3. $(x-a)^3(x-b)^3 y'''_{xxx} - cy = 0,$ $\qquad a \neq b.$

The transformation

$$t = \ln\left|\frac{x-a}{x-b}\right|, \qquad w = \frac{y}{(x-b)^2}$$

leads to a constant coefficient linear equation:

$$(a-b)^3(w'''_{ttt} - 3w''_{tt} + 2w'_t) - cw = 0.$$

References

Kamke, E., *Differentialgleichungen: Lösungsmethoden und Lösungen, I, Gewöhnliche Differentialgleichungen*, B. G. Teubner, Leipzig, 1977.

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