MATH 1120 Calculus II - Fall 2018 07 Sep 2018

Problem Set 5

(1) What is an arc length function? Explain how you would use the arc length function to compute curve lengths?

(2) Consider the semi-circle given by the graph of $y = \sqrt{1 - x^2}$. Show that the length of the arc starting at $(-1, 0)$ and passing through an angle θ radians is given by θ units.

(3) **[T14:6.6.27]** Compute the arc length of $y = \int_0^x \sqrt{\cos 2x}\, dx$ from $x = 0$ to $x = \pi/4$.

(4) Show that the surface area of a sphere of radius R is given by $S = 4\pi R^2$.

(5) Show that the lateral surface area of a cone is given by $A = \pi r\sqrt{r^2 + h^2}$ where r is the base radius of the cone and h is the cone height.