

# Introduction to the financial system

CASE STUDY: MORTGAGE TRADING ANALYSIS IN POWER BI



**Nick Edwards**

Capital Markets Analyst at Mynd

# Welcome!

- Learn about the **financial system**
- You play the part of a **Junior Trader at Sooper Mortgage**
  - Fictional non-bank lender
  - United States based
- Execute a trade of mortgages in the **capital markets**
  - The date is September 21, 2021
  - Settlement date is October 13, 2021
- Multiple datasets that describe a population of over 5,000 mortgages!
  - Derived from real mortgage data
  - Derived from real market data

# Prerequisites

- Test your skills and apply them to complex problems
  - Build confidence with new skills and strategies
- Comfortable with DAX, a bit of M, and the Power Query Editor
- Recommended courses:
  - [Intermediate DAX in Power BI](#)
  - [Data Transformation in Power BI](#)
- No banking or finance skills needed

## Banks & Financial Institutions

Use deposits from savings accounts to buy investments which earn interest.



### People

Save at banks & financial institutions to earn interest; borrow money from lenders.



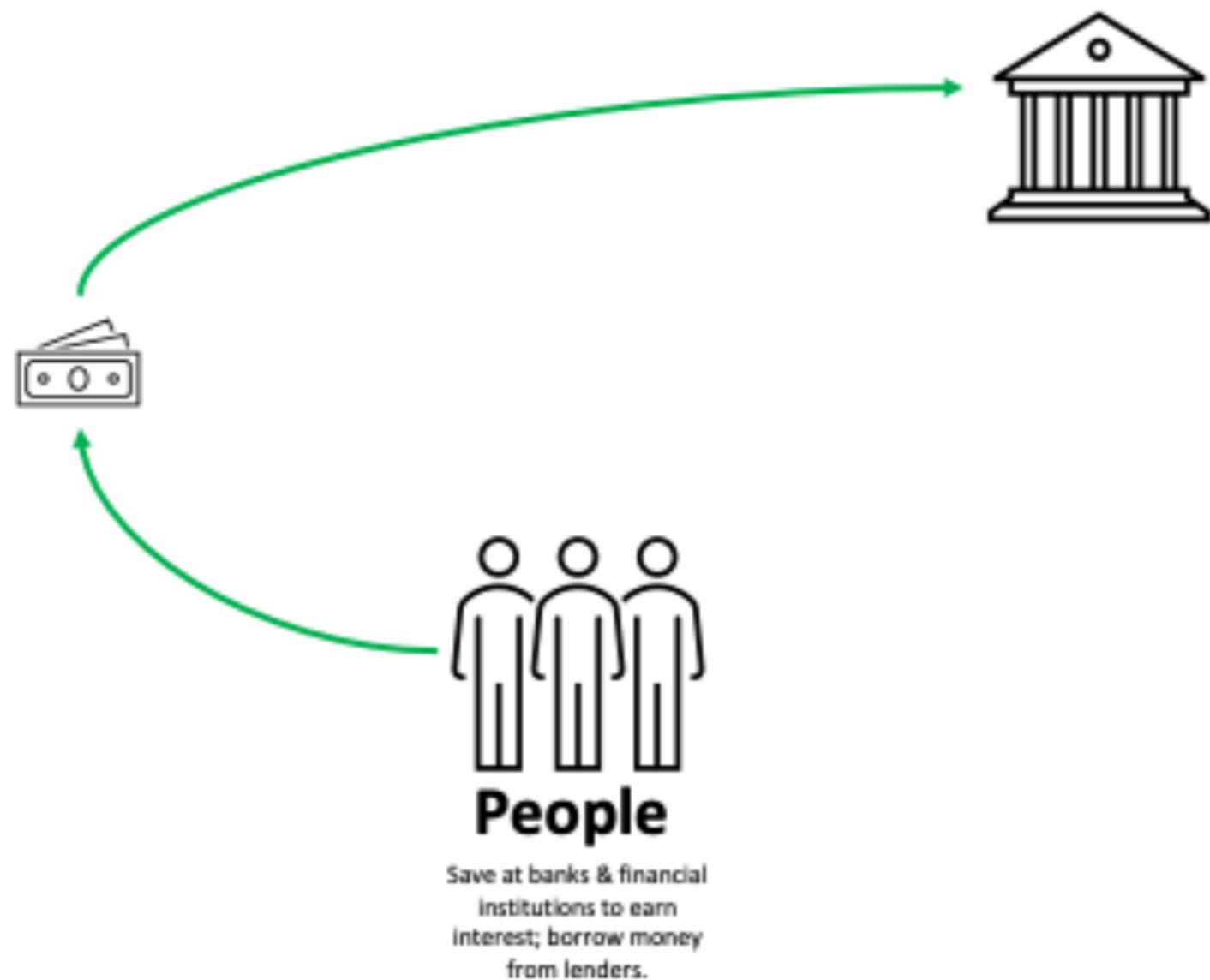
### Lenders

Earn fees from creating loans and lending money.

