

1. Solve the following DEs.

(a) $(2x - 1)dx + (3y + 7)dy = 0$

(b) $(5x + 4y)dx + (4x - 8y^3)dy = 0$

(c) $(\sin y - y \sin x)dx + (\cos x + x \cos y - y)dy = 0$

(d) $(\tan y - 3x^2)dx + x \sec^2 y dy = 0$

(e) $(y^2 e^{xy} + 1)dx + (xy e^{xy} + e^{xy})dy = 0$

2. Solve the following non exact differential equations by integration factor.

(a) $(x^5 + 3y)dx - xdy = 0$

(b) $(xy + 1)ydx + (2y - x)dy = 0$

(c) $(y^2 + xy^3)dx + (5y^2 - xy + y^3 \sin y)dy = 0$

(d) $(10 - 6y + e^{-3x})dx - 2dy = 0$

3. Solve the following IVP.

$$\begin{cases} xdx + (x^2y + 4y)dy & = 0 \\ y(4) & = 0 \end{cases}$$

4. Solve the following IVP.

$$\begin{cases} (x^2 + y^2 - 5)dx & = (y + xy)dy \\ y(0) & = 1 \end{cases}$$