$x = ay^2(x) + by(x) + c.\ 1 = 2ayy' + by'.\ b = \dfrac{1 - 2ayy'}{y'}.$

$0 = \dfrac{\left(-2a(y')^2 - 2ayy''\right)y' - (1 - 2ayy')y''}{(y')^2};\ -2a(y')^3 - 2ayy'y'' - y'' + 2ayy'y'' = 0.$

$2a(y')^3 + y'' = 0.\ a = -\dfrac{y''}{2(y')^3}.\ 0 = -\dfrac{2y'''(y')^3 - 6(y'y'')^2}{2(y')^3}.\ y'y''' = 3(y'')^2.$