Math 121, Section 01, Spring 2022

Homework #20

Due **Friday, May 6th** in Gradescope by 11:59 pm ET

Goal: Exploring Parametric Equations including Sketching, Derivatives, and Arclength.

For problems 1-3 do the following two things:

(a) Sketch the curve by using the parametric equations to plot points. Indicate with arrows the direction in which the curve is traced as t increases.

(b) Eliminate the parameter to find the Cartesian Equation of the curve

1. $x = 2t - 1$ and $y = \dfrac{t}{2} + 1$

2. $x = t^2 - 3$ and $y = t + 2$ where $-3 \leq t \leq 3$

3. $x = \sqrt{t}$ and $y = 1 - t$

Find an equation of the tangent to the curve at the point corresponding to the given parameter value.

4. $x = \sqrt{t}$ and $y = t^2 - 2t + 1$ when $t = 4$

5. $x = t\cos t$ and $y = t\sin t$ when $t = \pi$

Find the exact length for each of these curves.

6. $x = e^t - t$ and $y = 4e^{\frac{t}{2}}$ where $0 \leq t \leq 2$

7. $x = e^t \cos t$ and $y = e^t \sin t$ where $0 \leq t \leq \pi$

REGULAR OFFICE HOURS

Sunday: 6–7:30 pm TA Nico, SMUDD 207

Monday: 1:00–3:00 pm

6–7:30 pm TA Daksha, SMUDD 207

7:30–9:00 pm TA Karime, SMUDD 207

Tuesday: 12:00–4:00 pm

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Nico, SMUDD 207

Wednesday: 1:00-3:00 pm

9–10:30 pm TA Daksha, SMUDD 207

Thursday: none for Professor

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Karime, SMUDD 207

Friday: 12:00–2:00 pm

Start to refocus the entire semester.

Start to review certain early topics.