Class-1

I. Form the PDE by eliminating the arbitrary constants from the following relations:

1. $z=(x+a)(y+b)$, where a and b are the arbitrary constants.

2. $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$, where a, b and c are the arbitrary constants.

3. $z=ce^{-\omega t}\cos(\omega x)$, where t and ω are the arbitrary constants.

4. $z=a\log\left(x^2+y^2\right)+b$, where a and b are the arbitrary constants.

5. $\left(x^2+y^2\right)=(z-c)^2\tan^2\alpha$, where c and α are the arbitrary constants.

Answers:

1. $z=pq$

2. $zy\frac{\partial^2 z}{\partial y^2}+y\left(\frac{\partial z}{\partial y}\right)^2-z\frac{\partial z}{\partial y}=0$

3. $\frac{\partial^2 z}{\partial x^2}+\frac{\partial^2 z}{\partial t^2}=0$

4. $py-xq=0$

5. $yp=xq$