MA 15400

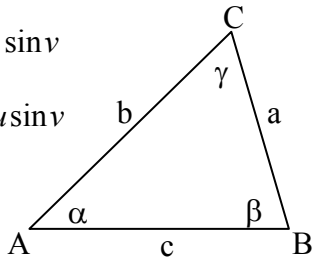
Spring 2011

Exam 2

$$\sin(u+v)=\sin u\cos v+\cos u\sin v \qquad \sin(u-v)=\sin u\cos v-\cos u\sin v$$

$$\cos(u+v)=\cos u\cos v-\sin u\sin v \qquad \cos(u-v)=\cos u\cos v+\sin u\sin v$$

$$\tan(u+v)=\frac{\tan u+\tan v}{1-\tan u\tan v} \qquad \tan(u-v)=\frac{\tan u-\tan v}{1+\tan u\tan v}$$



$$\sin(2u)=2\sin u\cos u \qquad \cos(2u)=\cos^2 u-\sin^2 u \qquad \tan(2u)=\frac{2\tan u}{1-\tan^2 u}$$

$$\sin^2\theta+\cos^2\theta=1 \qquad 1+\tan^2\theta=\sec^2\theta \qquad 1+\cot^2\theta=\csc^2\theta$$

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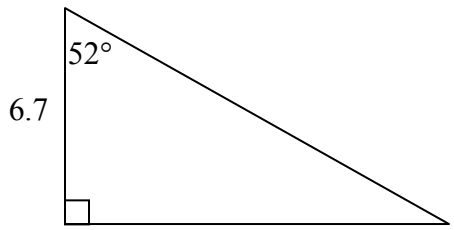
Covers Lessons 12 to 22, which include all of Sections 6.7, 7.2, 7.3, 7.4, and 7.6 to question #34

1. Approximate the perimeter of the given triangle to one decimal place.



A. 20.5

B. 18.7

C. 30.4

D. 26.2

E. None of the above

2. A 32-foot ladder leans against the side of a 200-foot tall building such that the angle between the ladder and the building is 26°. To the nearest tenth of a foot, how far will the top of the ladder move up the side of the building if the bottom of the ladder is then moved 3 feet closer to the building?

A. 1.5 feet

B. 1.3 feet

C. 0.9 feet

D. 1.1 feet

E. None of the above

3 At 1:00 PM a ship leaves port and travels N34°E at 40 miles per hour. At the same time, a second ship leaves the same port and travles N56°W at 20 miles per hour.

At 5:00 PM, what is the bearing from the first ship to the second one.

A. S61°W

B. S17°W

C. S32°W

D. S29°W

E. None of the above

4. An airplane leaves Point A and travels in the direction 95° for two hours at 300 miles per hour. It then travles in the direction 185° for one hour. How far is it now from Point A? Round to the nearest mile.

A. 548 miles

B. 424 miles

C. 671 miles

D. 598 miles

E. None of the above

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

$$\tan\theta = \sqrt{3}$$

A. $\theta = \frac{\pi}{6} + \pi n$

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

C. $\theta = \frac{5\pi}{6} + \pi n$

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

E. $\theta = \frac{\pi}{3} + \pi n$

6. Express as a trigonometric funtion of one angle.

$$\sin 52^\circ \cos 12^\circ - \cos 52^\circ \sin 12^\circ$$

A. $\cos 40^\circ$

B. $\sin 40^\circ$

C. $\cos 64^\circ$

D. $\sin 64^\circ$

E. None of the above

7. Express side *c* of $\sphericalangle ABC$, with $\gamma = 90^\circ$, in terms of side *b* and angle α.

A. $c = b\tan\alpha$

B. $c = b\csc\alpha$

C. $c = b\sin\alpha$

D. $c = b\sec\alpha$

E. $c = b\cos\alpha$

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

$$2\cos^2 x + 3\cos x + 1 = 0$$

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

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

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

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

E. None of the above

9. If $\sin\alpha = \frac{-3}{5}$ and $\tan\beta = \frac{-2}{7}$ for a third-quadrant angle α and a second-quadrant angle β, then find the exact value of $\sin(\alpha+\beta)$.

A. $\frac{29}{5\sqrt{53}}$

B. $\frac{-13}{5\sqrt{53}}$

C. $\frac{-29}{5\sqrt{53}}$

D. $\frac{13}{5\sqrt{53}}$

E. None of the above

10. Find the exact value of $\cos(2\theta)$ if $\csc\theta = \frac{5}{2}$ *and* $0° < \theta < 90°$.

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

B. $\frac{4\sqrt{21}}{25}$

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

D. $\frac{-4\sqrt{21}}{25}$

E. None of the above

11. $\cos\left(\theta + \frac{\pi}{4}\right)$ is equivalent to which of the following?

A. $\frac{\sqrt{2}}{2}(\sin\theta - \cos\theta)$

B. $\frac{\sqrt{2}}{2}(\cos\theta - \sin\theta)$

C. $\frac{\sqrt{2}}{2}\sin\theta\cos\theta$

D. $\frac{\sqrt{2}}{2}(\cos\theta + \sin\theta)$

E. $\frac{-\sqrt{2}}{2}\sin\theta\cos\theta$

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

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

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

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

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

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

E. None of the above

13. If a projectile is fired from ground level with an initial velocity of v ft/sec and at an angle of t degrees with the horizontal, the range R of the projectile is given by $R = \frac{v^2}{16}\sin t \cos t$.

If $v = 75$ ft/sec, to the nearest tenth of a degree, approximate the angle that results in a range of 150 feet.

A. $t = 29.9°, 60.1°$

B. $t = 31.4°, 58.6°$

C. $t = 25.3°, 67.7°$

D. $t = 28.7°, 61.3°$

E. None of the above

14. Find the exact value of expression: $\sin^{-1}\left(\sin\frac{2\pi}{3}\right)$.

A. $\frac{\pi}{3}$

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

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

D. $\frac{-\pi}{3}$

E. None of the above

15. Find the exact value of expression: $\sin\left(2\arccos\left(\frac{-4}{7}\right)\right)$.

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