

Understanding home loans

Choosing a lender

Loan features

Planning to borrow

Home loans in detail

Home loan tips

You need to be able to ...

- 1. Explain some key issues to consider when choosing a lender**
- 2. Identify the pros and cons of various loan features for different situations**
- 3. Calculate the repayments on a home loan and also the amount that can be borrowed**
- 4. Understand and explain how the principal outstanding and interest payments change over time**
- 5. Identify some strategies for paying off a home loan faster and explain why the strategies work**

Choosing a lender

Think and discuss

Imagine that you are about to contact a financial institution to arrange a home loan.

What is the first financial institution that you would contact?

Why do you think that it came to mind first?

Arrange pre-approval

You do this “before” making any offers!

Decide on your bank and mortgage product

Apply for the maximum amount possible

Provide them with all paperwork / ID / payslips required

can take a few weeks to get everything together

Bank will give you “pre-approval”

subject to them being happy with property you buy

Usually given within a week of receiving paperwork

Rarely “reject” a loan after pre-approval given

3 types of lenders

1. Major retails banks

ANZ (ING Direct), Westpac, CBA, NAB (UBank) and St George

Good service and good features

Consistent, moderate interest rates

2. Smaller banks and lenders

Adelaide bank, Bendigo bank, Bank of Queensland

A lot of smaller lenders exited the market in the GFC

3. Mortgage brokers and other non-bank financial inst.

Aussie home loans, Mortgage choice

Help you to find the cheapest home loan

Many left the market in the GFC

Loan features

2 repayment options

1. Payments consist of both principal and interest

The normal situation (on previous slides)

Loan is fully paid off at the end of the term (eg 25 years)

Good for people who are not great savers

Bad if you want to build up other investments as well

2. Interest only payments

Only pay interest on principal

Usually limited to the first 10 years ... then principal + interest

Good for savers who want other investments

Very bad for people who are bad savers

3 interest rate options

1. Variable interest rates

Increase or decrease with central bank monetary policy

As interest rate rises, so does your loan repayments

Expect average variable rate < fixed rate over long-run

Good for people who can easily meet increased repayments

2. Fixed interest rates

Calculated as average of expected future variable rates

... plus a 'buffer' to the bank since they take more risk

Can be charged a large penalty fee if re-finance loan within ~5 years

Better for people who borrow large sums and for some investors

3. Split rates

Part variable and part fixed ... hedge your bets!

Good for people the indecisive or who don't know what is best

Repayment terms

Period over which loan must be repaid

Maximum is usually 30 years

Shorter the term

- Higher the compulsory repayments**

- The lower the total interest in the long-run**

- Less likely to be able to make voluntary extra repayments**

- Choose if you need the bank to force you to make high payments**

Longer the term

- Lower the compulsory repayments but higher interest**

- Choose if you are a good saver and will make extra repayments**

Other useful features

Mortgage offset account

Balance of your savings account reduces principal outstanding

If average balance is \$10,000 then ...

... bank calculates interest on loan outstanding - \$10,000

Allows you to pay off loan faster with same repayments

Very good feature if it doesn't cost you a higher interest rate!

Redraw facility

Allows you to withdraw extra repayments at any time

Both usually only available with variable rate loans

New product features

Zero deposit with “Family Guarantee”

Parents use their home as security for your home loan

**Allows you to borrow 100% of purchase price + stamp duty
+ legal fees + bank fees**

**Saves you paying mortgage insurance of \$5000+
(insures bank against you defaulting on loan payments)**

Reverse mortgages

**Allows people aged 62+ to borrow against their home and make no
repayments until house ceases to be main residence**

**Good for parents who need extra money for superannuation but bad
for your inheritance!**

Q1: Loan features

- a) Considering the pros and cons, would you borrow at a fixed, variable or split rate?**
- b) Identify 3 different financial institutions from whom you would consider borrowing money to buy a home. Compare their home loans in terms of interest rates and loan features.**

Planning to borrow

Recap: What is an annuity?

