{\pi}{4}$

C. $\frac{-3\pi}{4}$

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

E. None of the above.

2. Find the period and phase shift of the function.

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

A. *Period* = 6, *Phase Shift* = $\frac{\pi}{6}$

B. *Period* = 6, *Phase Shift* = $\frac{3}{2}$

C. *Period* = $\frac{2\pi}{3}$, *Phase Shift* = $\frac{3}{2}$

D. *Period* = $\frac{2\pi}{3}$, *Phase Shift* = $\frac{\pi}{6}$

E. None of the above.

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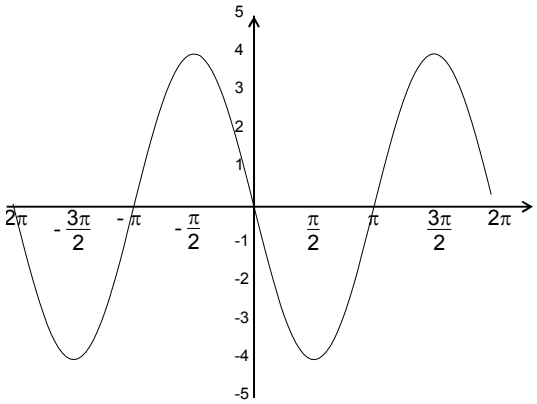
3. Find the equation of the function graphed below in the form $y = a\sin(bx + c)$ for $a > 0$, $b > 0$, and least positive real number c.



A. $y = 4\sin\left(2x + \frac{\pi}{2}\right)$

B. $y = 4\sin(x + \pi)$

C. $y = 4\sin(2x + 2\pi)$

D. $y = 4\sin\left(\frac{1}{2}x + \pi\right)$

E. $y = 4\sin(x + 2\pi)$

4. A ship leaves port at 1:00 PM and sails in the direction N38ºW at a rate of 31 miles per hour. Another ship leaves the same port at the same time and travels S52ºW at a rate of 50 miles per hour. How far apart are the two ships at 3:00 PM? Please round your answer to the nearest mile.

A. 59 miles

B. 88 miles

C. 112 miles

D. 118 miles

E. None of the above.

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5. An airplane flying at a speed of 410 miles per hour flies from a Point A in the direction 115º for 2 hours and then flies in the direction 25º for one hour. What direction does the plane now have to travel to get back to Point A? Please round your answer to the nearest whole degree.

A. 263º

B. 252º

C. 268º

D. 227º

E. None of the above.

6. Given $\beta = 60º$ and $a = 4$ in ΔABC with $\gamma = 90º$, find the **exact** value of b.

A. $4\sqrt{3}$

B. 2

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

D. 8

E. None of the above.

7. Express as a trigonometric functions of one angle.

$\sin 54° \cos 12° - \cos 54° \sin 12°$

A. $\cos 42°$

B. $\sin 66°$

C. $\cos 66°$

D. $\sin 42°$

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E. None of the above.

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8. Find all the solutions of the equation, using *n* as arbitrary integer.

$$\sin(x) = \frac{-\sqrt{2}}{2}$$

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

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

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

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

E. None of the above.

9. Find all the solutions of the equation, using *n* as arbitrary integer.

$$\sqrt{3}\cot\left(\frac{1}{4}t\right) = 1$$

A. $t = \frac{4\pi}{3} + 4\pi n$

B. $t = \frac{\pi}{24} + \frac{\pi}{4}n$

C. $t = \frac{2\pi}{3} + 4\pi n$

D. $t = \frac{\pi}{12} + \frac{\pi}{4}n$

E. None of the above.

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10. Find the solutions of the equation that are in the interval [0, 2π).

$$2\cos^2 t - 3\cos t + 1 = 0$$

A. $t = \frac{\pi}{6}, \frac{11\pi}{6}, 0$

B. $t = \frac{\pi}{3}, \frac{5\pi}{3}, 0$

C. $t = \frac{5\pi}{6}, \frac{7\pi}{6}, \pi$

D. $t = \frac{2\pi}{3}, \frac{4\pi}{3}, \pi$

E. None of the above.

11. Find the solutions of the equation that are in the interval [0, 2π).

$$\sin^2(t) + \cos(2t) = 0$$

A. $t = \frac{\pi}{3}, \frac{2\pi}{3}$

B. $t = \frac{7\pi}{6}, \frac{11\pi}{6}$

C. $t = 0, \pi$

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

E. Undefined

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12. If $\sin\alpha = \frac{7}{8}$ and $\cos\beta = \frac{7}{25}$ for a second-quadrant angle α and a fourth-quadrant angle β, find the exact value of $\cos(\alpha - \beta)$.

A. $\frac{-7\sqrt{15}+168}{200}$

B. $\frac{7\sqrt{15}+168}{200}$

C. $\frac{-7\sqrt{15}-168}{200}$

D. $\frac{7\sqrt{15}-168}{200}$

E. None of the above.

13. Find the exact value of $\sin 2\theta$ for $\sec\theta = \frac{-7}{4}$ and $90° < \theta < 180°$.

A. $\frac{-8\sqrt{33}}{49}$

B. $\frac{17}{49}$

C. $\frac{8\sqrt{33}}{49}$

D. $\frac{-17}{49}$

E. None of the above.

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14. A 33 foot ladder leans against the side of a building making a 68º angle with the ground. If the bottom of the ladder is then moved 1 foot farther away from the base of the building, how much does the angle the ladder makes with the ground change? Round to the nearest tenth of a degree.

A. 2.1º

B. 1.3º

C. 2.4º

D. 1.9º

E. None of the above.

15. Find the exact value of the expression $\tan\left[2\arccos\left(\frac{-1}{8}\right)\right]$.

A. $\frac{-\sqrt{63}}{31}$

B. $\frac{16}{63}$

C. $\frac{\sqrt{63}}{31}$

D. $\frac{-16}{63}$

E. None of the above.

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Question	Answer	Letters
1.	$\frac{3\pi}{4}$	E
2.	*Period = 6, Phase Shift =* $\frac{3}{2}$	B
3.	$y = 4\sin(x+\pi)$	B
4.	118 miles	D
5.	268^0	C
6.	$4\sqrt{3}$	A
7.	$\sin 42°$	D
8.	$x = \frac{5\pi}{4} + 2\pi n, \frac{7\pi}{4} + 2\pi n$	C
9.	$t = \frac{4\pi}{3} + 4\pi n$	A
10.	$t = \frac{\pi}{3}, \frac{5\pi}{3}, 0$	B
11.	$t = \frac{\pi}{2}, \frac{3\pi}{2}$	D
12.	$\frac{-7\sqrt{15}-168}{200}$	C
13.	$\frac{-8\sqrt{33}}{49}$	A
14.	1.9°	D
15.	$\frac{\sqrt{63}}{31}$	C