- Flow of money
- Flow of investing

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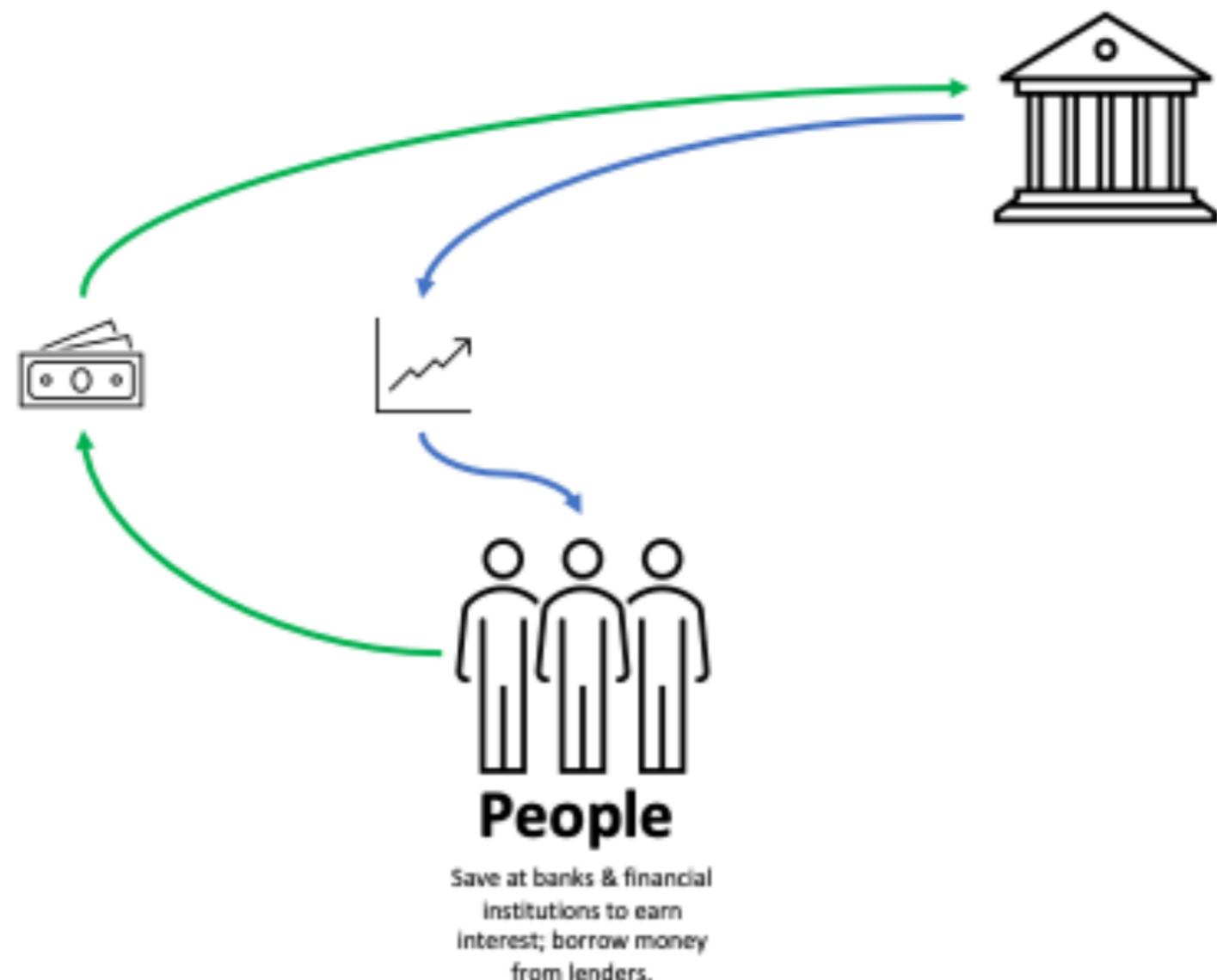