Regular series of cash flows

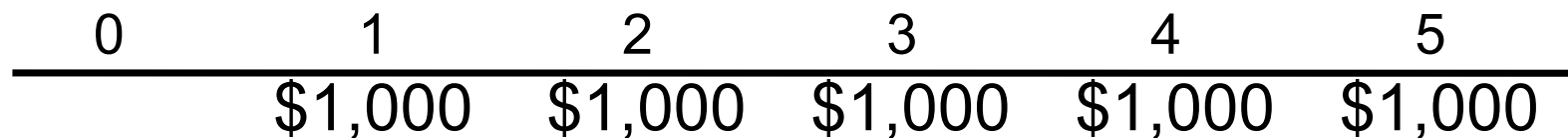
Cash flows are all the same

First cash flow is in one period

If first cash flow is today then it should be handled separately

There is a final cash flow

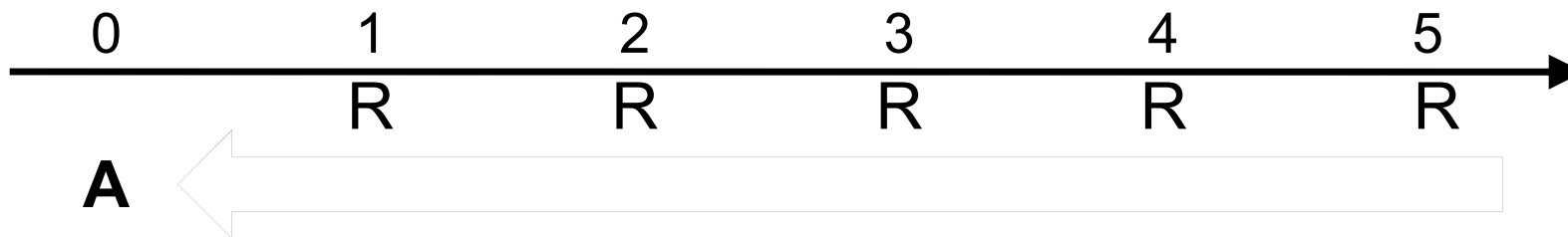
No missing cash flows in the middle



Present value (A)

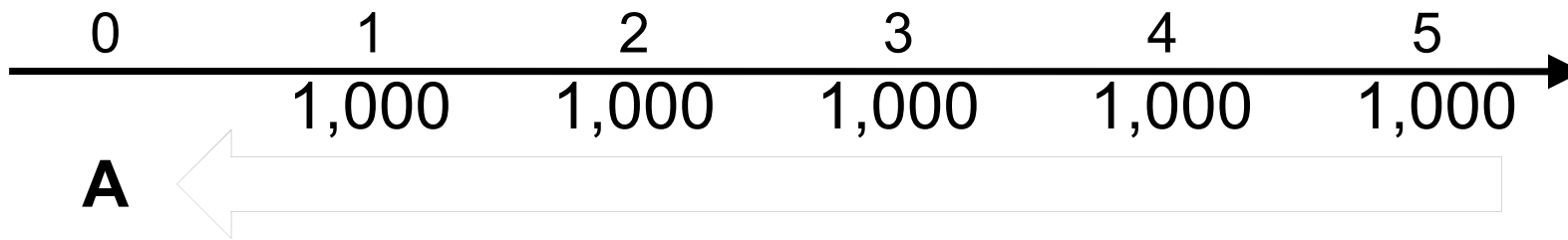
The present value (A)
of a set of regular identical cash flows (R)
paid for n periods
with a return of r per period

$$A = R \times \left(\frac{1 - (1 + r)^{-n}}{r} \right)$$



Example of present value

How much can Susan borrow if she can afford loan repayments of \$1,000 per year for 5 years and interest rates are 6% p.a.?



$$\begin{aligned}
 A &= R \left(\frac{1 - (1 + r)^{-n}}{r} \right) \\
 &= 1,000 \left(\frac{1 - 1.06^{-5}}{0.06} \right) \\
 &= 4,212.36
 \end{aligned}$$



$$1000 \times ((1 - 1.06^{-5}) \div 0.06) =$$



$$= PV (0.06, 5, 1000, 0)$$

Present value payment (R)

What will be Susan's yearly loan repayments if she borrows \$5,000 now at an interest rate of 6% p.a. for 5 years?



$$R = A \div \left(\frac{1 - (1 + r)^{-n}}{r} \right)$$

$$R = 5,000 \div \left(\frac{1 - 1.06^{-5}}{0.06} \right)$$

$$= 1,186.98$$



$$5000 \div ((1 - 1.06^{-5}) \div 0.06) =$$



$$= \text{PMT} (0.06, 5, 5000, 0)$$

Q2: Planning to borrow

- a) **David is able to afford monthly loan repayments of \$1,000 per month. He is considering taking a home loan with a loan term of 25 years (300 months) at an interest rate of 7.2% per year compounded monthly (0.6% per month). The first loan repayment would be in one month. How much can he borrow?**
- b) **Fiona would like to borrow \$400,000 to buy a new home. She is considering a loan term of 30 years (360 months) at an interest rate of 6% per year compounded monthly (0.5% per month). The first loan repayment would be in 1 month. What will be her monthly loan repayments?**

