$\ln y = ax + by. \; b = \dfrac{\ln y - ax}{y}.$

$0 = \left(\dfrac{\ln y - ax}{y}\right)' = \dfrac{\left(\frac{y'}{y} - a\right)y - (\ln y - ax)y'}{y^2} = \dfrac{y'(1 - \ln y + ax) - ay}{y^2}; a = \dfrac{y'(\ln y - 1)}{xy' - y}.$

$0 = \dfrac{\left(y''(\ln y - 1) + \frac{(y')^2}{y}\right)(xy' - y) - y'(\ln y - 1)(y' + xy'' - y')}{(xy' - y)^2}.$

$xy'y''(\ln y - 1) + \dfrac{x(y')^3}{y} - yy''(\ln y - 1) - (y')^2 - xy'y''(\ln y - 1) = 0.$

$y^2y''(\ln y - 1) = (y')^2(xy' - y).$