Math-19 Homework #7

Reading

Please read sections 6.1 through 6.3 and 5.1 through 5.3 and do all concept problems in the posted sections on webassign.

Problems

1). A blu-ray disk has a diameter of $12cm$. The track of recorded information on the disk spirals in from the outside toward the center. A blu-ray player must make sure that the track passing under the optical reader stays at a constant linear speed, so the motor will vary from 200 to 500 rpm, depending on where the disk is being read.

   a). Which angular speed is used for the part of the track on the outer rim of the disk? Why?

   b). What is the linear speed of the outer track in cm/s?

   c). What is the distance from the center of the disk for the innermost part of the track?

2). Determine a positive and a negative coterminal angle for the angle $\dfrac{2\pi}{3}$.

3). Use a sketch of the unit circle to show why $\sin^2\theta + \cos^2\theta = 1$, and then use that formula to prove the other two forms of the pythagrean identity.

4). Write $\cos x$ in terms of $\tan x$, assuming that x is in QI.

5). Consider the following sinusoidal function:

$$f(x) = -3\sin\frac{\pi}{2}(x-1)$$

   a). What is the amplitude?

   b). What is the period?

   c). What is b (the horizontal translation)?

   d). What is ϕ (the phase angle)?

   e). Is the phase angle leading or lagging?

   f). Sketch the graph from $[0, b + \text{period}]$, i.e., one full period starting from the horizontal shift point, and then extended back to 0. You must clearly show the amplitude and the x values for each zero/min/max.

   g). Looking at your sketch, what is an equivalent function in terms of $\cos$? (Hint: try to find where a cos graph overlays your graph)