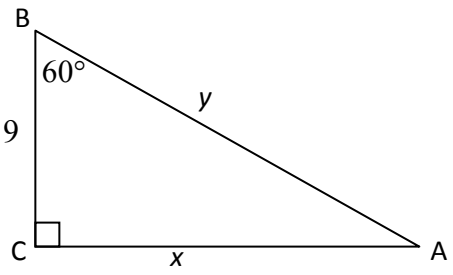
MA 15400 Exam 2 Spring 2010

Covers all of Section 6.7, 7.2, 7.3 and all of 7.4

1. Given ΔABC, which one the following statement is completely true.



A. $x = 3\sqrt{3}, y = 6\sqrt{3}$

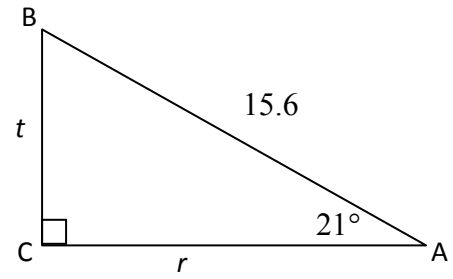
B. $x = 6\sqrt{3}, y = 12\sqrt{3}$

C. $x = 9\sqrt{2}, y = 9\sqrt{3}$

D. $x = 3\sqrt{2}, y = 3\sqrt{11}$

E. None of the above.

2. Given ΔABC, find the values of *t* and *r* approximated to the nearest tenth.



A. $t = 6.0, r = 14.4$

B. $t = 5.6, r = 14.6$

C. $t = 8.7, r = 11.5$

D. $t = 13.7, r = 6.4$

E. None of the above

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

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

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

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

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

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

4. An airplane, flying at a speed of 345 miles per hour, flies from point A in the direction 131˚ for two hours and then flies in the direction 221˚ for one hour. What direction, to the nearest degree, does the plane need to fly to return to point A?

A. 346°

B. 338°

C. 356°

D. 328°

E. None of the above

5. A 27 foot ladder is leaning against a building, making a 71˚ angle with the ground. The bottom of the ladder is then moved 3 feet closer to the building. What angle, to the nearest tenth of a degree, does the ladder now make with the ground?

A. 77.6°

B. 64.6°

C. 77.2°

D. 64.1°

E. None of the above

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

$$\sec\beta = 2$$

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

B. $\beta = \frac{\pi}{6} + 2\pi n, \frac{11\pi}{6} + 2\pi n$

C. $\beta = \frac{\pi}{3} + 2\pi n, \frac{5\pi}{3} + 2\pi n$

D. $\beta = \frac{\pi}{6} + 2\pi n, \frac{5\pi}{6} + 2\pi n$

E. None of the above

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

$$\tan\left(2\beta - \frac{\pi}{6}\right) = \frac{1}{\sqrt{3}}$$

A. $\beta = \frac{\pi}{8} + \frac{\pi}{4}n$

B. $\beta = \frac{\pi}{6} + \frac{\pi}{2}n$

C. $\beta = \frac{\pi}{12} + \frac{\pi}{4}n$

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

E. None of the above

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

$$\cos\left(3x + \frac{\pi}{2}\right) = -1$$

A. $x = \frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$

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

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

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

E. None of the above

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

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

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

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

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

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

E. None of the above

10. Express as a trigonometric function of one angle.

$$\cos(50°)\cos(13°) - \sin(50°)\sin(13°)$$

A. $\sin(63°)$

B. $\cos(37°)$

C. $\sin(37°)$

D. $\cos(63°)$

E. None of the above

11. If α and β are third-quadrant angles, such that $\csc\alpha = -8$ and $\tan\beta = \frac{4}{3}$, find $\sin(\alpha+\beta)$.

A. $\frac{3+4\sqrt{63}}{40}$

B. $\frac{3\sqrt{63}-4}{40}$

C. $\frac{3-4\sqrt{63}}{40}$

D. $\frac{3\sqrt{63}+4}{40}$

E. None of the above

12. The angle of elevation from point A of the top of a tower is $32.1°$. From a point B, which is on the same line but 55.5 feet closer to the tower, the angle of elevation is $36.5°$. Find the height of the tower to the nearest foot.

A. 253 feet

B. 426 feet

C. 229 feet

D. 384 feet

E. None of the above

13. If a projectile is fires from level ground with an initial velocity of v ft/sec and at an angle of θ degrees with the horizontal, the range R of the projectile is given by the formula $R = \frac{v^2}{16}\sin\theta\cos\theta$, If v = 65 ft/sec and $\theta = 31^\circ$, approximate, to the nearest foot, the range of the projectile.

A. $103\ ft$

B. $117\ ft$

C. $146\ ft$

D. $161\ ft$

E. None of the above

14. Find the exact value of $\cos(2\theta)$ if $\tan\theta = \frac{-5}{7}$, and $270° < \theta < 360°$

A. $\frac{-12}{37}$

B. $\frac{-35}{37}$

C. $\frac{12}{37}$

D. $\frac{35}{37}$

E. None of the above

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

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

A. $0, \pi, \frac{\pi}{3}, \frac{5\pi}{3}$

B. $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{3}, \frac{5\pi}{3}$

C. $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{2\pi}{3}, \frac{4\pi}{3}$

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

E. None of the above

Covers all of Section 6.7, 7.2, 7.3 and all of 7.4

Exam 2 Answers

Question	Answer	
1.	E	$x = 9\sqrt{3}, y = 18$
2.	B	$t = 5.6, r = 14.6$
3.	D	$\frac{1}{2}\left(\cos\theta - \sqrt{3}\sin\theta\right)$
4.	B	$338°$
5.	A	$77.6°$
6.	C	$\beta = \frac{\pi}{3} + 2\pi n, \frac{5\pi}{3} + 2\pi n$
7.	B	$\beta = \frac{\pi}{6} + \frac{\pi}{2}n$
8.	D	$x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{2}$
9.	A	$t = \frac{\pi}{6}, \frac{5\pi}{6}$
10.	D	$\cos\left(63°\right)$
11.	A	$\frac{3 + 4\sqrt{63}}{40}$
12.	C	229 feet
13.	B	$117\ ft$
14.	C	$\frac{12}{37}$
15.	D	$0, \pi, \frac{2\pi}{3}, \frac{4\pi}{3}$