MA 15400

Fall 2014
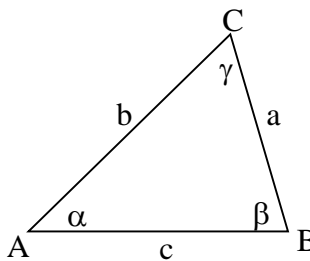
Exam 1

PYTHAGOREAN IDENTITIES:

$\sin^2 \theta + \cos^2 \theta = 1$

$1 + \tan^2 \theta = \sec^2 \theta$

$1 + \cot^2 \theta = \csc^2 \theta$

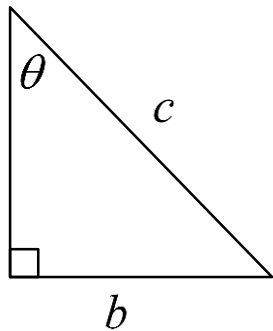Covers Lessons 1-11, Sections 6.1, 6.2, 6.3, 6.4, and 6.5

1. Find the angle that is complementary to $48°57'9''$

     A. $42°3'51''$

     B. $131°2'51''$

     C. $41°2'51''$

     D. $132°3'51''$

     E. None of the above

2. Express $\theta = 3.5$ in terms of degrees, minutes, and seconds, to the nearest second.

     A. $200°32'7''$

     B. $151°15'22''$

     C. $200°53'52''$

     D. $151°42'33''$

     E. None of the above

3. Find the measure of the central angle θ, to nearest $0.1°$, subtended by the arc of length $s = 3.5$ feet on a circle of radius $r = 18$ inches . (12 inches = 1 foot)

     A. $115.9°$

     B. $127.8°$

     C. $151.5°$

     D. $133.7°$

     E. None of the above

Covers Lessons 1-11, Sections 6.1, 6.2, 6.3, 6.4, and 6.5

4. Which **one** of the following statements is true for the given triangle?

A. $\cot\theta = \dfrac{c}{b}$

B. $\sec\theta = \dfrac{c}{\sqrt{c^2 - b^2}}$

C. $\tan\theta = \dfrac{\sqrt{c^2 - b^2}}{b}$

D. $\cos\theta = \dfrac{b}{\sqrt{c^2 - b^2}}$

E. $\csc\theta = \dfrac{b}{c}$

5. A forester, 180 feet from the base of a redwood tree, observes that the angle between the ground and the top of the tree is $62°$. Find the height of the tree to the nearest whole foot.

A. 85 feet

B. 159 feet

C. 204 feet

D. 339 feet

E. None of the above

6. Which of the following is equivalent to $\left(\cot\theta + \csc\theta\right)\left(\tan\theta - \sin\theta\right)$?

A. $\sec\theta - \cos\theta$

B. $1 + \tan^2\theta$

C. $\csc\theta - \sin\theta$

D. $\csc\theta\sec\theta$

E. $1 + \cot^2\theta$

2

Covers Lessons 1-11, Sections 6.1, 6.2, 6.3, 6.4, and 6.5

7. Find the exact value of $\sin\theta$ if θ is in standard position and the terminal side of θ is in quadrant *III* and parallel to the line $12x-5y=15$

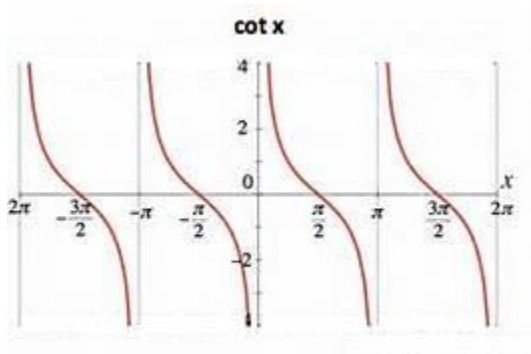   A. $\sin\theta = \dfrac{5}{13}$

     B. $\sin\theta = \dfrac{-12}{13}$

     C. $\sin\theta = \dfrac{-5}{13}$

     D. $\sin\theta = \dfrac{12}{13}$

     E. None of the above

8. Use the graph to complete the statement: As $x \to \dfrac{\pi}{2}^{-}$, $\cot(x) \to$ _____

cot x

     A. $-\infty$

     B. 1

     C. 0

     D. ∞

     E. None of the above

9. In March in Tucson, Arizona, the temperature in degrees Fahrenheit could be described by the equation $T(t) = -11\cos\left(\dfrac{\pi}{12}t\right) + 57$, where t is in hours and $t = 0$ corresponds to 6 A.M. What is the temperature at 3 P.M.? Angles are in radians and round to a whole number.

