

	1	2	3	4	5
JAN 20	6	7	8	9	10
	13	14	15	16	17
	20	21	22	23	24
	27	28	29	30	31
					12
					19
					26

Section 2

Q1) solve  $x^2 z - y^2 z + p x - q y = \log x$

let  $x = e^x$ ,  $y = e^y$  so that  $X = \log x$  and  $Y = \log y$   
and let  $\partial = \frac{\partial}{\partial x} = D'$  the given equation  
reduce to  $\frac{\partial}{\partial x} = D'$  the given equation

$$[D(D-1) - D'(D'-1) + D - D']z = X$$

$$[D^2 - D'^2]z = X$$

which is homogenous linear partial differential  
equal with coefficients.

$$CF = \phi_1(X+Y) + \phi_2(Y-X)$$

$$PI = \frac{1}{D^2 - D'^2} (X) = \frac{1}{(D+D')(D-D')} \int \int u \, du \, dv$$

$$X = u = \int \frac{u^2}{2} \, du = \frac{u^3}{6} = \frac{X^3}{6}$$

$$z = \phi_1(X+Y) + \phi_2(Y-X) + \frac{X^3}{6}$$

$$= \phi_1(\log y + \log x) + \phi_2(\log y - \log x) + \frac{(\log x)^3}{6}$$

$$= \phi_1(\log xy) + \phi_2\left(\log \frac{y}{x}\right) + \frac{1}{6} (\log x)^3$$

Notes

Call

$$z = f_1(xy) + f_2\left(\frac{y}{x}\right) + \frac{1}{6} (\log x)^3$$