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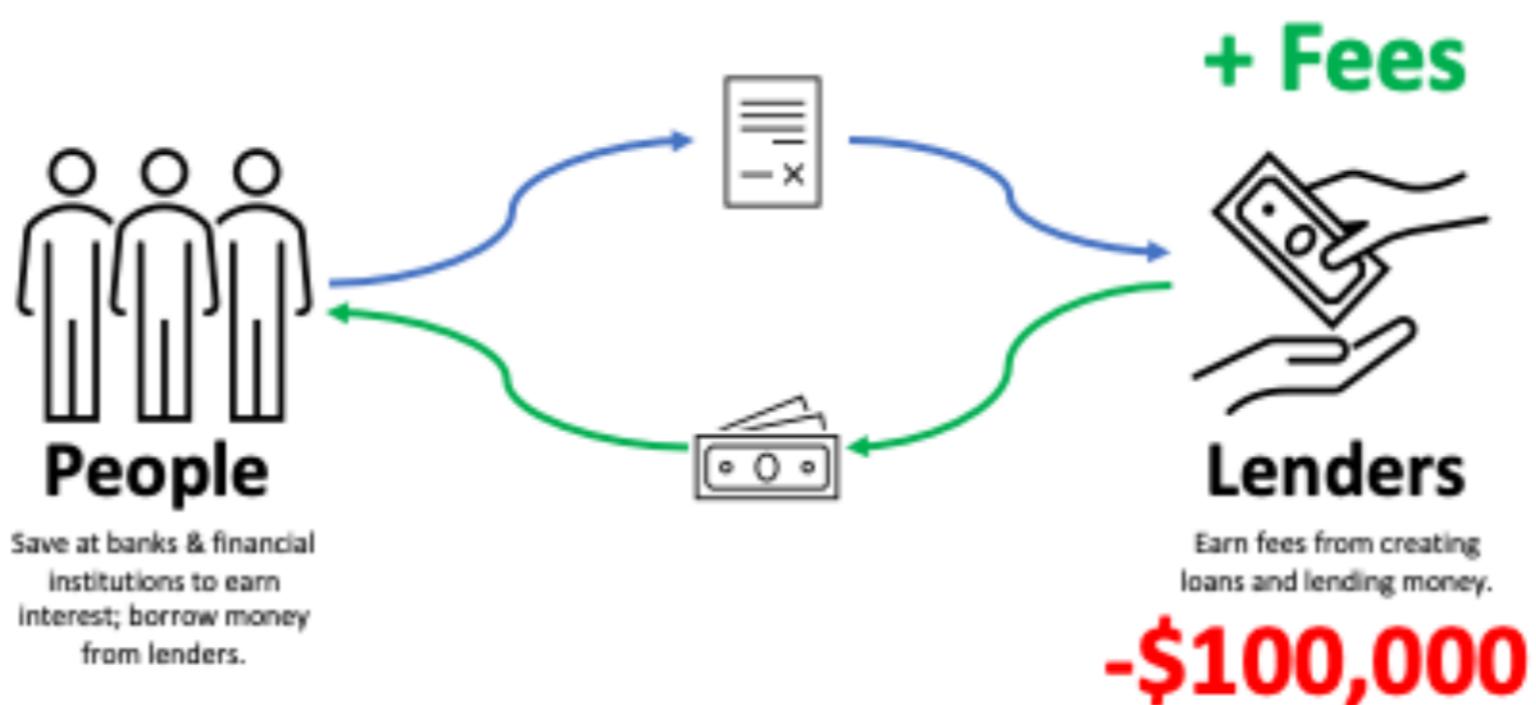


## Loan Agreement

- Repay the money borrowed (usually with interest)
  - Timely payments (usually monthly)

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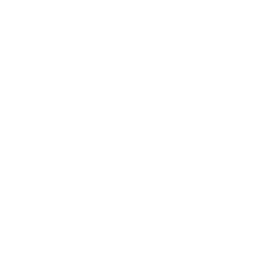


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Capital Markets

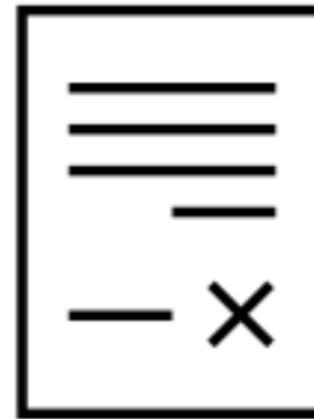


**Lenders**

Earn fees from creating loans and lending money.