[Go to Answers](#)

Home loans in detail

Modelling a path to out of financial slavery

Home loan example

Loan amount

\$300,000

Repayments

Principal and interest

Monthly payments

Loan term

25 years

300 months

Interest rate

8.4% p.a. (compound monthly)

0.7% per month ($8.4\% \div 12$)

Monthly repayment

Use PV of annuity formula

$A = 300,000$

$r = 0.007$

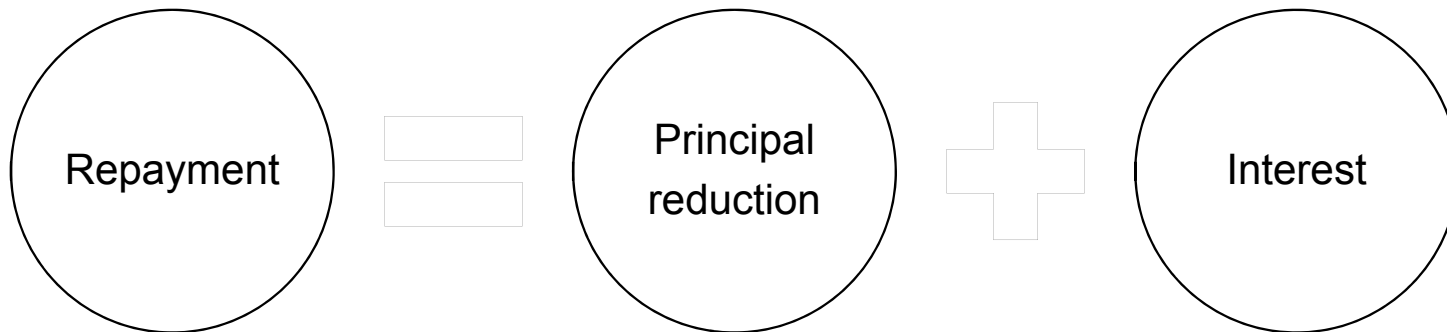
$n = 300$

$R = ?$

Repayments

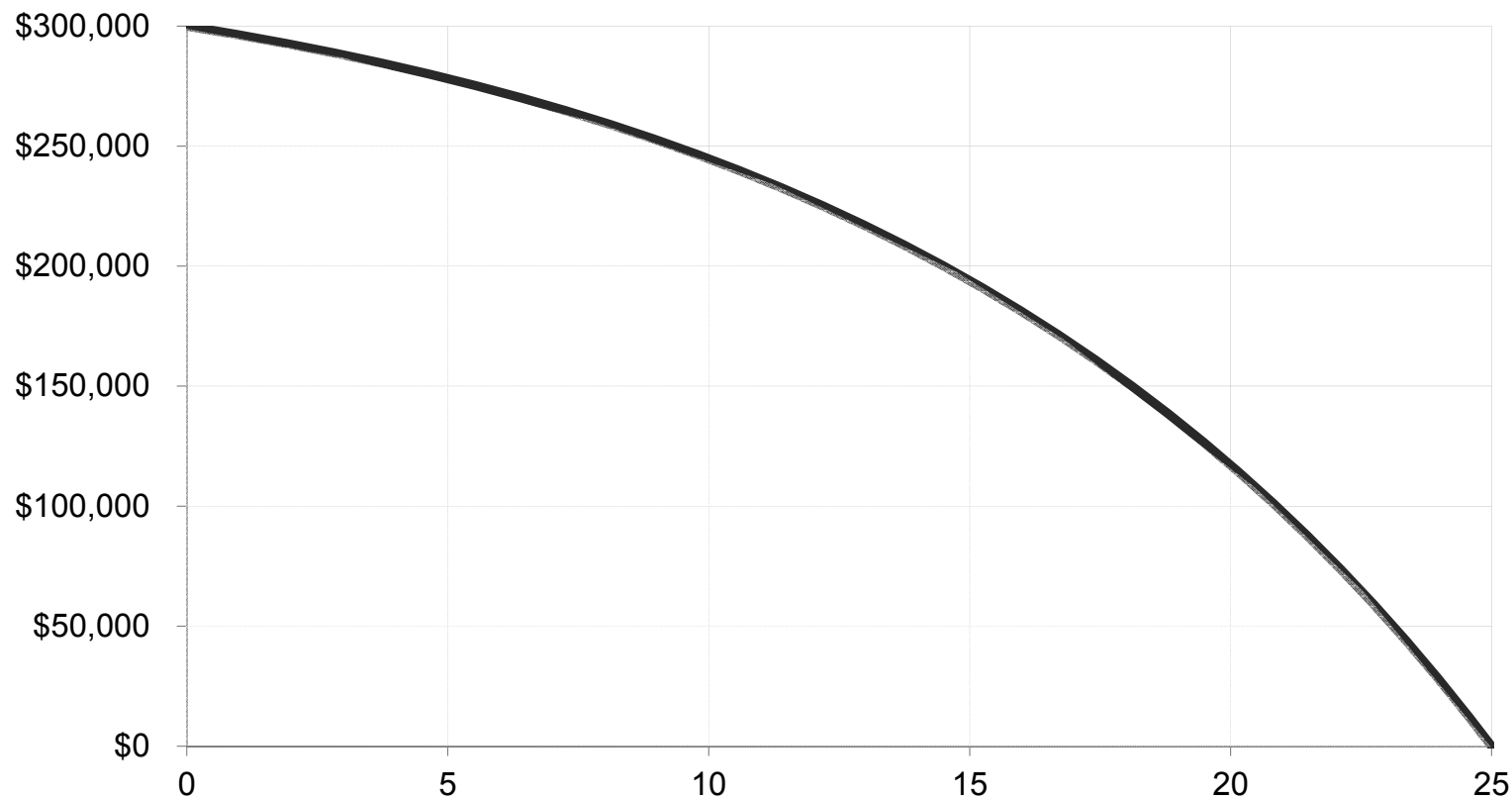
Repayment pays interest and reduces principal

