Starting from the substantial derivative form of the momentum equation:

$$\rho \frac{Du}{Dt} = -\frac{\partial p}{\partial x} + \rho f_x + (f_x)_{\text{viscous}}$$

$$\rho \frac{Dv}{Dt} = -\frac{\partial p}{\partial y} + \rho f_y + (f_y)_{\text{viscous}}$$

$$\rho \frac{Dw}{Dt} = -\frac{\partial p}{\partial z} + \rho f_z + (f_z)_{\text{viscous}},$$

derive the Euler’s equations in $x$, $y$, and $z$ directions. Compare your results against the Euler’s equation (derived in unit A-3: $dp = -\rho Vd\rho V$ along a streamline).

**Hints . . .**
- Did you get the same Euler’s equation ($dp = -\rho Vd\rho V$)?