**+\$100,000**

- Flow of money
- Flow of investing



**Loan Agreement**

=



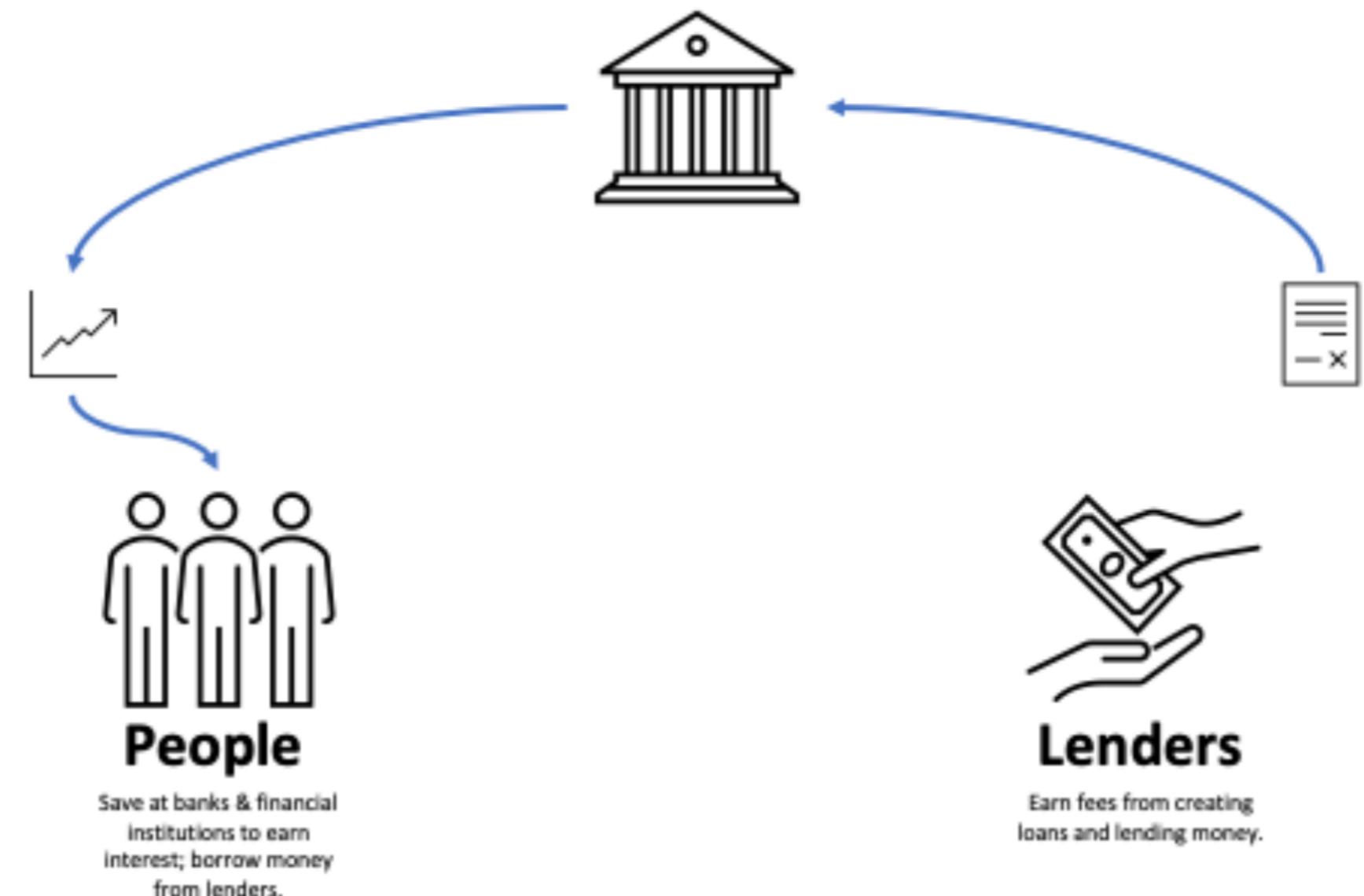
**Investment**

- A cash flow with timely payments
- It earns interest over time

- Example:
  - A **30YR** loan for **\$100,000** at **5%** annually pays **\$95,000** in interest over the full term.