     A. 49°

     B. 57°

     C. 68°

     D. 54°

     E. 65°

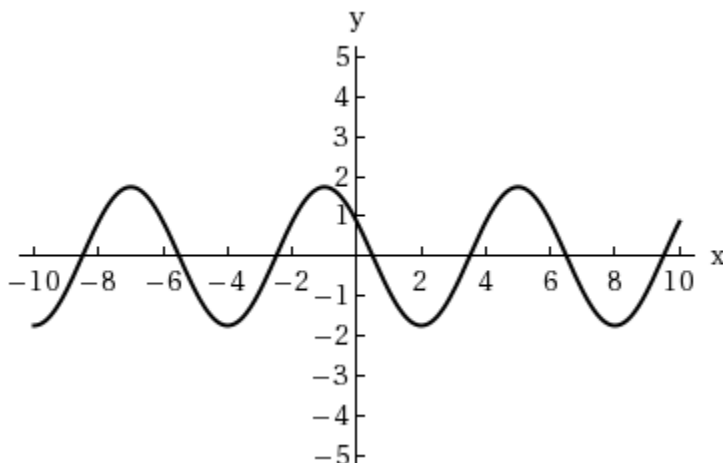Covers Lessons 1-11, Sections 6.1, 6.2, 6.3, 6.4, and 6.5

10. A point $P\left(\dfrac{3}{5}, \dfrac{-4}{5}\right)$ is the point of intersection between the terminal side of angle t and the

Unit circle. Find the exact value of $\cot(t)$

    A. $\cot(t) = \dfrac{3}{5}$

    B. $\cot(t) = \dfrac{-4}{5}$

    C. $\cot(t) = \dfrac{4}{3}$

    D. $\cot(t) = \dfrac{-3}{4}$

    E. None of the above

11. Find the reference angle θ_R if $\theta = 300°$

    A. $\theta_R = 60°$

    B. $\theta_R = 30°$

    C. $\theta_R = 120°$

    D. $\theta_R = 45°$

    E. None of the above
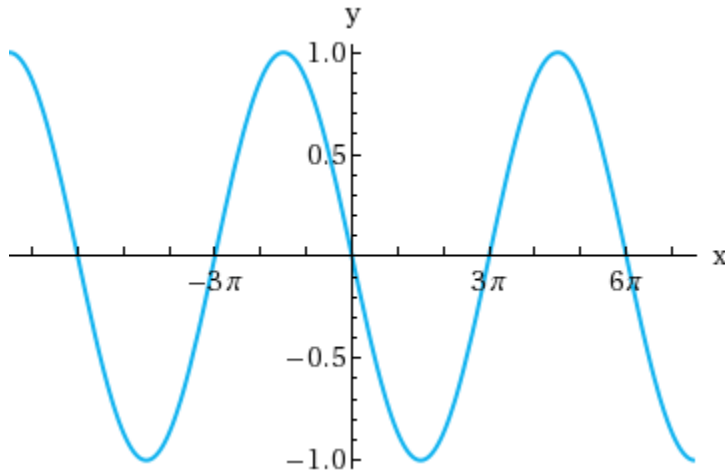
12. Find the Period of the given graph.

    A.   Period $= 8$

    B.   Period $= 6$

    C.   Period $= 4$

    D.   Period $= 2$

    E.   Period $= \infty$

Covers Lessons 1-11, Sections 6.1, 6.2, 6.3, 6.4, and 6.5

13. Write the equation in the form $y = a \sin(bx + c)$ for $a > 0$, $b > 0$, and the least positive real number c.

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

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

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

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

E. $y = \sin\left(6x + 3\pi\right)$

14. Approximate, to the nearest 0.1°, all angles θ in the interval [0°, 360°) that satisfy equation $\sec\theta = 2.3456$.

A. $\theta = 64.8°, 295.2°$

B. $\theta = 115.2°, 244.8°$

C. $\theta = 64.8°, 244.8°$

D. $\theta = 115.2°, 295.2°$

E. None of the above

15. Approximate, to the nearest 0.0001 radians, all angles θ in the interval [0, 2π) that satisfy equation $\sin\theta = -0.8765$

A. $\theta = 1.0685, 5.2146$

B. $\theta = 2.0730, 4.2101$

C. $\theta = 4.2101, 5.2146$

D. $\theta = 1.0685, 2.0730$

E. None of the above

Covers Lessons 1-11, Sections 6.1, 6.2, 6.3, 6.4, and 6.5

Question	Answer	Letter
1.	41°2'51"	C
2.	200°32'7"	A
3.	133.7°	D
4.	$\sec\theta = \dfrac{c}{\sqrt{c^2-b^2}}$	B
5.	339 feet	D
6.	$\sec\theta - \cos\theta$	A
7.	$\sin\theta = \dfrac{-12}{13}$	B
8.	0	C
9.	65°	E
10.	$\cot(t) = \dfrac{-3}{4}$	D
11.	$\theta_R = 60°$	A
12.	$\text{Period} = 6$	B
13.	$y = \sin\left(\dfrac{1}{3}x + \pi\right)$	D
14.	$\theta = 64.8°, 295.2°$	A
15.	$\theta = 4.2101, 5.2146$	C