Calculate repayment using PV of annuity (=R)



$$R = A \div \left(\frac{1 - (1 + r)^{-n}}{r} \right) = 300,000 \div \left(\frac{1 - 1.007^{-300}}{0.007} \right) = 2395.50$$

Principle outstanding



Slavery is alive and well

Calculating monthly interest

1. Calculate Principal at start of month

For first month = loan amount

For later months = principal at end of previous month

2. Calculate Repayment

Same as last month if interest rates are the same

3. Calculate Interest payment

Monthly interest rate \times Principal at start of month

4. Calculate Principal reduction

Repayment – Interest payment

5. Calculate Principal at end of month

Principal at start – Principal reduction

Example of calculating monthly interest

Loan = \$300,000 $r = 0.007$ per month $n = 300$ months

Month	Principal at start	Repayment per month	Interest on principal	Principal reduction	Principal at end
0					300,000.00
1	300,000.00	2,395.50	2,100.00	295.50	299,704.50
	<div><div>300,000 ÷ $\left(\frac{1 - 1.007^{-300}}{0.007}\right)$</div><div>300,000 × 0.007</div><div>2395.50 – 2100.00</div><div>300,000 – 295.50</div></div>				
2	299,704.50	2,395.50	2,097.93	297.57	299,406.94
	<div><div>299,704.5 ÷ $\left(\frac{1 - 1.007^{-299}}{0.007}\right)$</div><div>299,704.50 × 0.007</div><div>2395.50 – 2097.93</div><div>299,704.50 – 297.57</div></div>				
3	299,406.94

Think and discuss

How to calculate repayments
when future variable interest rates
are uncertain?

How to calculate R when variable rates uncertain?

The bank does NOT need to predict future variable rates

Bank assumes future variable rates = current rate

When variable interest rates change in the future:

A is known (the current principle outstanding)

n is known (the number of months left on the loan)

r is known (the new interest rate)

R is unknown

Only one variable is unknown ... R

The bank recalculates your minimum monthly repayment (R) based on new interest rate (r)

Home loan tips

Think and discuss

How can we repay home loan faster?

How do the banks determine fixed rates?

How do banks determine fixed rates?

‘Term structure of interest rates’ or ‘Yield curve’

Fixed interest rate = average expected variable rate + liquidity premium

Example: Expected variable rates are 5% in 1st year, 6% in 2nd year and 8% in 3rd year and 1% liquidity premium. What is 3 year fixed interest rate?