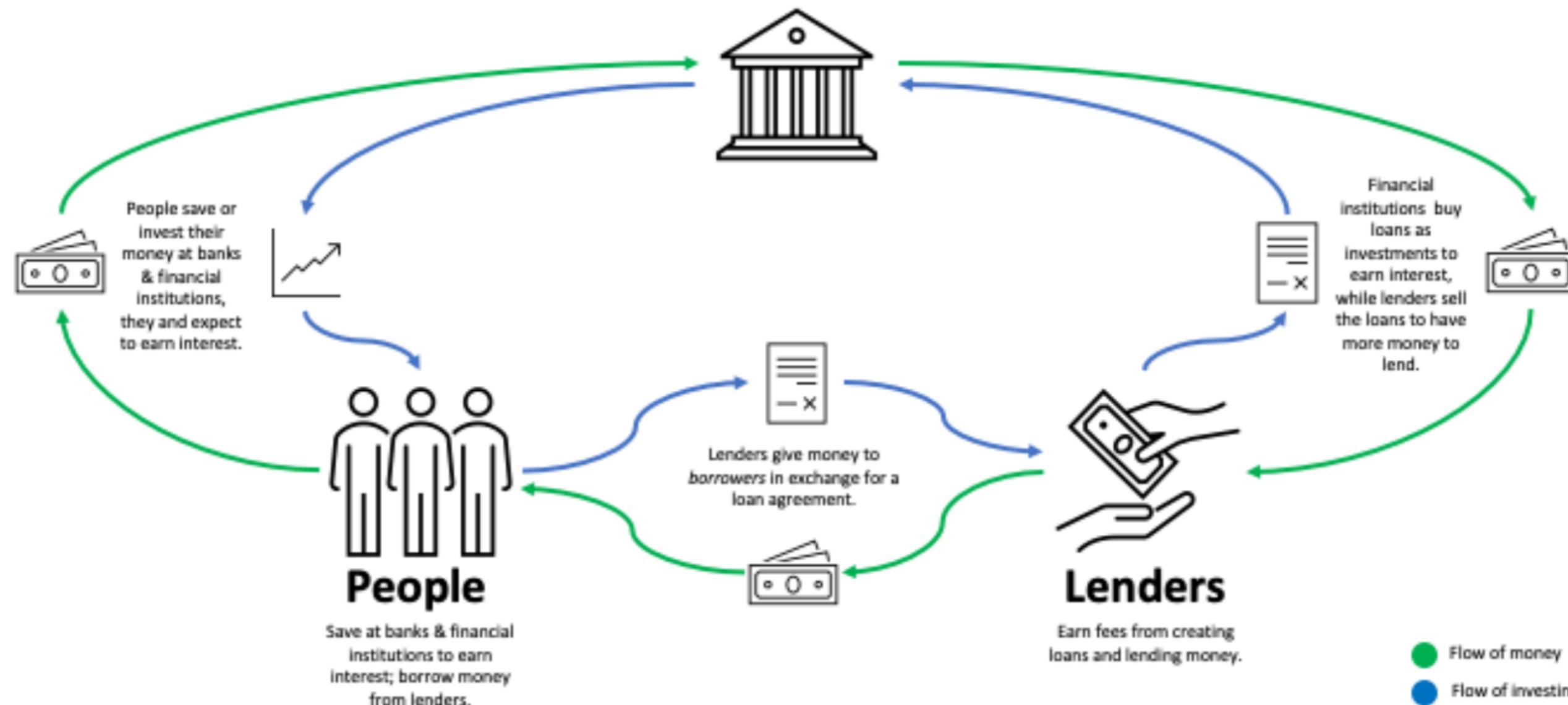
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# **Let's practice!**

