MA 154 Exam 2 Fall 2003

The exam covers sections 6.7, 7.2, 7.3, 7.4 and through question #14 of section 7.6.

1. If $x$ is measured in radians, $\cos(x)$ is equivalent to which of the following?

A. $\cot\left(\frac{\pi}{2} - x\right)$

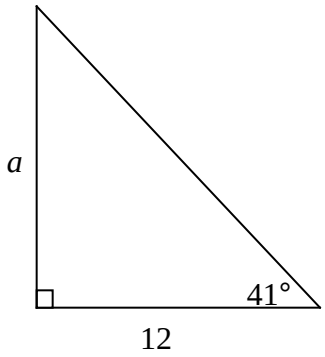
B. $\sec\left(\frac{\pi}{2} - x\right)$

C. $\csc\left(\frac{\pi}{2} - x\right)$

D. $\sin\left(\frac{\pi}{2} - x\right)$

E. None of these.

2. Approximate the value of $a$ to the nearest tenth.




A. 15.9

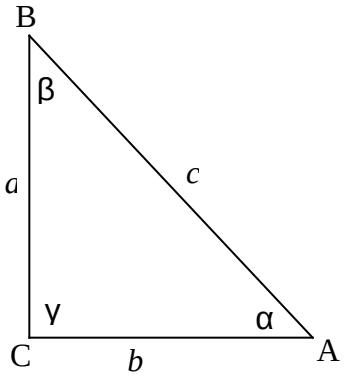
B. 13.8

C. 7.9

D. 9.1

E. None of these.

3. Given $\Delta ABC$ with $\gamma = 90°$, express c in terms of $\alpha$ and $b$.




A. $c = \frac{b}{\cos\alpha}$

B. $c = b\cos\alpha$

C. $c = \frac{b}{\sin\alpha}$

D. $c = b\sin\alpha$

E. None of these.

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4. A 20-foot long ladder leans against the side of a building such that the top of the ladder is 18 feet from the ground. If the bottom of the ladder is moved 2 feet closer to the building, how much does the angle the ladder makes with the ground change?

A. 5.7°

B. 6.2°

C. 4.1°

D. 2.9°

E. None of these.

5. A ship leaves port at 2:00 PM and sails in the direction S12°W at a rate of 35 miles per hour. At 2:30, a second ship leave the same port and travels in the direction N78°W at a rate of 25 miles per hour. To the nearest mile, how far apart are the two ships at 5:00 PM?

A. 115 miles

B. 129 miles

C. 122 miles

D. 108 miles

E. None of these.

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6. Find all the solutions of the equation $\cot\theta = -\sqrt{3}$.

A. $\frac{2\pi}{3} + \pi n$

B. $\frac{7\pi}{6} + \pi n$

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

D. $\frac{5\pi}{6} + \pi n$

E. None of these.

7. Find all the solutions of the equation $\sin\left(3x - \frac{\pi}{3}\right) = -1$.

A. $\frac{11\pi}{18} + \frac{2\pi}{3} n$

B. $\frac{4\pi}{9} + \frac{2\pi}{3} n$

C. $\frac{4\pi}{9} + \pi n$

D. $\frac{4\pi}{9} + 2\pi n$

E. $\frac{11\pi}{18} + 2\pi n$

8. If $\sec\theta = \frac{5}{2}$, for $270° < \theta < 360°$, find the exact value of $\cos(2\theta)$.

A. 1

B. $-\frac{17}{25}$

C. –1

D. $\frac{17}{25}$

E. None of these.

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9. If $\alpha$ and $\beta$ are second-quadrant angles such that $\tan\alpha = -\frac{4}{3}$ and $\sin\beta = \frac{12}{13}$, find the exact value of $\sin(\alpha + \beta)$.

A. $\frac{56}{65}$

B. $-\frac{16}{65}$

C. $-\frac{56}{65}$

D. $\frac{16}{65}$

E. None of these.

10. $\cos\left(\theta - \frac{\pi}{3}\right)$ is equivalent to which of the following?

A. $\frac{1}{2}\left(\cos\theta + \sqrt{3}\sin\theta\right)$

B. $\frac{1}{2}\left(\sin\theta + \sqrt{3}\cos\theta\right)$

C. $\frac{1}{2}\left(\cos\theta - \sqrt{3}\sin\theta\right)$

D. $\frac{1}{2}\left(\sin\theta - \sqrt{3}\cos\theta\right)$

E. None of these.

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11. Find the *x*-intercepts of the function $y = \cos(x) - \sin(2x)$, for $0 \le x < 2\pi$.

A. $0, \pi, \frac{\pi}{3}, \frac{2\pi}{3}$

B. $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{3}, \frac{2\pi}{3}$

C. $0, \pi, \frac{\pi}{2}, \frac{3\pi}{2}$

D. $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$

E. None of these.

12. Find the exact value of $\cos\left[\tan^{-1}\left(-\frac{1}{\sqrt{3}}\right)\right]$.

A. $-\frac{\pi}{6}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{1}{2}$

D. $\frac{\pi}{6}$

E. $\frac{\sqrt{2}}{2}$

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13. An airplane leaves point A and travels in the direction 150° at a speed of 500 miles per hour for 2 hours. It then travels in the direction 60° at a speed of 400 miles per hour for 1 hour. To the nearest degree, what direction does it now have to take to get back to point A?

A. 301°

B. 285°

C. 296°

D. 308°

E. None of these.

14. How many solutions does the equation have in the interval $[0, 2\pi)$?

$$2\sin^2 t - 5\sin t + 3 = 0$$

A. 1

B. 2

C. 3

D. 4

E. 0

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Exam 2 Answers

| Question | | |
|---|---|---|
| 1 | $\sin\left(\frac{\pi}{2} - x\right)$ | D |
| 2 | 10.4 (None of these) | E |
| 3 | $c = \frac{b}{\cos\alpha}$ | A |
| 4 | 6.2° | B |
| 5 | 122 miles | C |
| 6 | $\frac{5\pi}{6} + \pi n$ | D |
| 7 | $\frac{11\pi}{18} + \frac{2\pi}{3} n$ | A |
| 8 | $-\frac{17}{25}$ | B |
| 9 | $-\frac{56}{65}$ | C |
| 10 | $\frac{1}{2}\left(\cos\theta + \sqrt{3}\sin\theta\right)$ | A |
| 11 | $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$ | D |
| 12 | $\frac{\sqrt{3}}{2}$ | B |
| 13 | 308° | D |
| 14 | 1 | A |