Read each question carefully and be sure to SHOW ALL WORK. Correct answer without proper justification will not receive a "Complete" grade. Paç fat! Good luck!


Name: _____

LO 13. Polar Coordinates. I am fluent with polar coordinates and can do Calculus with them.

Criteria for Success: I can

- describe points and graphs in the plane using polar coordinates

- convert points and graphs between polar and rectangular coordinates

- use derivatives to calculate slopes and rates of change of polar equations

- find intersection points between polar equations

- find arclengths and areas using integrals in polar coordinates

Question: SOS! You've just received a distress signal from a ship located at point B on your radar screen below.
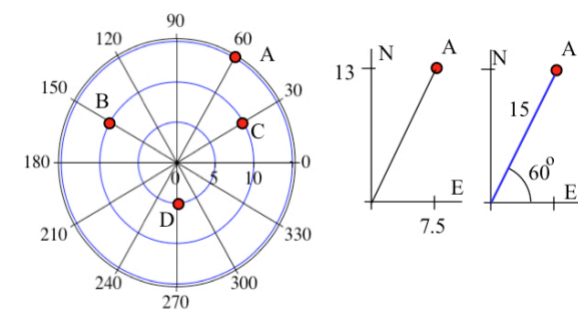
(a) Describe its location to your captain. Use both Polar and Cartesian coordinates, and explain which coordinate system is more suitable for the situation.

(b) Your captain realizes that a rescue team at point D on the radar screen is the closest one to point B, so asks them to make the rescue. Find both the polar and rectangular equations for the straight line path that the emergency team at point D needs to use to get to point B.

(c) Write down the appropriate integral in polar coordinates that can be used to find the arclength of the straight path that the rescue team needs to follow from point D to point B. You do not need to solve the integral. Check with technology that this is the same answer you get if you used the distance formula with Cartesian coordinates.

LO 15. Conic Sections. I know the definitions of conic sections, their reflecting properties, eccentricity, and I can analyze them through both Cartesian and Polar coordinates.

Criteria for Success: I can

- describe conic sections as loci of points related to foci points

- apply reflection properties of conics in physical and geometric contexts

- find the eccentricity of conic sections and understand its meaning

- analyze conic sections using polar equations

Question: Consider a mirror in the shape of the conic section given by $r = \dfrac{100}{9 + 9\sin(\theta)}$.

(a) Find the x and y intercept(s), the center, the focus(foci), directrix (if applicable), asymptotes (if applicable), and eccentricity.

(b) Suppose you are standing at the origin in the dark, and shoot a light ray horizontally to the left along the negative x-axis. Draw the path of the light ray, and describe it in relation to the focii and/or axis of symmetry.