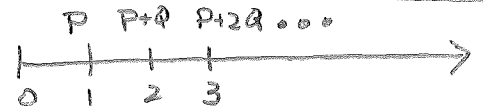


# PERPETUITIES

$$a_{\overline{\infty}|} = \frac{1}{i} \quad \ddot{a}_{\overline{\infty}|} = \frac{1}{d} = \frac{1}{i} (1+i) = \frac{1}{i} + 1$$

$$(I_{P,Q} a)_{\overline{\infty}|} = \frac{P}{i} + \frac{Q}{i^2}$$

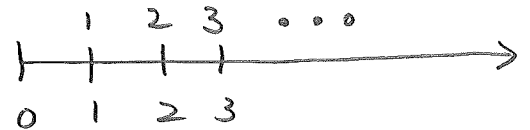


$$(I_{P,Q} \ddot{a})_{\overline{\infty}|} = \frac{P}{d} + \frac{Q}{id} = \left( \frac{P}{i} + \frac{Q}{i^2} \right) (1+i)$$



$$P=1 \quad Q=1$$

$$(Ia)_{\overline{\infty}|} = \frac{1}{i} + \frac{1}{i^2} = \frac{1}{id}$$

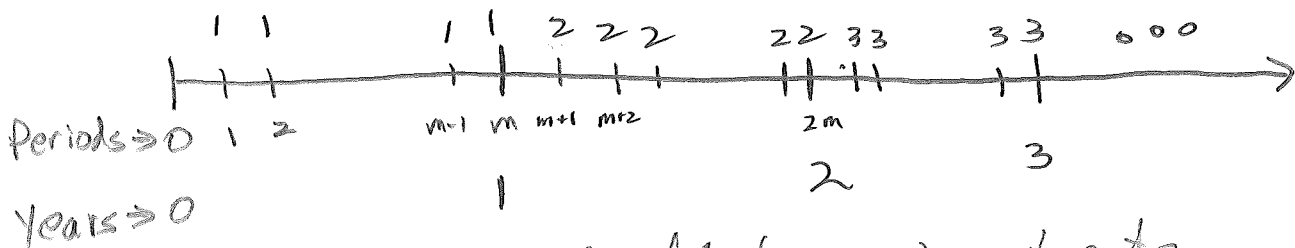


$$(I\ddot{a})_{\overline{\infty}|} = \frac{1}{d} + \frac{1}{id} = \frac{1}{d^2} = (Ia)_{\overline{\infty}|} (1+i)$$



For All Calculations above  $i = m^{\text{thly}}$  effective interest rate  $\left( \frac{i^{(m)}}{m} \right)$  and  $d = m^{\text{thly}}$  effective discount rate  $\left( \frac{d^{(m)}}{m} \right)$ .

$$(Ia)^{(m)}_{\overline{\infty}|} = \frac{1}{d \frac{i^{(m)}}{m}} = \frac{1}{i \cdot \frac{i^{(m)}}{m}} (1+i) = \frac{1}{\frac{i^{(m)}}{m}} + \frac{1}{\frac{i^{(m)}}{m} i}$$



Here  $i$  is annual effective interest rate

$$(I\ddot{a})^{(m)}_{\overline{\infty}|} = (Ia)^{(m)}_{\overline{\infty}|} \left( 1 + \frac{i^{(m)}}{m} \right) = \frac{1}{\frac{d^{(m)}}{m}} + \frac{1}{i \cdot \frac{d^{(m)}}{m}}$$

Perpetuity payable at a rate of 1 per year continuously

$$\bar{a}_{\overline{\infty}|} = \frac{1}{\delta}$$

Perpetuity payable at a rate of  $t$  at time  $t$

$$(\overline{I\bar{a}})_{\overline{\infty}|} = \frac{1}{\delta^2}$$