MA 154   Exam 1   Spring 2007

Covers Sections 6.1, 6.2, 6.3. 6.4 and all of 6.5

1.   Which of the following angles is **NOT** coterminal with 140°?

                                        A. 500°

                                        B. $\dfrac{25\pi}{9}$

                                        C. −220°

                                        D. −940°

                                        E. $\dfrac{41\pi}{9}$

2.   The distance between two points A and B on Earth is measured along a circle having center
      C at the center of Earth and radius equal to the distance from C to the surface. If the
      diameter of Earth is approximately 8000 miles, approximate, to the nearest mile, the
      distance between A and B if angle ACB is 31°?

                                        A. 2,164 miles

                                        B. 3,246 miles

                                        C. 4,328 miles

                                        D. 3,787 miles

                                        E. None of the above.

3.   Find the angle that is supplementary to 12°34'8"

                                        A. 167°24'40"

                                        B. 77°25'52"

                                        C. 167°25'52"

                                        D. 77°24'40"

                                        E. None of the above.

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4.   Given $\sec\theta = \dfrac{6}{5}$ and $\sin\theta > 0$, what is the exact value of $\sin\theta$?

A. $\dfrac{\sqrt{11}}{5}$

B. $\dfrac{\sqrt{61}}{5}$

C. $\dfrac{\sqrt{61}}{6}$

D. $\dfrac{\sqrt{11}}{6}$

E. None of the above

5.   The Big Koala can be found 27 km north-west of Stawell, Australia in the small township of Dadswells Bridge. The Koala weighs 12 tons and is made of bronze set on a steel frame. The sculptor, Ben Van Zetton, was hired to design and construct the piece in 1988. From a distance of 31 meters from the base of The Big Koala, the angle between the flat ground and the top of the Koala is $24°$. To the nearest tenth of a meter, what is the height of The Big Koala?

A. 13.8 meters

B. 69.6 meters

C. 12.6 meters

D. 28.3 meters

E. None of the above

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6.   Find the exact value of $\cos\theta$ if θ is in standard position and the terminal side of θ is in Quadrant *II* and on the line $4x+3y=0$.

     A. $\dfrac{4}{5}$

     B. $-\dfrac{3}{5}$

     C. $-\dfrac{4}{5}$

     D. $\dfrac{3}{5}$

     E. None of the above

7. $\sec(-x)-\sin(x)\tan(x)$ is equivalent to which of the following?

     A. $\tan(x)$

     B. $-\cos(x)$

     C. 1

     D. $-\tan(x)$

     E. $\cos(x)$

8.   As $x\to(\pi)^{+}$, $\tan x\to$ _____

     A. 0

     B. ∞

     C. undefined

     D. $-\infty$

     E. 1

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9.   Which is/are true about the graph of $y = 3 + \sin x$?

     I. Crosses the *y*-axis at 2   A.   Only I and II are true

     II. Crosses the *x*-axis at π B.   Only I and III are true

     III. Has a range of [2, 4]   C.   Only I is true

                                   D.   Only III is true

                                   E.   None are true

10.   Find the reference angle θ_R if $\theta = 71.2$. Round your answer
       to the nearest hundredth of a radian.

                                   A. 2.08

                                   B. 0.33

                                   C. 1.06

                                   D. 0.51

                                   E. None of the above

11.   Approximate, to the nearest 0.0001 radian, all angles θ in the interval $[0, 2\pi)$
       that satisfy the equation $\csc \theta = -5.6781$

                                   A. 0.1770, 2.9646

                                   B. 3.3186, 6.1061

                                   C. 1.7478, 4.5354

                                   D. 1.3938, 4.8894

                                   E. None of the above

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12.   Given the graph below, write the equation in the form $y = a \sin(bx + c)$ for
         $a > 0, b > 0,$ and least positive real number c. [Hint: Amplitude $= 3$]
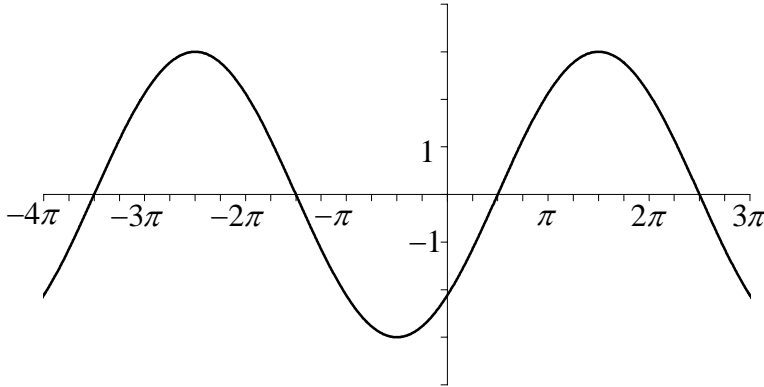
A. $y = 3\sin\left(\dfrac{1}{2}x + \dfrac{7\pi}{4}\right)$

B. $y = 3\sin\left(2x + \dfrac{\pi}{4}\right)$

C. $y = 3\sin\left(2x + \dfrac{7\pi}{4}\right)$

D. $y = 3\sin\left(\dfrac{1}{2}x + \dfrac{\pi}{4}\right)$

E.   None of the above

13.   What is the period and phase shift of the graph of the equation $y = \sin\left(\dfrac{1}{3}x - 5\right)$.

A.   Period $= \dfrac{2\pi}{3}$, Phase Shift $= \dfrac{5}{3}$

B.   Period $= 6\pi$, Phase Shift $= -15$

C.   Period $= \dfrac{2\pi}{3}$, Phase Shift $= 15$

D.   Period $= 6\pi$, Phase Shift $= 15$

E.   Period $= 6\pi$, Phase Shift $= -\dfrac{5}{3}$

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14.   Scientists sometimes use the formula $f(t) = a\sin(bt + c) + d$ to simulate temperature variations during the day, with *t* in hours, temperature *f(t)* in $°C$, and $t = 0$ corresponding to midnight. Assume that *f(t)* is decreasing at midnight.

On a given day, the high temperature was $15\,°C$ and the low temperature of $9\,°C$ occurred at 3 A.M. What time did the high temperature occur?

A. Noon

B. 3:00 P.M.

C. 2:00 P.M.

D. 1:00 P.M.

E. 4:00 P.M.

15.   Approximate $\csc(4.1)$ to four decimal places.

A. −1.7397

B. 0.9704

C. 0.2415

D. −1.2221

E. None of the above

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Answers

Question	Answer	Letter
1.	$\dfrac{41\pi}{9}$	E
2.	2,164 miles	A
3.	167°25'52"	C
4.	$\dfrac{\sqrt{11}}{6}$	D
5.	13.8 meters	A
6.	$-\dfrac{3}{5}$	B
7.	$\cos(x)$	E
8.	0	A
9.	Only III is true	D
10.	1.06	C
11.	3.3186, 6.1061	B
12.	$y = 3\sin\left(\dfrac{1}{2}x + \dfrac{7\pi}{4}\right)$	A
13.	Period $= 6\pi$, Phase Shift $= 15$	D
14.	3:00 P.M.	B
15.	-1.2221	D