Simple Interest

Lecture 2
Section 10.2

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Outline

Terminology

- The situations we will consider involve a lender and a borrower.
- The lender is the one who lends the money to the borrower.
- The borrower is the one who borrows the money from the lender.

Terminology

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Terminology

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  - Uses a credit card to make a purchase?
  - Gets a mortgage?
  - Deposits money in a bank account?
  - Buys stock in a company?
- In all cases, the party that pays the interest is the borrower. The other party is the lender.

Outline

Definitions

Definition (Principal)

The principal P is the amount of money borrowed or invested.

Definition (Interest Rate)

The interest rate r is the percentage of the principal paid by the borrower to the lender (investor) over a given period of time, usually one year.

Definitions

Definition (Term)

The term t is the duration in time of the loan or investment, usually in years.

Definition (Annual Percentage Rate)

The annual percentage rate, or APR, is the interest rate, as a percentage of the principal, when the term is one year. It does not take into account compounding.

Definitions

Definition (Present Value)

The principal P is also called the present value of the loan.

Definition (Future Value)

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- That is,

$$\text{future value} = \text{principal} + \text{accrued interest}$$

Outline

Simple Interest

Definition (Simple Interest)

When a loan is based on simple interest, the interest rate is applied to the *original* principal, not the current balance, no matter how long the term.

Simple Interest

Example (Future Value of a Loan)

- A person borrows $1000 at 5% simple interest for 4 years.
- What is the future value (after 4 years)?

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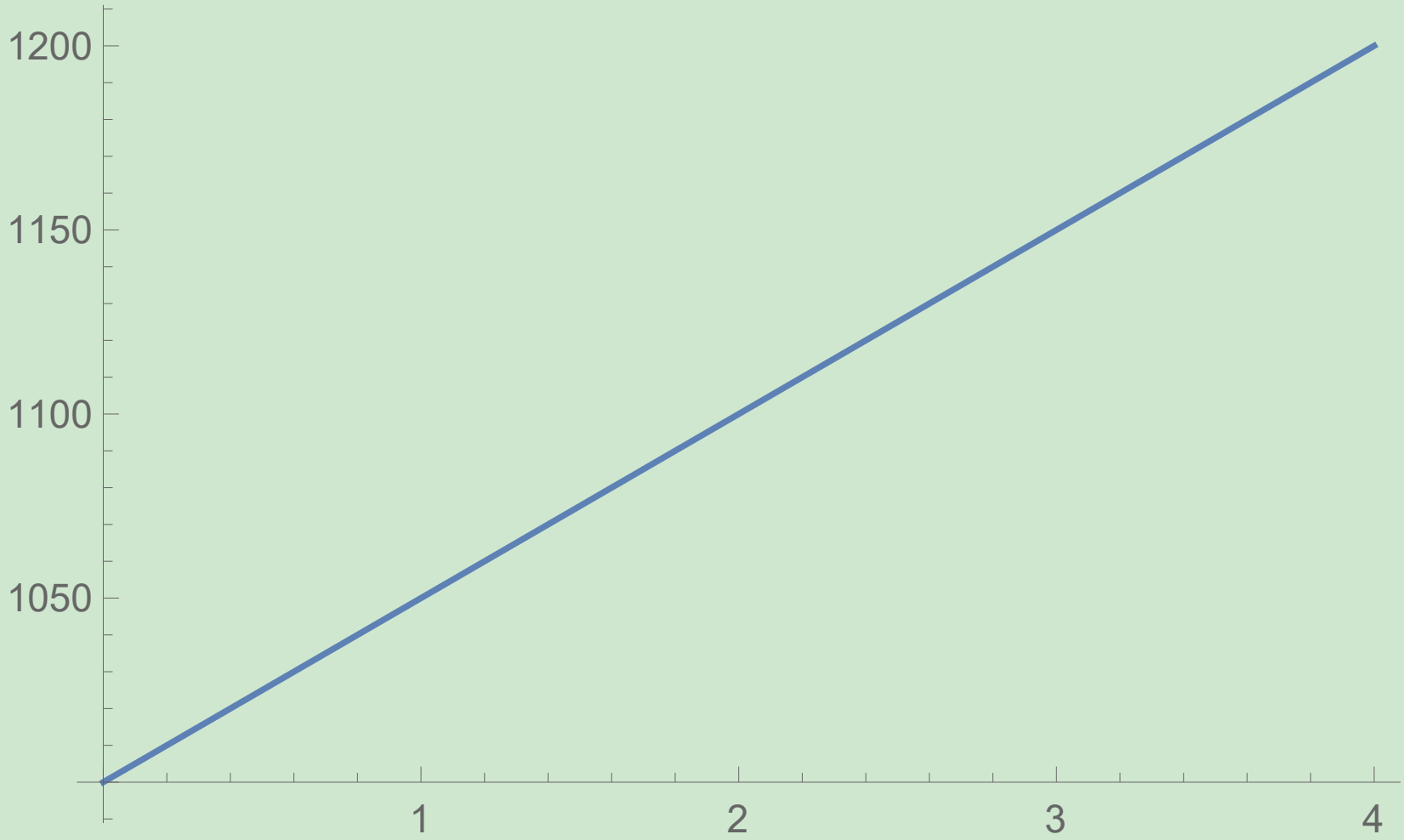
3	1100.00	50.00	1150.00
4	1150.00	50.00	1200.00

Simple Interest

Example (Future Value of a Loan)



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- The simple interest formula:

$$F = P(1 + rt).$$

Simple Interest

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- Assuming a 360-day year, we apply $\frac{30}{360} \times 5\%$ to get

$$1000 \times \frac{30}{360} \times 0.05 = \$4.17.$$

Simple Interest

Example (Present Value of a Loan)

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- Suppose you invest $90,000 in such an account for 180 days.
- How much interest do you earn. (Use a 360-day year.)

Simple Interest

Example (Present Value of a Loan)

- The current passbook rate for a Wells Fargo Platinum saving account is 0.03%, for up to $99,999.99.
- Suppose you invest $90,000 in such an account for 180 days.
- How much interest do you earn. (Use a 360-day year.) ans: $13.50

The Present Value

Example (Present Value of a Loan)

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- If the future value of a 5% loan for 10 years is $12,000, what is the present value?

The Present Value

Example (Present Value of a Loan)

- What is the future value of an 8% simple-interest loan for 5 years on a principal of $4,000? ans: $5,600
- If the future value of a 5% loan for 10 years is $12,000, what is the present value? ans: $8,000

Outline

Assignment

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- Chapter 10: Exercises 5, 12, 17, 18, 25, 26; 67.