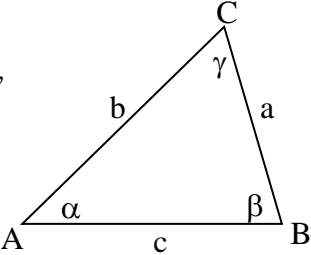


MA 15400

Fall 2012

Exam 2

$\sin(u + v) = \sin u \cos v + \cos u \sin v$		$\sin(u - v) = \sin u \cos v - \cos u \sin v$
$\cos(u + v) = \cos u \cos v - \sin u \sin v$		$\cos(u - v) = \cos u \cos v + \sin u \sin v$
$\tan(u + v) = \frac{\tan u + \tan v}{1 - \tan u \tan v}$		$\tan(u - v) = \frac{\tan u - \tan v}{1 + \tan u \tan v}$
$\sin(2u) = 2 \sin u \cos u$		$\tan(2u) = \frac{2 \tan u}{1 - \tan^2 u}$
$\sin^2 \theta + \cos^2 \theta = 1$		$1 + \cot^2 \theta = \csc^2 \theta$
	$\cos(2u) = \cos^2 u - \sin^2 u$	
	$1 + \tan^2 \theta = \sec^2 \theta$	

1. Given triangle ABC , with $\gamma = 90^\circ$, $\beta = 68^\circ$, and $b = 200.0$, which one of the following statements is true? Note that all values have been rounded to one decimal place.

- A. side $a = 279.8$
- B. side $c = 533.9$
- C. side $a = 495.0$
- D. side $c = 264.8$
- E. None of the above statements are true

2. Given triangle ABC , with $\gamma = 90^\circ$, express side b in terms of angle β and side a .

- A. $b = a \cos \beta$
- B. $b = a \tan \beta$
- C. $b = a \sin \beta$
- D. $b = a \cot \beta$
- E. $b = a \sec \beta$

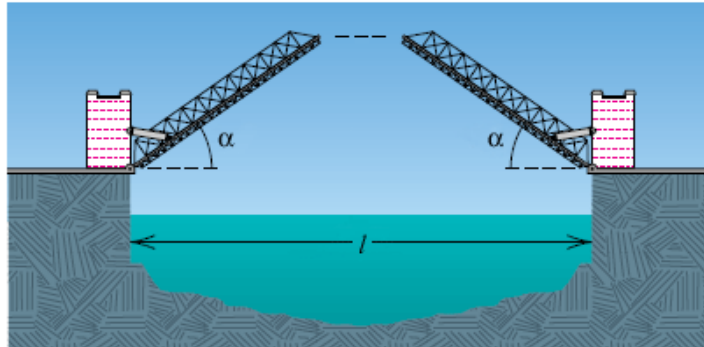
3. Express as a trigonometric function of one angle.

$$\sin(46^\circ)\cos(21^\circ) + \cos(46^\circ)\sin(21^\circ)$$

- A. $\cos(67^\circ)$
- B. $\sin(25^\circ)$
- C. $\cos(25^\circ)$
- D. $\sin(67^\circ)$

4. A drawbridge is $l = 250$ feet long when stretched across a river. As shown in the figure, the two sections of the bridge can be rotated upward through an angle of $\alpha = 40^\circ$. **Approximately how far apart are the ends of the two sections** when the bridge is fully opened? Round your answer to one decimal place.

- A. 89.3 ft.
B. 80.3 ft.
C. 58.5 ft.
D. 55.5 ft.
E. None of the above



5. A builder wishes to construct a ramp 27 feet long that rises to a height of 4.3 feet above level ground. To the nearest tenth of a degree, approximate the angle that the ramp should make with the horizontal.
- A. 9.2°
B. 10.4°
C. 10.8°
D. 9.7°
E. None of the above

Covers Lesson 12 to 22, Sections 6.7, 7.2, 7.3, 7.4, and 7.6 (questions 1 to 34)

Questions 6 and 7:

An airplane, flying at a speed of 600 miles per hour, flies from a point A in the direction 138° for 2 hour and then flies in the direction 48° for 1.5 hours.

