

# Geometry Round

45 minutes

**Please put all answers on the provided answer sheet, units are not required.**

- 1) A rectangular traffic light has a perimeter of 304 cm and a length that is 40 cm longer than the width. What is the length of the traffic light? (1 point)
- 2) A circle has a radius of 12. What is the ratio of the circle's circumference to its area? (1 point)
- 3) On Coney Island there is a circular Ferris Wheel that is 100 feet tall. It takes 120 seconds for the Ferris Wheel to make a complete revolution. When Taylor Swift is sitting on a bench at ground level she sees that Selena Gomez is 30 feet in the air. What is the sum of the two possible times it takes for Selena to reach the ground? (1 point)
- 4) Taylor Swift is riding a white horse to get to Wonderland, however, she needs to make a stop at 16th Avenue first. 16th Avenue is 30 miles East and 40 miles South from Taylor's starting point, and Wonderland is 80 miles East and 160 miles South from Taylor's starting point. Assuming Taylor Swift takes the shortest path to get to Wonderland while also stopping by 16th Avenue, how many miles will Taylor Swift have to ride on her white horse? (1 point)
- 5) Taylor Swift wants to build a bridge across the Red River. The bridge is the shape of an arc of a circle. The bridge is 8 feet tall and 24 feet wide. What is the radius of the circle that defines the arc of the bridge? (2 points)
- 6) Taylor is drinking sweet tea in the summer. The dimensions of the glass that holds the sweet tea is a cylinder with a height of 13 centimeters and radius of 3 centimeters. The drink was initially filled to a height of 8 centimeters. When an ice cube is fully submerged in the tea, the tea rises to a height of 9 centimeters. What is the volume of the ice cube in cubic centimeters? Leave your answer in terms of  $\pi$ . (1 point)
- 7) Henry Kwon has a rather suspicious-looking equilateral triangle. The number of inches in the perimeter of the triangle equals the number of square inches in the area of its circumscribed circle. What is the radius, in inches, of the circle? Express your answer in terms of  $\pi$  and in the simplest radical form. (2 points)
- 8) A spider and a dead insect are at the two furthest corners (vertices) of a cube with side length 1. If the spider can crawl only along the outer surface of the cube, what is the shortest distance it can travel to reach the insect? (2 points)
- 9) A perfectly spherical mirrorball rolls down a hill. The ball travels in a perfectly straight line and completes 7 full rotations. If the ball travels  $112\pi$  feet, what is the radius of the ball? (1 point)