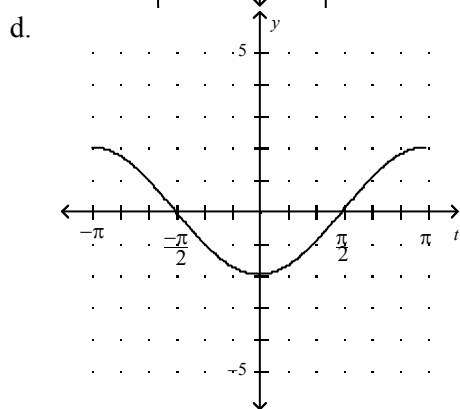
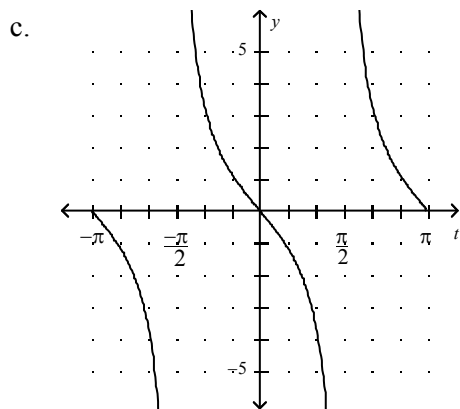
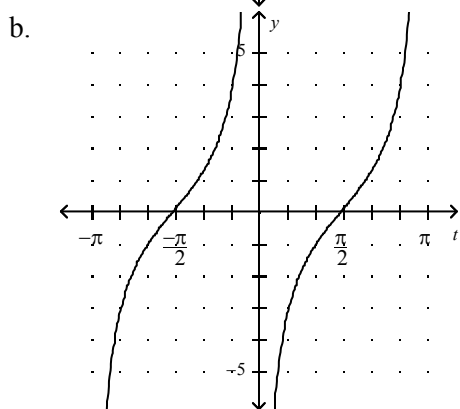
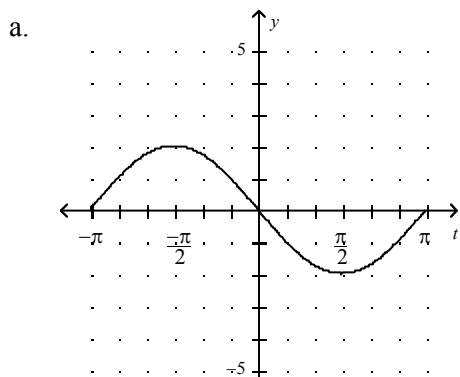


Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

- Find the measure of an angle between 0 and 2π that is coterminal with $\frac{73\pi}{3}$.
 - $\frac{\pi}{6}$
 - $\frac{4\pi}{3}$
 - $\frac{\pi}{3}$
 - $\frac{2\pi}{3}$
- Convert 59° to radian measure.
 - 94π
 - $\frac{59\pi}{180}$
 - $\frac{10620}{\pi}$
 - 59π
- Find the exact value of $\csc\left(\frac{9\pi}{4}\right)$.
 - $\frac{\sqrt{2}}{2}$
 - $-\frac{\sqrt{2}}{2}$
 - $-\sqrt{2}$
 - $\sqrt{2}$
- A tree casts a shadow of 27 meters when the angle of elevation of the sun is 26° . Find the height of the tree to the nearest meter.
 - 24 m
 - 15 m
 - 32 m
 - 13 m
- Find the horizontal shift of $y = -5\sin 3(x + \pi/3)$.
 - left π
 - right π
 - left $\pi/3$
 - right $\pi/3$

6. Which is the graph of $f(t) = -2 \tan t$?



7. On a Ferris wheel, you travel through a central angle of $\frac{88\pi}{7}$ before stopping. If the radius of the Ferris wheel is 53 feet, how many feet have you traveled?

- a. 2093.2 feet b. 1993.2 feet c. 2393.2 feet d. 2293.2 feet

8. A water wave is created in a wave tank. It has an amplitude of 5 and a period of $\frac{3\pi}{7}$. Find the equation of this wave as a sine function.

a. $f(t) = \frac{3\pi}{7} \sin \frac{t}{5}$ b. $f(t) = \frac{14}{3} \sin 5t$ c. $f(t) = 5 \sin \frac{14t}{3}$ d. $f(t) = 5 \sin \frac{3\pi t}{7}$

