

$$(x^2 + 6y^2) dx - 4xy dy = 0$$

1) Homogeneous

$$2) \frac{\partial M}{\partial y} = 12y \quad \Bigg| \quad \frac{\partial N}{\partial x} = -4y$$

not exact  $\neq$

$$\frac{1}{N} \left( \frac{\partial M}{\partial y} - \frac{\partial N}{\partial x} \right) = \frac{16y}{-4xy} = -\frac{4}{x}$$

$$I.F. = e^{\int -\frac{4}{x} dx} = \dots$$

2) not exact can be converted to exact by I.F

$$3) (x^2 + 6y^2) dx - 4xy dy = 0$$

$$(x^2 + 6y^2) dx = 4xy dy$$

$$\frac{x^2 + 6y^2}{4xy} = \frac{dy}{dx}$$

$$\frac{1}{4} \frac{x}{y} + \frac{3}{2} \cdot \frac{1}{x} y = \frac{dy}{dx}$$

$$\frac{x}{4} y^{-1} = y^{-1} - \frac{3}{2x} y$$

Bernoulli eq with  $n = -1$