

# Financial Mathematics (Tutor Worksheet)

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Total Marks: 10  
Number of Pages: 2

## Instructions

- This sheet is compiled from past material with minor adjustments and mainly for your own practice.
- Your workings are very important and earn part marks in excel assessments.
- Label columns and make sure your work is understandable.
- Aim to learn more than you already know.
- **Note:** The mark allocations in this sheet are not a true reflection of the actual marking standard.

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*Good luck and do your best! Remember, the goal is to test your own understanding and identify areas that need revision.*

## Questions

**Q1** Miguel deposits R1000 into a fund annually and doubles the annual contribution fifteen years later. All contributions are in arrears.

Interest is credited at a nominal discount rate of  $d$  compounded quarterly for the first 10 years, and at a nominal interest rate of 5% compounded semi-annually for next 16 years, and at a force of interest of 7% per annum thereafter.

The accumulated balance in the fund at the end of 30 years is R100000

Calculate  $d$ .

*Hint: Try GoalSeek*

[4]

**Q2** Nisreen, Janice, and Boipelo are interested in pooling together R30000 to invest into a fund, however they are undecided on whose suggested fund to use.

- Nisreen suggests investing the R30000 in an upcoming project that pays back R10000 every 3 years, (until the principal investment is returned) at an interest rate of 3% per annum effective.
- Janice found a fixed interest security that pays out annual payments of R2000 over 10 years with a R10000 repayment at the end. For the price of R30000, an effective compound rate of interest charge of 0.9% per month is due.
- Boipelo knows a “reliable” investor that guarantees quarterly payments for 5 years in exchange for the R30000. The payments are R500 for the 1st year, increasing by R500 each year, at an interest rate of 2% per annum effective.

Calculate the present value of each scenario and help them by giving them their best option (based *solely* on the present values!!!).

[6]