6. To the nearest tenth of an hour, how long will it take to get back to point A ?

- A. 1.9 *hours*
- B. 2.2 *hours*
- C. 2.5 *hours*
- D. 2.7 *hours*
- E None of the above

7. To the nearest degree, in what direction does the plane need to fly in order to get back to point A ?

- A. 296°
- B. 255°
- C. 312°
- D. 281°
- E None of the above

Covers Lesson 12 to 22, Sections 6.7, 7.2, 7.3, 7.4, and 7.6 (questions 1 to 34)

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

$$4\sec \beta = 8$$

- A. $\beta = \frac{\pi}{3} + 2\pi n, \frac{5\pi}{3} + 2\pi n$
B. $\beta = \frac{\pi}{6} + 2\pi n, \frac{5\pi}{6} + 2\pi n$
C. $\beta = \frac{\pi}{3} + 2\pi n, \frac{2\pi}{3} + 2\pi n$
D. $\beta = \frac{\pi}{6} + 2\pi n, \frac{11\pi}{6} + 2\pi n$
E. $\beta = \frac{\pi}{4} + 2\pi n, \frac{5\pi}{4} + 2\pi n$

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

$$\tan\left(2\theta - \frac{5\pi}{6}\right) = \sqrt{3}$$

- A. $\theta = \frac{3\pi}{4}, \frac{7\pi}{4}, \frac{11\pi}{4}, \frac{15\pi}{4}$
B. $\theta = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}$
C. $\theta = \frac{\pi}{6}, \frac{2\pi}{3}, \frac{7\pi}{6}, \frac{5\pi}{3}$
D. $\theta = \frac{\pi}{12}, \frac{7\pi}{12}, \frac{13\pi}{12}, \frac{19\pi}{12}$
E. None of the above

Covers Lesson 12 to 22, Sections 6.7, 7.2, 7.3, 7.4, and 7.6 (questions 1 to 34)

10. From a point 45 meters above level ground, a hiker measures the angle of **depression** to the friend on the ground to be 57° . If the hiker drops her backpack straight down to the ground, approximate the distance her friend will have to walk, along the level ground, to retrieve the backpack. Round to one decimal place.
- A. 37.7 meters
B. 29.2 meters
C. 69.3 meters
D. 24.5 meters
E. None of the above
11. If $\cos \alpha = \frac{24}{25}$ and $\sin \alpha > 0$, find the exact value of $\cos\left(\alpha + \frac{\pi}{6}\right)$
- A. $\frac{24\sqrt{3} - 7}{50}$
B. $\frac{-24\sqrt{3} - 7}{50}$
C. $\frac{-24\sqrt{3} + 7}{50}$
D. $\frac{24\sqrt{3} + 7}{50}$
E. None of the above

12. If $\sec \beta = \frac{11}{6}$, for $0^\circ < \beta < 90^\circ$, find $\sin(2\beta)$.

A. $\frac{12\sqrt{157}}{121}$

B. $\frac{-12\sqrt{85}}{121}$

C. $\frac{12\sqrt{85}}{121}$

D. $\frac{-12\sqrt{157}}{121}$

E None of the above

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

$$\cos(t) - \sin(2t) = 0$$

A. $t = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{\pi}{2}, \frac{3\pi}{2}$

B. $t = 0, \pi, \frac{\pi}{3}, \frac{2\pi}{3}$

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

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

E None of the above

14. Find the exact value of the expression whenever it is defined.

$$\cos^{-1}\left(\cos\left(\frac{5\pi}{3}\right)\right) =$$

- A. $\frac{\pi}{3}$
- B. $\frac{2\pi}{3}$
- C. $\frac{-\pi}{3}$
- D. $\frac{5\pi}{3}$
- E. None of the above

15. Write the expression as an algebraic expression in x for $x > 0$.

$$\sin\left(2\sin^{-1}\left(\frac{x}{4}\right)\right)$$

- A. $\frac{x}{2}$
- B. $\frac{x - x^2}{2}$
- C. $\frac{4x - x^2}{8}$
- D. $\frac{x\sqrt{16 - x^2}}{8}$

Exam 2 Answers

	Answers
1.	E
2.	B
3.	D
4.	C
5.	A
6.	C
7.	D
8.	A
9.	D
10.	B
11.	A
12.	C
13.	A
14.	A
15.	D