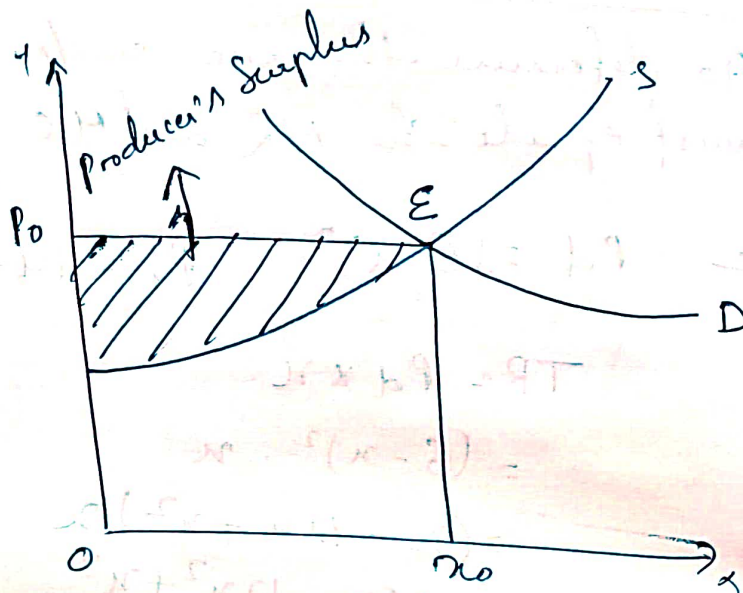


Producer's Surplus

P.S = Area of the whole rectangle $P_0 O x_0 E$ - Area of the curve under the supply curve from O to x_0 .



$$P.S = p \times x - \int_0^{x_0} \text{supply function} dx$$

Example

$$\text{Given } P_d = 3x^2 - 20x + 5$$

$$P_s = 15 + 9x$$

$$\text{Equilibrium } D = S$$

$$3x^2 - 20x + 5 = 15 + 9x$$

$$\Rightarrow x = 10 \text{ or } x = -\frac{1}{3}$$

$$\text{At } x = 10 \text{ equilibrium price} = 105$$

$$TR = P \times x = 1050$$

$$\begin{aligned} P.S &= 1050 - \int_0^{10} (15 + 9x) dx \\ &= 1050 - \left[15x + \frac{9x^2}{2} \right]_0^{10} \\ &= 1050 - \left[150 + \frac{900}{2} \right] \\ &= 1050 - 600 \\ &= 450 \end{aligned}$$