Dividing through by dr

$$\frac{dP}{dr} = -\rho g$$

gravitational acceleration

Pressure gradient

density

Since ρ and g are positive, $\frac{dP}{dr} < 0$

i.e. **$P(r)$ decreases as r increases**

How fast ?.....

We define the pressure scale height H_p, via

$$\frac{1}{H_p} = -\frac{1}{P(r)}\frac{dP}{dr}$$

Assume H_p is approx. constant :- (OK for ISOTHERMAL $T = \text{const.}$ case)

$$\frac{dP}{P} = -\frac{dr}{H_p}$$

$$\Leftrightarrow \int \frac{dP}{P} = -\int \frac{dr}{H_p} = -\frac{1}{H_p}\int dr$$

$$\Leftrightarrow \ln P + \text{const.} = -\frac{r}{H_p}$$