**CASE STUDY: MORTGAGE TRADING ANALYSIS IN POWER BI**

# What is a mortgage?

CASE STUDY: MORTGAGE TRADING ANALYSIS IN POWER BI



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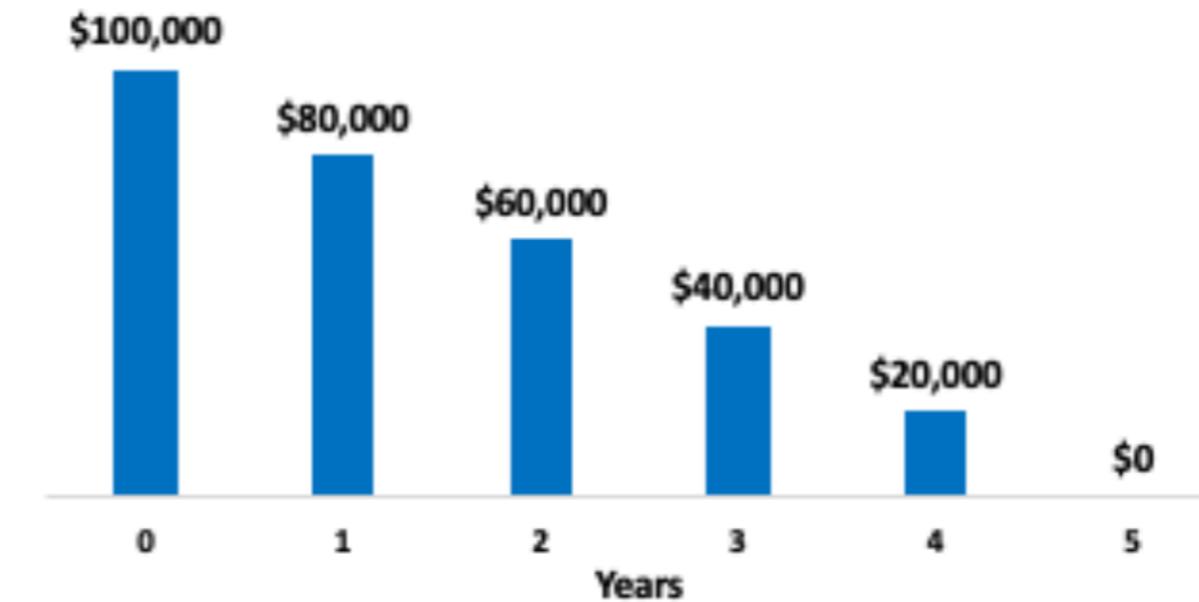
# What is a loan agreement?

A **loan agreement** is the borrower's promise to repay the money to the lender.

