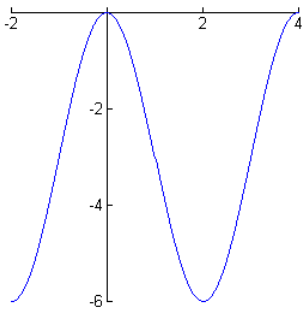
Test 4 – Math 107 – Fall 2011

As on previous tests, show your work for partial credit. When finished write out the full honor pledge, sign it and fold this test and your work in half length-wise and put your name on the outside of this paper. Perform all calculations accurate to three decimal places, attdp.

1. Estimate the period, midline and amplitude of the graph pictured to the right. (2 points each)



2. A right triangle has one angle of 59° and the side opposite that angle has length 5. (3 points each)
   a) Draw this triangle.
   b) Find the length, attdp, of the side adjacent to the 59° side.
   c) Find the length, attdp, of the hypotenuse.

3. Do each of the following: (2 points each, except as noted)
   a) What angle measured in degrees corresponds to three rotations around the unit circle?
   b) What angle measured in radians corresponds to two rotations around the unit circle?
   c) Find the x-coordinate, attdp, of the point at angle 107° on a unit circle.
   d) Find the y-coordinate, attdp, of the point at angle 3 radians on a circle of radius 2.
   e) Convert 100° to radians, attdp.
   f) Convert 4.2 radians to degrees, attdp.
   g) Find the arc length of that corresponds to an angle of 72° in a circle of radius 4. Give your answer attdp. (3 points)

4. The top of a 200-foot vertical tower is to be anchored by cables that make an angle of 30° with the ground. How long must the cables be? How far from the base of the tower should anchors be placed? Give both answers attdp. (6 points)

5. An ant starts at the point (1, 0) on the unit circle and walks counterclockwise a distance of 3 units around the circle. Find the x and y coordinates (attdp) of the final location of the ant. (6 points)

6. Find an angle, ϕ, with $0° < \phi < 360°$, that has the same: (2 points each)
   a) Cosine as 112° b) Sine as 112°

7. For ϕ given in the figure to the right, sketch, on the figure, the angles: Clearly label each angle. (2 points each)
   a) $\pi + \phi$ b) $\pi - \phi$