

PERPETUITIES

A Perpetuity is a special kind of annuity where the payment received equals the interest earned.

The recurrence relation for a perpetuity is:

Payment Received = Interest Earned.

$$D = \frac{r}{100} \times V_0.$$

V_0 = Initial value

r = Interest rate per compounding period

D = regular payment received.

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Eg ~~Jack~~ invests \$500 000 into a perpetuity that will provide a monthly income. The interest rate is 6% p.a. compounding monthly. What payment does he receive?

$$D = \frac{r}{100} \times V_0$$

$$V_0 = 500\,000 \quad r = 6\% \text{ p.a.} = \frac{6}{12} = 0.5\% \text{ p Month.}$$

$$D = \frac{0.5}{100} \times 500\,000$$

$$= \$2500.$$

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Eg Dino wants to receive a monthly payment of \$ 200 from a perpetuity. If the perpetuity earns 4.2% pa, compounding monthly. How much will he need to invest?

$$V_0 = ?$$

$$D = 200$$

$$r = 4.2\% \text{ pa.}$$

$$= \frac{4.2}{12}$$

$$= 0.35\% \text{ per Month.}$$

$$200 = \frac{0.35}{100} \times V_0.$$

Calc Main and Solve function

$$\text{Solve}(200 = \frac{0.35}{100} \times x, x).$$

$$V_0 = \$ 5714.29.$$

Note - We could not use Financial solver for this because both PV and FV are unknown.

