

Interest only loans

Year 12 General Maths
Units 3 and 4

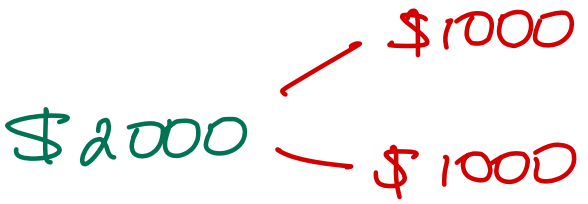
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Learning Objectives

By the end of the lesson, I would hope that you have an understanding and be able to apply to questions the following concepts:

- To be able to find the regular payment amount for an interest-only loan with and without a financial solver.
- To be able to find the amount borrowed for an interest-only loan.
- To be able to find the interest rate for an interest-only loan.







Recap

We are building quite a knowledge bank of questions and scenarios.

We have seen the power of the financial solver and how it can be used to answer some complex financial problems.

There are two more important financial concepts which we need to look at:

- Interest only loans
- Perpetuities



Interest only loans

Note: These really are not a good idea.

As the title suggests, interest only loans mean you borrow some money (e.g. $400 000) and then only pay back the interest accrued each month. This makes the monthly payments cheaper and more affordable.

The term of the loan might be 25 years. Which means, for 25 years you are only paying the interest.

But what of the $400,000?

This will be required to pay back to the bank at the end of the loan.

OUCH! Who will also be saving enough money to pay back to $400,000?

PV

FV

N → 1

30×12



Interest only loans

The most important thing to note with an interest only loan is:

The present value and the future value are the same (except for a change of sign).

You are NOT paying back any of the principal.

The value of N can be anything you like as it doesn't matter if you make one payment or 100 payments.



Modelling interest only loans

If we look back to the recurrence relationship we have been using all through Chapter 7:

$$V_0 = Principal, \qquad V_{n+1} = R \times V_n - D$$

The value of D will always have to be the same as the interest gained.

If you do the following, you can find the value of D:

$$D = R \times V_0 - V_0$$

$$\frac{\text{comp int rate \%} \times V_0}{100}$$



Example: By hand

Jane borrows $50 000 to buy some shares. Jane negotiates an interest-only loan at an interest rate of 9% per annum, compounding monthly. What is the monthly amount Jane will be required to pay?

$$\frac{9}{12} = 0.75\%$$

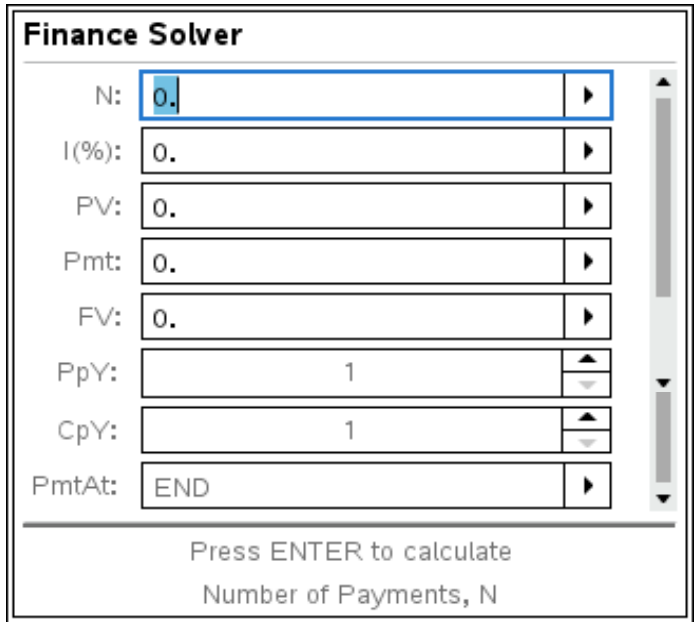
$$\frac{0.75}{100} \times 50\,000 = \$375$$



Example: Using the financial solver

Jane borrows $50 000 to buy some shares. Jane negotiates an interest-only loan at an interest rate of 9% per annum, compounding monthly. What is the monthly amount Jane will be required to pay?

$375





Example

A loan at 6% per annum, compounding monthly, requires payments of $440 each month.

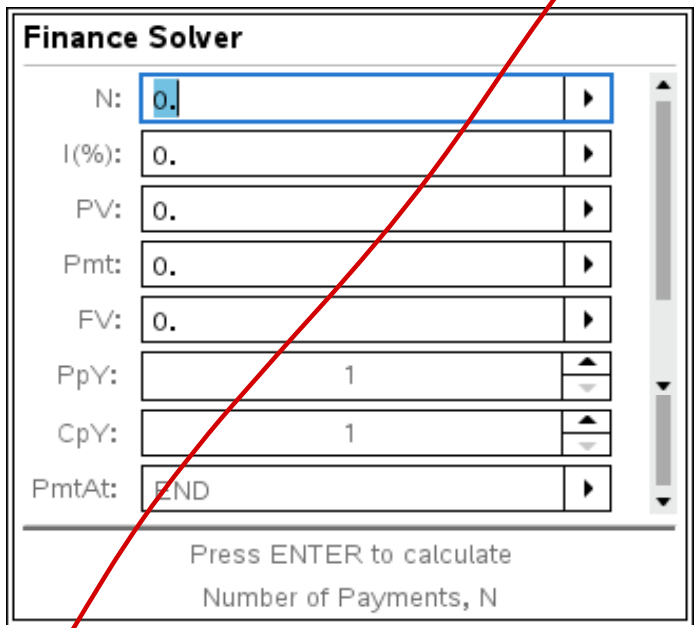
If the loan is an interest-only loan, what is the principal?

$$r = \frac{6}{12} = 0.5\%$$

solve $(0.5 \div 100$ of $x = 440, x)$

1% of PV = 880

100% of PV = 88000



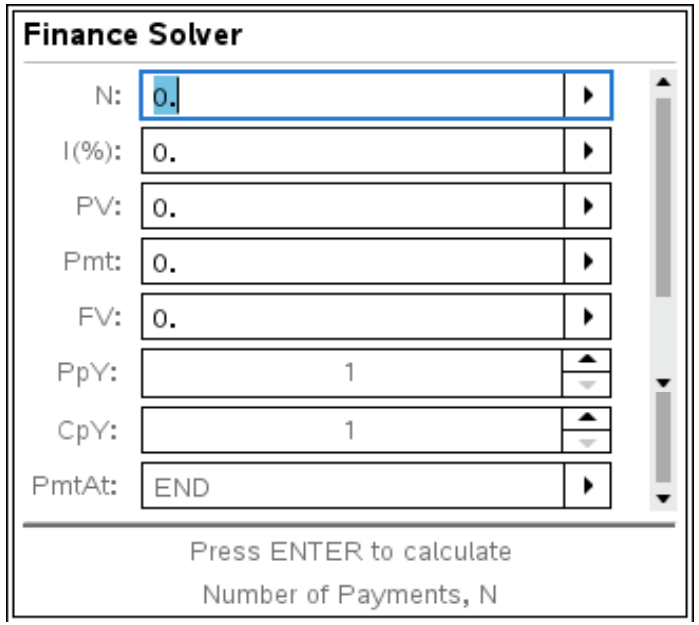


Example

An interest-only loan of $1 000 000 requires quarterly payments of $4000.

What is the annual interest rate on the loan?

1.6%







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