1 Geometry and Trigonometry

1. A cone-shaped cup is filled with shaved ice and then syrups is added to make a snow cone. The height of the cone is 15 cm and the area of the base of the cone is 9 cm^2. After adding 10 cm^3 of syrup, the cone is full. Which of the following is the volume of the shaved ice in the cup? (Assume no melting has occurred.)

2. If a cube has an edge of 14 inches, what is its volume, in cubic inches?

3. Given a parallelogram $DEFG$, angle D measures $30°$ and angle E measures $6x°$. If angle F measures $y°$, what is the value of $y - x$?

4. To determine the height of a tree, a person measures 50 feet from the base of the tree and determines the angle of elevation from the ground to the top of the tree is $43°$. Which of the following equations could be used to determine the height of the tree?

(A) $h = \frac{50}{\tan 43°}$ **(B)** $h = 50 \sin 43°$ **(C)** $h = 50 \tan 43°$ **(D)** $h = \frac{50}{\sin 43°}$

5. Which of the following is equivalent to the value of $sin42°$?

(A) $\cos 42°$ **(B)** $\sin 48°$ **(C)** $\tan 48°$ **(D)** $\cos 48°$

6. If an angle measures $\frac{8\pi}{5}$ radians, what is its measure in degrees?

7. In a circle with center O, radius 12 centimeters, and length of arc $\overset{\frown}{AB}$ is 9π centimeters, what is the measure, in degrees, of angle AOB?

8.

$$(x-2)^2 + (y+3)^2 = 25$$

For the equation of the circle given above, which of the following represents the center and the radius?

(A) $(2, -3); r = 5$ **(B)** $(-2, 3); r = 5$ **(C)** $(2, -3); r = 25$ **(D)** $(-2, 3); r = 25$

9. A figure represents a giant hourglass found in Red Square in Moscow. The promoters claim that it's 12 meters tall. You want to confirm its height, so you stand 3 meters away from the hourglass and measure the angle at 76˚. Which of the following equations could be used to find the height, h, of the hourglass, in meters?

(A) $h = 3 \tan 76°$ **(B)** $h = 3 \tan 14°$ **(C)** $h = 3 \cos 76°$ **(D)** $h = 3 \sin 76°$

10. The center of a circle is point C and the measure of arc $\overset{\frown}{AB}$ is 75˚. What is the measure, in degrees, of the central angle ACB?

11. In triangle EFG, F is a right angle and $\sin(G) = \frac{15}{39}$. What is the value of $\sin(E)$?

(A) $\frac{5}{13}$ **(B)** $\frac{12}{13}$ **(C)** $\frac{12}{5}$ **(D)** $\frac{13}{5}$

12.

$$x^2 + 6x + y^2 - 12y = 99$$

If the equation above is graphed in the xy-plane, what is the y-coordinate of the center of the resulting circle?

13. If a shaded sector of a circle M is $\frac{1}{8}$ of the area of the circle, what is the degree measure of $\angle LMN$?

14. You are constructing a zip line at your house. You have 110 feet of cable to connect from the top of your house to the groud. If your house is 30 ft. tall, how far away, to the nearest foot, from the base of the hosue will the cable connect to the groud? (Disregard any amount needed to secure the cable.)

15. A square pyramid has a height of 12 cm and the area of the square is 25 cm^2. What is the volume of the pyramid, in cubic cm?

16. In a right triangle ABC, $\sin A = \frac{8}{10}$. What is the value of $\cos A$?

17. A cylinder has a volume of 640π cubic feet and a base diameter of 16 feet. What is the height, in feet, or the cylinder?

18. If $0 < \theta < \frac{\pi}{2}$ and $\cos\theta = \frac{12}{13}$, what is $\sin\theta$?

19. In circle O, central angle AOB measures 120°. If $OA = 9$, what is the length of minor arc $\overset{\frown}{AB}$?

(A) 5π **(B)** 6π **(C)** 8π **(D)** 9π

20. A 20-foot ladder is leaning against a wall and the base of the ladder has to be more than 12 feet away from the wall. Which of these is one possible value for the height that the ladder can reach up the wall?

(A) 15ft. **(B)** 16 ft. **(C)** 20 ft. **(D)** 32ft.

21. Which of the following is equal to $\sin\frac{\pi}{7}$?

(A) $\cos\frac{\pi}{7}$ **(B)** $-\sin\frac{\pi}{7}$ **(C)** $\cos\frac{6\pi}{7}$ **(D)** $\sin\frac{6\pi}{7}$

22.

$$(x-3)^2 + (y+4)^2 = 36$$

Given the equation of a circle shown above, which of the following points would NOT lie in the interior of the circle?

(A) $(-2,-7)$ **(B)** $(-1,1)$ **(C)** $(5,1)$ **(D)** $(7,-8)$

23. Which of the following is true of the graph of a circle represented by the equation $(x-8)^2+(y+3)^2 = 36$?

(A) The circle intersects the x-axis 2 times and the y-axis 0 times. **(B)** The circle intersects the x-axis 2 times and the y-axis 2 times.
(C) The circle intersects the x-axis 0 times and the y-axis 0 times. **(D)** The circle intersects the x-axis 0 times and the y-axis 2 times.

Solutions

1. 35

2. 2744

3. 5

4. C

5. D

6. 288

7. 135

8. A

9. A

10. 75

11. B

12. 6

13. 45

14. 106

15. 100

16. 3/5

17. 10

18. 5/13

19. B

20. A

21. D

22. B

23. A