0	1	2	3
0.05	0.06	0.08	

Calculate geometric average

$$(1+i)^3 = (1+i_1) \times (1+i_2) \times (1+i_3)$$

$$(1+i)^3 = (1.05) \times (1.06) \times (1.08)$$

$$(1+i) = \sqrt[3]{(1.05) \times (1.06) \times (1.08)}$$

$$i = 0.0633 \text{ or } 6.33\%$$

Then add liquidity premium

$$i_f = 0.0633 + 0.005$$

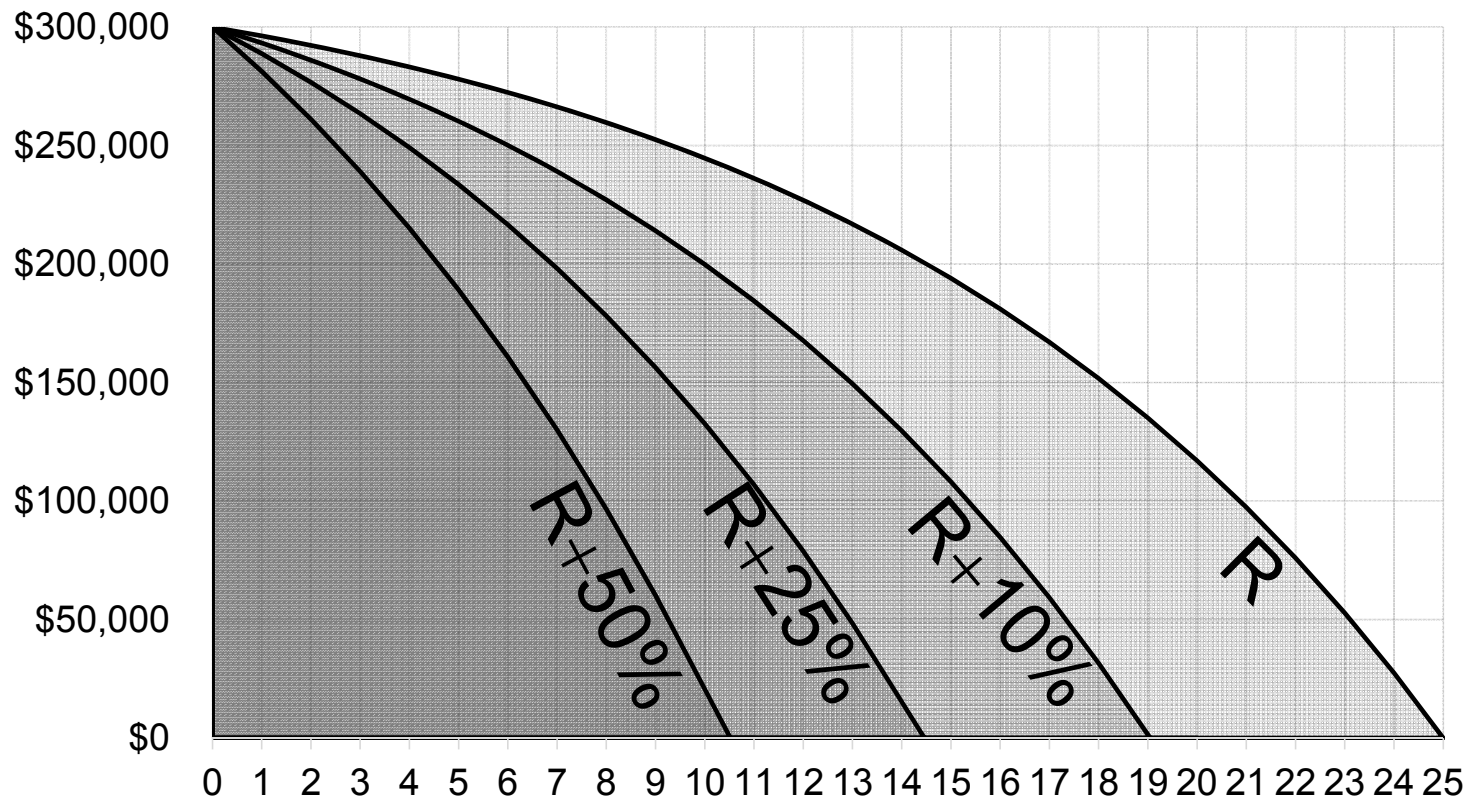
$$= 0.0683 \text{ or } 6.83\%$$

How can we repay a home loan faster?

- 1. Don't borrow to capacity**
- 2. Plan to make 150% of minimum payments**
- 3. Borrow <80% to avoid mortgage insurance**
- 4. Increase payment frequency to fortnightly**
- 5. Use mortgage offset accounts**
- 6. Negotiate 'professional' interest rate discount**
- 7. Variable rates should save money but also risky**
- 8. Positively gear other investments for cash flow**

Accelerated loan repayments

The way out of slavery!



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A2: Planning to borrow

a)

$$A = R \times \left(\frac{1 - (1 + r)^{-n}}{r} \right) = 1,000 \times \left(\frac{1 - 1.006^{-300}}{0.006} \right) = 138,968$$

b)

$$R = A \div \left(\frac{1 - (1 + r)^{-n}}{r} \right) = 400,000 \div \left(\frac{1 - 1.005^{-360}}{0.005} \right) = 2,398$$

[Go to Question](#)