

Partial Differential Equations and its Applications (MAT231)

Instructor: Mayamma Joseph (mayamma.joseph@christuniversity.in)

Practice Problems

Formation of Partial Differential Equations

Form the partial differential Equations corresponding to the following equations.

1. $z = (x - a)^2 + (y - b)^2$	2. $2z = \frac{x^2}{a^2} + \frac{y^2}{b^2}$
3. $x^2 + y^2 = (z - c)^2 \tan^2 \alpha$	4. $x^2 + y^2 + (z - c)^2 = a^2$
5. $z = (x + a)(y + b)$	6. $2z = (ax + y)^2 + b$
7. $ax^2 + by^2 + z^2 = 1$	8. $z = axy + b$
9. $z = xy + y\sqrt{x^2 - a^2} + b$	10. $z = ax + a^2 y^2 + b$
11. $z = \left(\frac{ax}{y}\right) + b$	12. $z = (x^2 + a)(y^2 + b)$
13. $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$	14. $f(xyz, x + y + z) = 0$
15. $f(x + y + z, x^2 + y^2 - z^2) = 0$	16. $f(z, x^2 + y^2) = 0$
17. $f(x^2 + y^2 + z^2, z^2 - 2xy) = 0$	18. $f(xyz, x^2 + y^2 + z^2) = 0$
19. $f(xy + z^2, x + y + z) = 0$	20. $z = e^{mx} f(x + y)$
21. $z = f(x + ay) + g(x - ay)$	22. $v = \left(\frac{1}{r}\right) [f(r - at) + F(r + at)]$
23. $z = yf(x) + xg(y)$	24. $z = \left(\frac{1}{y}\right) [f(x + ay) + g(x - ay)]$
25. $z = f(x + ay)$	26. $z = f\left(\frac{xy}{z}\right)$
27. $z = f(xy) + g(x + y)$	28. $z = f(x + iy) + F(x - iy)$
29. $z = y^2 + 2f\left(\frac{1}{x} + \log y\right)$	30. $lx + my + nz = f(x^2 + y^2 + z^2)$
31. $xyz = \varphi(x + y + z)$	32. $f(x + y + z, x^2 + y^2 + z^2) = 0$
33. $f(x^2 + y^2, z - xy) = 0$	34. $f(x^2 + y^2, y^2 + z^2) = 0$

35. Find the PDE of all spheres of radius 3 units and having their centres in the xy -plane.