



Assignment 1 - Mathematics-II  
Departments: CSE,ECE,ENE  
Pondicherry University

Aasaimani Thamizhazhagan  
 [aasaimanit@pondiuni.ac.in](mailto:aasaimanit@pondiuni.ac.in)

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 M05, RSMS Building

1. Form the partial differential equations by eliminating the arbitrary constants or arbitrary functions from the following:

(a)  $(x - a)^2 + (y - b)^2 + z^2 = 1$

(b)  $z = axe^y + \frac{1}{2}a^2e^{2y} + b$

(c)  $f(x^2 + z^2, y - xz) = 0$

(d)  $z = f_1(x)f_2(y)$

2. Solve by direct integration:

(a)  $\frac{\partial^2 z}{\partial x \partial y} = \frac{1}{xy}$

(b)  $\frac{\partial^2 z}{\partial x^2} = a^2 z$  given that when  $x = 0$ ,  $\frac{\partial z}{\partial x} = a \sin y$  and  $\frac{\partial z}{\partial y} = 0$ .

(Hint: Refer 16.4 solved examples and ODE from M1)

3. Solve the following Lagrange linear equations:

(a)  $(z - y)p + (x - z)q = y - x$

(b)  $x(y - z)p + y(z - x)q = z(x - y)$

(c)  $x^2p + y^2q = (x + y)z$

(d)  $z(xp - yq) = y^2 - x^2$

4. Solve the following equations:

(a)  $\frac{\partial^2 z}{\partial x^2} - 7 \frac{\partial^2 z}{\partial x \partial y} + 6 \frac{\partial^2 z}{\partial y^2} = \cos(y - 3x)$

(b)  $4 \frac{\partial^3 z}{\partial x^3} - 3 \frac{\partial^3 z}{\partial x \partial y^2} + \frac{\partial^3 z}{\partial y^3} = 6x^2y^2$

(c)  $(4D_x^2 D_y - 4D_x D_y^2 + D_y^3)z = (y - 1)e^x$

(Hint: Interchange  $x$  to  $y$  and do the same in the final solution (OR) find the characteristic directions from factoring! You will have to use general method of finding P.I.)