

ODE

First Order ODE

Separable

1. $y' = x^2 y$

2. $\frac{dy}{dx} = y^2 e^{-x}$

3. $(x^2 + 9) \frac{dy}{dx} + xy = 0$

4. $y' = y$

5. $y' + x = xy^2$

6. $y' = y^2 \cos(x) + 4y' \sin^2(x)$

7. $y'(x) = y(x) + 2, y(0) = 0$

8. $xyy' = 1 + x^2 + y^2 + x^2 y^2$

9. $\frac{dy}{dx} = \frac{y^2}{x^3}, y(1) = 1$

10. $y' = -4xy^2, y(0) = 1$

Answers

ODE

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Separable

$$1. y = e^{\frac{x^3}{3} + c_1}$$

$$2. y = -\frac{e^x}{-1 + c_1 e^x}$$

$$3. y = \frac{c_1}{\sqrt{x^2 + 9}}$$

$$4. y = e^{t + c_1}$$

$$5. y = -\frac{e^{c_1}}{e^{x^2} - e^{c_1}} - \frac{e^{x^2}}{e^{x^2} - e^{c_1}}$$

$$6. y = -\frac{4}{\ln(1 + 2\sin(x)) - \ln(-1 + 2\sin(x))} + c_1$$

$$7. y = 2e^x - 2$$

$$8. y = \sqrt{e^{x^2 + c_1 x^2} - 1}, y = -\sqrt{e^{x^2 + c_1 x^2} - 1}$$

$$9. y = \frac{2x^2}{1 + x^2}$$

$$10. y = \frac{1}{2x^2 + 1}$$