MA 154 Exam 2 Spring 2003

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

1. Express as a trigonometric function of one angle.
   $\sin(32°)\cos(12°) + \sin(12°)\cos(32°)$

   A. $\sin(20°)$

   B. $\cos(20°)$

   C. $\sin(44°)$

   D. $\cos(44°)$

   E. None of these.

2. Given $a = 12$ and $\alpha = 40°$ in ΔABC, with $\gamma = 90°$, approximate the value of the perimeter of the triangle to one decimal place.

   A. 37.7 cm

   B. 47.4 cm

   C. 52.9 cm

   D. 45.0 cm

   E. 47.9 cm

3. In triangle ABC, where $\gamma = 90°$, express b in terms of β and c.

   A. $b = \dfrac{c}{\sin\beta}$

   B. $b = c\cos\beta$

   C. $b = \dfrac{c}{\cos\beta}$

   D. $b = \dfrac{c}{\tan\beta}$

   E. $b = c\sin\beta$

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4. Initially, a 25-foot ladder, leaning against a building, makes a 15° angle with the building. The ladder is moved, so that it now makes a 25° angle with the building. How far did the top of the ladder move down the building? Round to the nearest tenth of a foot.

A. 1.5 feet

B. 6.3 feet

C. 5.0 feet

D. 1.7 feet

E. None of these.

5. Find all the solutions of the equation, $\cos\theta = \frac{1}{\sqrt{2}}$.

A. $\theta = \frac{3\pi}{4} + 2\pi n,\ \theta = \frac{5\pi}{4} + 2\pi n$

B. $\theta = \frac{5\pi}{4} + \pi n$

C. $\theta = \frac{\pi}{4} + \pi n$

D. $\theta = \frac{\pi}{4} + 2\pi n,\ \theta = \frac{7\pi}{4} + 2\pi n$

E. None of these.

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Questions 6 and 7:

An airplane, flying at a speed of 420 miles per hour, flies from point A in the direction 32° for 2 hours. It then flies in the direction 122° for 1 hour.

6. How long will it take to fly back to point A, provided it flies straight back and does not change its speed? Round to the nearest tenth of an hour.

A. 3.0 hours

B. 1.4 hours

C. 2.5 hours

D. 2.2 hours

E. None of these.

7. In what direction does the plane need to fly in order to get back to point A? Round to the nearest whole degree.

A. 297°

B. 247°

C. 239°

D. 302°

E. 255°

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8. Find all the solutions of the equation, $\tan\left(3x + \frac{\pi}{2}\right) = \sqrt{3}$.

A. $x = \frac{\sqrt{3}}{3} - \frac{\pi}{6}$

B. $x = \frac{\pi}{9} + \frac{\pi}{3}n$

C. $x = \frac{\pi}{12} + \frac{\pi}{3}n$

D. $x = \frac{\pi}{18} + \frac{\pi}{3}n$

E. None of these.

9. Find the solutions of the equation that are in the interval $[0, 2\pi)$.

$\tan^2 t - 1 = 0$

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

B. $\frac{3\pi}{4}, \frac{7\pi}{4}$

C. $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

D. $\frac{3\pi}{4}, \frac{5\pi}{4}$

E. None of these.

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10. If α and β are acute angles such that $\sec\alpha = \frac{13}{12}$ and $\cot\beta = \frac{7}{24}$, find the exact value of $\cos(\alpha - \beta)$.

A. $\frac{36}{325}$

B. $-\frac{36}{325}$

C. $\frac{253}{325}$

D. $-\frac{253}{325}$

E. None of these.

11. Find the exact value of $\tan(2\theta)$ if $\csc\theta = 6$ and $90° < \theta < 180°$.

A. $-13\sqrt{35}$

B. $\frac{\sqrt{35}}{17}$

C. $13\sqrt{35}$

D. $-\frac{\sqrt{35}}{17}$

E. None of these

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12. Find the solutions of the equation that are in the interval $[0, 2\pi)$.

$$\cos u + \cos 2u = 0$$

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

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

C. $0, \frac{5\pi}{6}, \frac{7\pi}{6}$

D. $\frac{\pi}{6}, \pi, \frac{11\pi}{6}$

E. None of these.

13. Find the exact value of the expression.

$$\tan^{-1}\left(\tan\left(-\frac{7\pi}{6}\right)\right)$$

A. $-\frac{7\pi}{6}$

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

C. $\frac{7\pi}{6}$

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

E. None of these.

14. A ramp, 20 feet in length, rises to a platform that is 3.5 feet off the ground. What is the angle of elevation of the ramp? Round to the nearest tenth of a degree.

A. 9.9°

B. 10.1°

C. 79.9°

D. 80.1°

E. None of these.

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MA 154, Spring 2003
Exam 2 Answers

Question	Answer	Letter
1	$\sin(44°)$	C
2	45.0 cm	D
3	$b = c\sin\beta$	E
4	1.5 feet	A
5	$\theta = \frac{3\pi}{4} + 2\pi n,\ \theta = \frac{5\pi}{4} + 2\pi n$	A
6	2.2 hours	D
7	239°	C
8	$x = -\frac{\pi}{18} + \frac{\pi}{3}n$	D
9	$\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}\frac{7\pi}{4}$	C
10	$\frac{204}{325}$	E(None of these)
11	$-\frac{\sqrt{35}}{17}$	D
12	$\frac{\pi}{3}, \pi, \frac{5\pi}{3}$	B
13	$\frac{\pi}{6}$	B
14	10.1°	B