Differentialgleichungen I - Equations to practice

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http://dynamics.mi.fu-berlin.de/lectures/12SS-Gurevich-Dynamics/

Solve the following equations by one of the methods discussed in the tutorials.

(i) $xy' + x^2 + xy - y = 0$.

(ii) $(2xy^2 - y)\mathrm{d}x + x\mathrm{d}y = 0$.

(iii) $y'^3 - y'e^{2x} = 0$.

(iv) $y' = 1/(x - y^2)$.

(v) $y' + y = xy^3$.

(vi) $xy' + y = \ln y'$.

(vii) $y' = (4x + y - 3)^2$.

(viii) $xy'/y + 2xy \ln x + 1 = 0$.

(ix) $yy' = 4x + 3y - 2$.

(x) $y \sin x + y' \cos x = 1$.

(xi) $(2xy^2 - y)\mathrm{d}x + (y^2 + x + y)\mathrm{d}y$.

(xii) $xy' + 1 = e^{x-y}$.

(xiii)
$$\begin{cases} \dot{x} = 4x - y, \\ \dot{y} = 3x + y - z, \\ \dot{z} = x + z. \end{cases}$$

(xiv)
$$\begin{cases} \ddot{x} = 2y, \\ \ddot{y} = -2x. \end{cases}$$

(xv)
$$\begin{cases} \dot{x} = y + 2e^t, \\ \dot{y} = x + t^2. \end{cases}$$

(xvi) $y''' - 8y = 0$.

(xvii) $y'' + y = 4xe^x$.

(xviii) $y''' - 2y'' + 4y' - 8y = e^{2x} \sin 2x + 2x^2$.