

Math-19 Homework #14

Problems

- 1). A blu-ray disk has a diameter of 12 cm. 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 $\frac{2\pi}{3}$.
- 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 pythagorean identity.
- 4). 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)