- Essentially a repayment plan



**Loan Agreement**

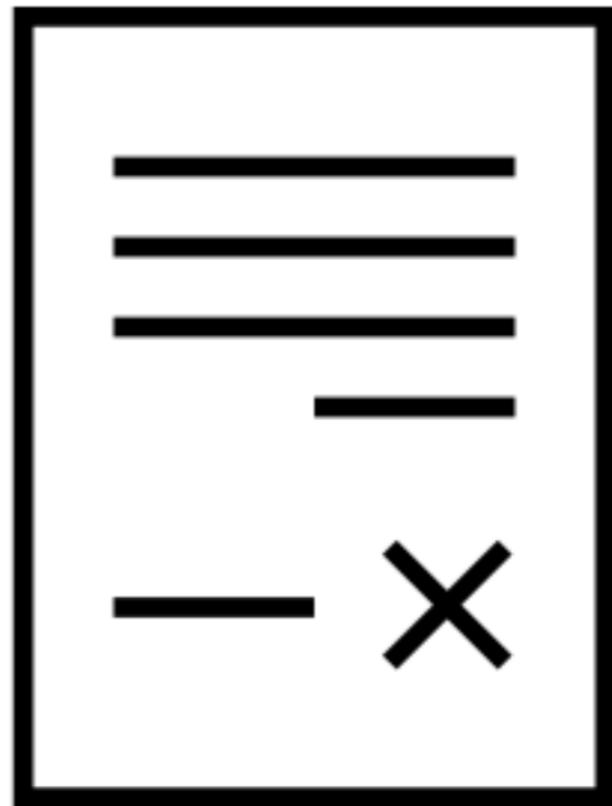


**Repayment plan**

# What is a loan agreement?

## Parts of a loan agreement:

- Loan amount
- Payment
  - Principal
  - Interest

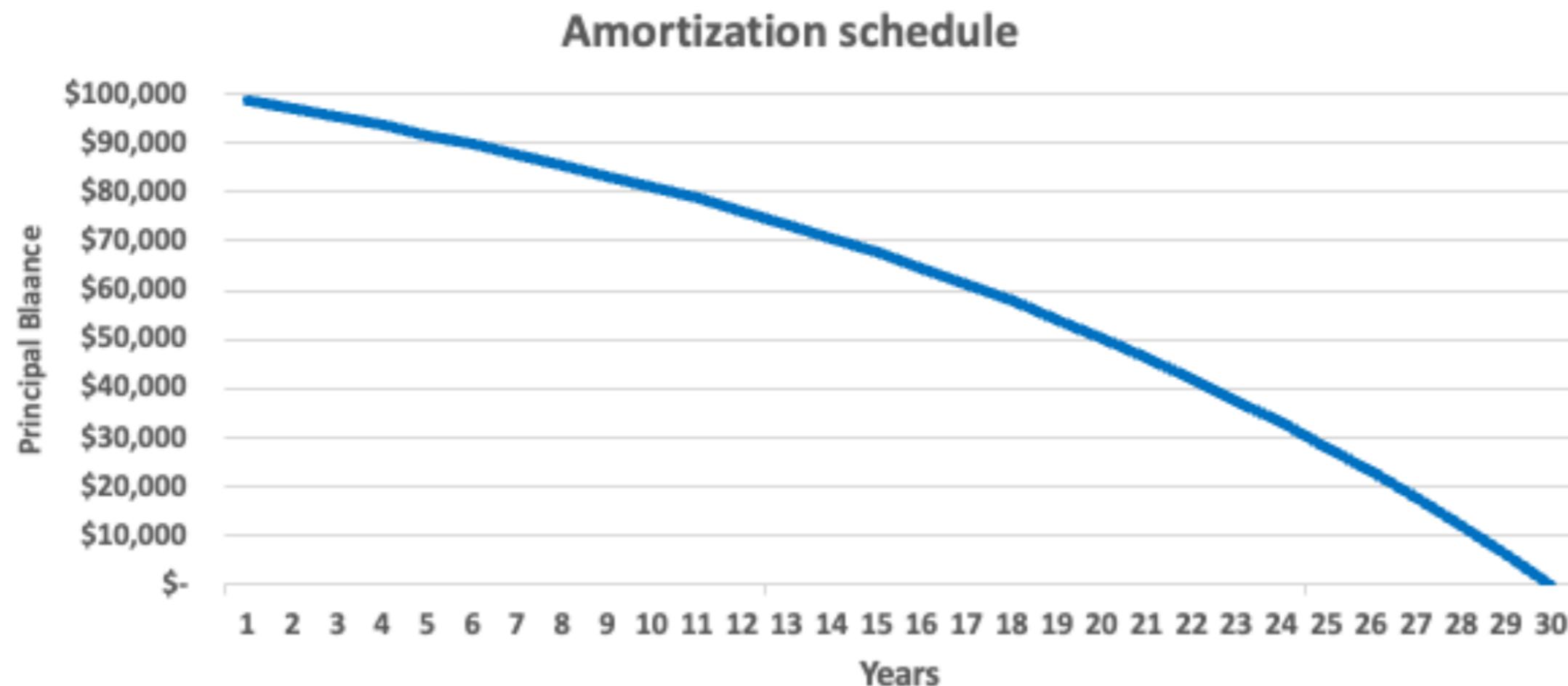


## Loan Agreement

<sup>1</sup> <https://www.investopedia.com/terms/m/mortgage.asp>

# Principal

- Principal is the current balance on the loan



# Interest

- The **interest rate** is the proportion of interest owed on the principal balance each period.
  - Quoted as an annual rate

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## Example

What is the interest due this month on a principal balance of \$100,000 at a 5% annual rate?

Interest rate	Monthly interest rate	Principal Balance	Interest owed
5%		\$100,000	

