

Implicit differentiation (§3.1)

1. The cissoid of Diocles (a member of the conchoid of de Sluze family) is the curve given by

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

Find the line tangent to this curve at the point $(1, 1)$.

2. The curve

$$y^2 = x^3 - x + 1$$

is an example of an *elliptic curve*. Such curves were used in Andrew Wiles' proof of Fermat's Last Theorem. Their applications are built on top of the relationships between points where lines intersect the curve.

Find the line tangent to the curve at the point $(3, -5)$.