

1.) Assume that y is a function of x . Compute $y' = \frac{dy}{dx}$ and $y'' = \frac{d^2y}{dx^2}$ (You need not simplify y'' .) for each equation.

a.) $y = x + x^3$

b.) $x = y + y^3$

c.) $y = x^2 \sin x$

d.) $y = x^2 \sin y$

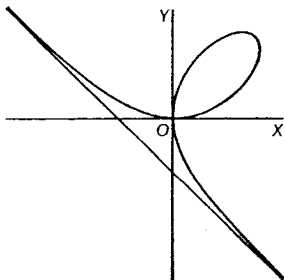
e.) $x^2 + y^3 = xy$

f.) $(x - y)^3 = x^2 - y^2$

g.) $\sin(3y) + \tan^2 y = \cos x$

2.) Use implicit differentiation to find the largest y -value in the “loop” of the Folium of Descartes, which is given by the equation $x^3 + y^3 - 3xy = 0$ (See diagram below.).

Folium of Descartes



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The following problem is for recreational purposes only.

3.) A horse is tethered by a rope to the corner of a small shed with a square 10 ft. by 10 ft. floor. If the rope is 40 feet long, sketch the shape of the horse’s grazing area. How close can you plant flowers to the shed and keep the horse from eating them ?