



3. $y'''_{xxx} = f(y)$.

Autonomous equation. The substitution $w(y) = (y'_x)^2$ leads to a second-order equation: $w''_{yy} = \pm 2f(y)w^{-1/2}$.

Reference

Polyanin, A. D. and Zaitsev, V. F., *Handbook of Exact Solutions for Ordinary Differential Equations, 2nd Edition*, Chapman & Hall/CRC, Boca Raton, 2003.