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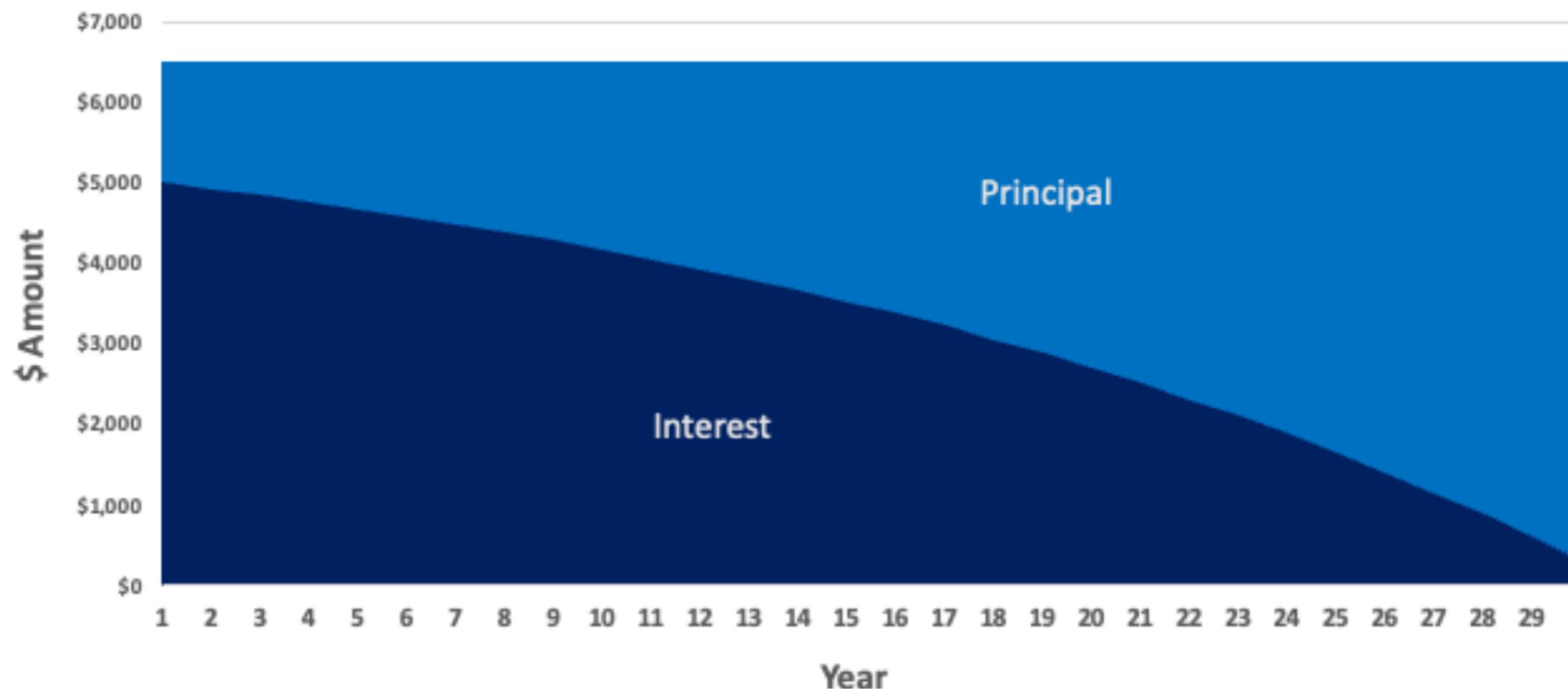
## Example

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Interest rate	Monthly interest rate	Principal Balance	Interest owed
5%	$5\% \div 12 = 0.417\%$	\$100,000	$0.417\% \times 100,000 = \$417$

# Amortizing

Principal & Interest Payments Over Loan Term



# Amortizing in Power BI

## Syntax

```
PPMT(<rate>, <per>, <nper>, <pv>[,<fv>,<type>])
```

- This produces a negative value!
- The rate needs to be adjusted!

**Example:** Find the principal amount on the **first payment** of a loan with a balance of **\$100,000** with a **5% annual** interest rate and a **360** month term.

```
PPMT(.05/12, 1, 360, 100000) = ($-120.15)
```

Click [here](#) to review the syntax in further detail

<sup>1</sup> <https://learn.microsoft.com/en-us/dax/ppmt-function-dax>

# Amortizing in Power BI

## 2 Steps to Amortize:

1. Use `PPMT()` to find the **principal** portion of a payment
2. Subtract the **principal** amount from the current loan balance

Example continue...

`[Principal Balance] + [PPMT]`

`[$100,000] + [-$120.15]`

\$99,879.85

# Mortgage qualification

- Credit score
  - Missed payments reduce score as they show risk
  - Ranges from 300 (lowest) to 850 (perfect)
- Debt-to-income (DTI) ratio
  - $$[\text{Monthly debt payments}] \div [\text{Monthly income}]$$
  - Generally needs to be under 50%
- Loan-to-value (LTV) ratio
  - $$[\text{Loan amount}] \div [\text{Property value}]$$
  - The lender needs to know they can get their money back in case of foreclosure
  - The lower, the better

<sup>1</sup> This is for educational purposes only. Consult your lender for actual terms and qualification guidelines.

# Let's continue!

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