Quiz **Name**

1. The Golden Gate Bridge has a center span of 4,200 feet and a total length of 6,450 feet. It has two main cables, one deck, a dead load of 21,300 pounds per foot, and a live load capacity of 4,000 pounds per foot. The towers have a height of 746 feet and the sag in each of the two main cables is 470 feet.

A. Compute the maximal and minimal tensions in each main cable over the center span.

B. Is it possible for the tension in a main cable over the center span of a suspension bridge to be constant?

Formulas: $f(x) = \frac{s}{d^2}x^2, \tan\alpha = \frac{2s}{d}, T(x) = w\sqrt{\left(\frac{d^2}{2s}\right)^2 + x^2}, T_d = wd\sqrt{\left(\frac{d}{2s}\right)^2 + 1}, T_0 = \frac{wd^2}{2s}$.

2. A sphere of a homogeneous material with a mass of 12 kg is held by a cord against a frictionless vertical wall. See the figure below. By analyzing the forces at the center O of the sphere,

i. Express the tension in the string in terms of the angle α.

ii. Express the force with which the sphere pushes against the wall in terms of α.

iii. Compute the tension and the force if $\alpha = 15°$.