9. Convert $25^\circ 20' 6''$ into decimal form.

a. 25.43° b. 25.34° c. 25.21° d. 25.01°

10. Find the exact value of $\cot 300^\circ$.

a. $\sqrt{3}$ b. $-\sqrt{3}$ c. $\frac{\sqrt{3}}{3}$ d. $-\frac{\sqrt{3}}{3}$

11. Which is equal to $\sec^{-1}(2)$?

a. $\frac{\pi}{3}$ b. $\frac{-\pi}{6}$ c. $-\frac{\pi}{3}$ d. $\frac{2\pi}{3}$

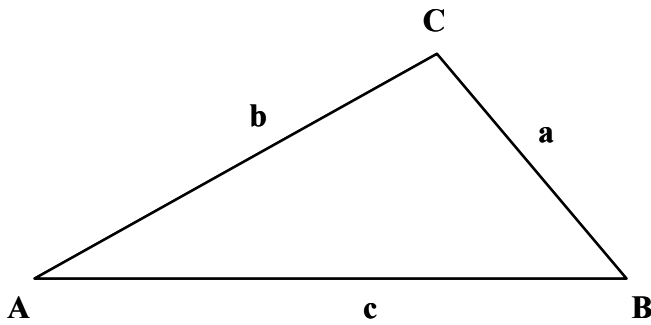
12. Evaluate $\cos(\tan^{-1}(3/4))$.

a. $3/5$ b. $4/5$ c. $4/3$ d. $5/4$

13. In which quadrant(s) can θ lie if $\tan\theta > 0$ and $\cos\theta < 0$?

a. I b. III c. II and IV d. II and III

14. Given $A = 50^\circ$, $B = 62^\circ$, and $a = 5.1$, find the value of b .



- A) $b = 5.36$
- B) $b = 6.17$
- C) $b = 4.21$
- D) $b = 5.88$
- E) $b = 4.42$

15. In $\triangle ABC$, $a = 5$, $b = 2$ and $C = 80^\circ$. Find c to the nearest tenth.

- a. 5.1
- b. 5.4
- c. 5.6
- d. 5.8

16. In $\triangle ABC$, $A = 30^\circ$, $a = 8$ and $b = 12$. Find the number of possible triangles.

- a. 0
- b. 1
- c. 2
- d. not enough information

17. In $\triangle ABC$, $a = 5$, $b = 5$ and $c = 6$. Find the area to the nearest unit².

- a. 11
- b. 12
- c. 13
- d. 14

18. A woman in a rowboat sets out due west and rows at 4.8 mph. The current is carrying the boat due south at 12mph. What is the true course of the rowboat?

- a. $N32^\circ E$
- b. $S22^\circ W$
- c. $S22^\circ E$
- d. $N32^\circ W$

19. Simplify $(2\text{cis}60)(3\text{cis}150)$.

- a. $\frac{2}{3} \text{cis}210^\circ$
- b. $\frac{2}{3} \text{cis}90^\circ$
- c. $6\text{cis}210^\circ$
- d. $6\text{cis}90^\circ$

20. Use the half-angle formula to determine the exact value of $\tan \frac{3\pi}{8}$.

- a. $\sqrt{2} + 1$ b. $-\frac{\sqrt{2-\sqrt{2}}}{4}$ c. $\sqrt{2} - 1$ d. $\sqrt{2-\sqrt{2}}$ e. $\frac{\sqrt{2+\sqrt{2}}}{4}$

21. Use the double angle formula to find the exact value of $\cos 2x$ when

$$\sin x = \frac{3}{5}, \text{ for } \frac{\pi}{2} < x < \pi.$$

- a. $\frac{2}{25}$ b. $\frac{12}{25}$ c. $\frac{24}{25}$ d. $\frac{7}{25}$ e. $\frac{32}{25}$

22. Find all solutions of $\cos 2x - \frac{\sqrt{3}}{2} = 0$.

- a. $\pm \frac{1}{12} \pi + k\pi$ b. $\pm \frac{5}{6} \pi + k\pi$ c. $\pm \frac{1}{6} \pi + k\pi$ d. $\pm \frac{7}{12} \pi + 2k\pi$
e. $\pm \frac{11}{12} \pi + 2k\pi$

23. Find the polar form of $3+8i$.

- a. $73(\cos(3.5) + i \sin(3.5))$ b. $8.54(\cos(0.36) + i \sin(0.36))$
c. $8.54(\cos(1.21) + i \sin(1.21))$ d. $73(\cos(1.21) + i \sin(1.21))$ e. $73(\cos(-3.6) + i \sin(-3.6))$

24. Find all solutions of $\sin x + 1 = 2 \cos^2 x$ on the interval $[0, 2\pi)$.

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

b. $x = \frac{2\pi}{7}$, $x = \frac{6\pi}{5}$, $x = \frac{3\pi}{2}$

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

d. $x = \frac{2\pi}{7}$, $x = \frac{5\pi}{6}$, $x = \frac{2\pi}{3}$

25. Test the equations graphically to determine which one might be an identity.

a. $\frac{\sec^2 x + 1}{\cot x} = \tan^3 x$

b. $\frac{\sec^2 x + 1}{\cot x} = \tan x$

c. $\frac{\sec x + 1}{\cot x} = \tan^3 x$

d. $\frac{\sec^2 x - 1}{\cot x} = \tan^3 x$

2012 Alpha Trigonometry

1. c
2. b
3. d
4. d
5. c
6. c
7. a
8. c
9. b
10. d
11. a
12. b
13. b
14. d
15. a
16. c
17. b
18. b
19. c
20. a
21. d
22. a
23. c
24. a
25. d