

$$\left[ \frac{m}{2} v^2 = P t \Rightarrow P = \frac{m}{2} 2v \dot{v} = m v a \right]$$

$$P = F \cdot v = m a v = m v \frac{dv}{dt}$$

$$= m v \frac{dv}{dt} \cdot \frac{ds}{ds} = m v^2 \frac{dv}{ds}$$

$$P \cdot ds = m v^2 dv$$

$$\int_0^s P ds = \int_0^v m v^2 dv$$

$P = \text{const.}$

$$P \cdot s = \frac{m v^3}{3}$$

$$v = \left[ \frac{3 P s}{m} \right]^{1/3}$$

$$\frac{m}{2} v^2 = \frac{m}{2} \left( \frac{3 P s}{m} \right)^{2/3} = \frac{(3 P s)^{2/3} m^{1/3}}{2}$$

$$\frac{m}{2} v^2 = \frac{3^{2/3}}{2} P^{2/3} s^{2/3} m^{1/3}$$

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