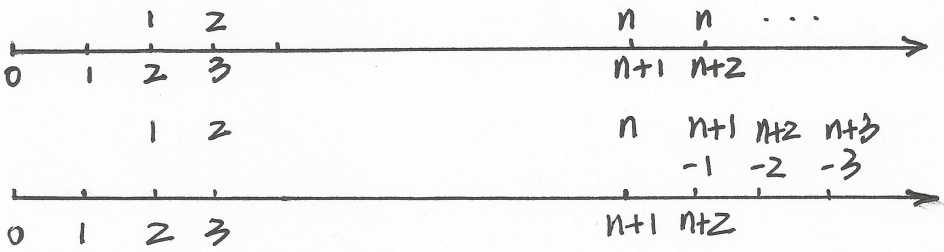
Solution #6

Find $n = ?$

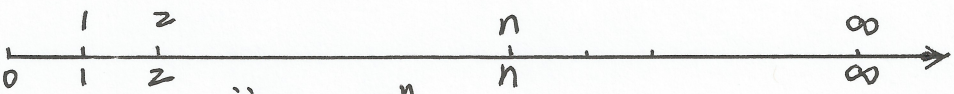
Given: PV(Perpetuity) = 77.1

$i = .105$

GF perpetuity.



$(Ia)_{\overline{\infty}|}$



$$(Ia)_{\overline{n}|} = \frac{\ddot{a}_{\overline{n}|} - nv^n}{i}$$

$n = \infty \quad (Ia)_{\overline{\infty}|} = \frac{\ddot{a}_{\overline{\infty}|} - 0}{i}$

$$= \left(\frac{1 - v^{\infty}}{d}\right) / i$$

$$= \frac{1 - 0}{di} \qquad d = \frac{i}{1+i}$$

$$= \frac{1+i}{i^2}$$

$$PV(\text{perpetuity}) = v \cdot (Ia)_{\overline{\infty}|} - v^{n+1} (Ia)_{\overline{\infty}|}$$

$$= v(1 - v^n)(Ia)_{\overline{\infty}|}$$

$$= v(1 - v^n)\frac{1+i}{i^2}$$

$$= \frac{1 - v^n}{i} \cdot \frac{1}{i} = \frac{1 - (1.105)^{-n}}{(.105)^2} = 77.1$$

$$= \frac{a_{\overline{n}|}}{i} \qquad (1.105)^{-n} = .15$$

$$n = -\frac{\ln .15}{\ln 1.105} = 19$$

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