

34.
$$yy_{xx}'' + (y_x')^2 + f(x)yy_x' + g(x) = 0$$
.

The substitution $u=y^2$ leads to a linear equation: $u''_{xx}+f(x)u'_x+2g(x)=0$. It is reduced to a first-order linear equation by the change of variable $w(x)=u'_x$.

Reference

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

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http://eqworld.ipmnet.ru/en/solutions/ode/ode0334.pdf