

Written HW9 – MATH 2501 Fall 2021

Due by 17 September for timely completion credit

For these problems, you should attach your plots to your submitted work. The work of finding a tangent line must be entirely done symbolically for full credit.

1. A “nephroid” is the graph of solutions to the equation

$$(x^2 + y^2 - 4)^3 = 108y^2.$$

Use Desmos to draw this curve, plot the point $\left(-\sqrt{3\left(1 + 2^{\frac{2}{3}}\right)}, 1\right)$ on the curve, and then find the equation and plot the tangent line to the curve at that point.

2. The “bean curve” is the set of solutions to the equation

$$x^4 + x^2y^2 + y^4 = x(x^2 + y^2).$$

Use Desmos to draw this curve, plot the point $\left(\frac{1}{2}, \frac{1}{2}\sqrt{\frac{1}{2} + \frac{\sqrt{5}}{2}}\right)$ on the curve, and then find the equation and plot the tangent line to the curve at that point.