Separable equations	$F(x)\,G(y)\,dx + H(x)\,P(y)\,dy = 0$
Solution	$\int \frac{F(x)}{H(x)}dx + \int \frac{P(y)}{G(y)}dy = K$
Homogeneous nonlinear equations	$M(x,y)\,dx + N(x,y)\,dy = 0$
Test	$M(\lambda x, \lambda y) = \lambda^n\, M(x,y) \;\wedge\; N(\lambda x, \lambda y) = \lambda^n\, N(x,y)$
Procedure	Substitution $y = v\,x, \quad f(v) = -\frac{M(x,v)}{N(x,v)}$
Solution	$x = K\, e^{\int \frac{dv}{f(v)-v}}$ then we make the change of variable $v = y/x$
Exact equations	$M(x,y)\,dx + N(x,y)\,dy = 0$
Test for exactness	$\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$
Solution	$\int M\,dx + \int \left(N - \frac{\partial}{\partial y}\int M\,dx \right) dy = K$ *or ...* $\int N\,dy + \int \left(M - \frac{\partial}{\partial x}\int N\,dy \right) dx = K$
Reducible to exact equations (Integrating factors)	$M(x,y)\,dx + N(x,y)\,dy = 0$
Test	if $p(x,y) = \frac{\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x}}{N}$ depends only on x $\quad \mu(x) = e^{\int p(x)dx}$ if $q(x,y) = \frac{\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y}}{M}$ depends only on y $\quad \mu(y) = e^{\int q(y)dy}$
Solution	Transform given equation into an exact differential multiplying it both sides by integrating factor $\mu(x)$ or $\mu(y)$.
Nonhomogeneous linear equations	$y' + p(x)\,y = q(x)$
Solution	$y\,e^{\int p\,dx} = \int q\,e^{\int p\,dx} dx + K$
Homogeneous linear equations	$y' + p(x)\,y = 0$
Solution	$y\,e^{\int p\,dx} = K$
Bernoulli equations	$y' + p(x)\,y = q(x)\,y^n$ where $n \neq 0 \wedge n \neq 1$
Solution	$y^{1-n}\, e^{\int (1-n)\,p\,dx} = \int (1-n) q\, e^{\int (1-n)\,p\,dx} dx + K$ *If* $n = 0$, view *Nonhomogeneous linear equations.* *If* $n = 1$, view *Homogeneous linear equations.*