

Math 1497 – Calculus II Spring 2022 – Homework 8

Week 10: Mar. 28 - Apr. 1, 2022

pg. 707, #5, 7, 11, 13, 23, and 31.

Sketch the curve represented by the parametric equations (and indicate orientation), and write the corresponding rectangular equation by eliminating the parameter.

5. $x = 2t - 3, \quad y = 3t + 1$

7. $x = t + 1, \quad y = t^2$

11. $x = \sqrt{t}, \quad y = t - 5$

13. $x = t - 3, \quad y = \frac{t}{t - 3}$

23. $x = 6 \sin 2\theta, \quad y = 4 \cos 2\theta$

31. $x = t^3, \quad y = 3 \ln t$

pg. 715, #21, 27, and 29.

Find the equation of the tangent line(s) at the given points.

21. $x = t^2 - 4, \quad y = t^2 - 2t, (0, 0), (-3, -1), (-3, 3)$

27. $x = 2 \sin 2t, \quad y = 3 \sin t$ (where curve crosses itself)

29. $x = t^2 - t, \quad y = t^3 - 3t - 1$ (where curve crosses itself)

pg. 715, #35, and 37.

Find all points (if any) of horizontal and vertical tangents to the curve.

35. $x = t + 4, \quad y = t^3 - 12t + 6$

37. $x = 7 \cos \theta, \quad y = 7 \sin \theta$

pg. 716, #51, and 53.

Find the arc length of the curve on the given interval.

51. $x = e^{-t} \cos t, \quad y = e^{-t} \sin t, \quad 0 \leq t \leq \frac{\pi}{2}$

53. $x = \sqrt{t}, \quad y = 3t - 1, \quad 0 \leq t \leq 1$

Sketch the following polar equations (verify your sketch using technology)

(i) $r = \sin \theta,$

(ii) $r = 2 \cos 2\theta$

(iii) $r = 2 + \sin \theta,$

(iv) $r = 2 + 2 \sin \theta$

(v) $r = 1 + 2 \sin \theta,$

Due: Friday Apr. 1, 2022.