Math 501 Spring 2016

Homework 2

Due: Thursday February 4 at the end of class. A portion of the homework will be graded (by Anusha Krishnan) and returned to you at the end of the next class. Remember to staple your homework and put your name on it.

(1) Find the curve $\alpha(s)$ in the plane with curvature $\kappa(s) = 1/\sqrt{s}$.

(2) If a curve in the plane is given in polar coordinates (r, θ) by $r = r(\theta)$, calculate the curvature of the curve in terms of the function $r(\theta)$.

(3) Shifrin p. 31 Problem 1

(4) Shifrin p. 32 Problem 2

(5) Show that the curve $\alpha(t) = (\sin(t), \sin(2t))$ has rotation index 0. Draw the curve and explain why that makes sense.

(6) (Extra Credit) Shifrin p. 20, Problem 19. Turn in Extra Credit problems on a separate sheet of paper.