Ecuaciones diferenciales homogeneas, exactas, factores integrantes

1. $\frac{dy}{dx} = \frac{y-3}{x+y+1}$ R: $\frac{x+4}{y-3} = \ln(y-3) + c$

2. $\frac{dy}{dx} = \frac{x-3y-7}{x-4}$ R: $(x-4)^4 - 4(x-4)^3(y+1) = c$

3. $\frac{dy}{dx} = \frac{x+2y+7}{-2x+y-9}$ R: $y^2 - 18y - 4xy - 14x - x^2 = c$

4. $\frac{dy}{dx} = \left(\frac{x+y+1}{x+1}\right)^2$ R: $\frac{2}{\sqrt{3}}\text{arctg}\left(\frac{x+2y+1}{\sqrt{3}(x+1)}\right) = \ln(x+1) + c$

5. $\frac{dy}{dx} = \frac{x-y+2}{x-y+3}$ R: $x = \frac{(x-y+3)^2}{2} + c$

6. $\frac{dy}{dx} = \frac{2x^3+6xy^2-2y^3+4x+3y}{6xy^2-6x^2y+4y^3-3x+2y}$ R: $\frac{x^4}{2} + 3x^2y^2 - 2xy^3 - y^4 + 2x^2 + 3xy - y^2 = c$

7. $\frac{dy}{dx} = -\frac{2x^3y^2+4x^2y+2xy^2+xy^4+2y}{2(y^3+x^2y+x)}$ R: $ce^{-x^2} = 2x^2y^2 + 4xy + y^4$

8. $\left(\frac{x^2-y^2}{x^2y} - \frac{y}{x^2+y^2}\right)dx + \left(\frac{x}{x^2+y^2} + \frac{y^2-x^2-x}{xy^2}\right)dy = 0$ R: $\text{arctg}\left(\frac{y}{x}\right) + \frac{x^2+x+y^2}{xy} = c$

9. $\left(\frac{2x}{\sqrt{x^2+y^2}} - y^2\right)dx + \left(\frac{2y}{\sqrt{x^2+y^2}} - 2xy\right)dy = 0$ R: $\text{arctg}\left(\frac{y}{x}\right) + \frac{x^2+x+y^2}{xy} = c$

10. $\left(\frac{1}{x-y} + \frac{x}{x^2+y^2}\right)dx + \left(\frac{1}{y-x} + \frac{y}{x^2+y^2}\right)dy = 0$ R: $(x-y)^2(x^2+y^2) = c$

11. $(3x^2 + 2xy)dx + (2x^3 + x^2 + 2x^2y)dy = 0$ R: $x^2e^{2y}(x+y) = c$

12. $\text{arcsen}(y)dx + \frac{x+2\sqrt{1-y^2}\cos(y)}{\sqrt{1-y^2}}dy = 0$ R: $x\text{arcsen}(y) + 2\text{sen}(y) = c$

13. $(x\ln(y) + y\ln(x) + y)dx + \left(\frac{x^2}{2y} + x\ln(x)\right)dy = 0$ R: $\frac{1}{2}x^2\ln|y| + xy\ln|x| = c$

14. $(10x^4y^2 + 4x^3y)dx - (2x^5y + 2x^4)dy = 0$ R: $2x^5y + x^4 = cy^2$

15. $xdx + (x^2 + y^2 + y)dy = 0$ R: $(x^2+y^2)e^{y^2} = c$

16. $ydx - (x^2 + y^2 + x)dy = 0$ R: $x = y\tan(c+y)$