

Study Guide
Exam FM: Financial Mathematics
Society of Actuaries (SOA)

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Preliminary

Information

Objectives

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Learning outcomes

1.

Autres ressources

Liens

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Vidéos YouTube

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Notes sur les vidéos YouTube

Subjects of study

1 Time Value of Money (10%-15%)

Information

Objective

The Candidate will understand and be able to perform calculations relating to present value, current value, and accumulated value.

Learning outcomes

The candidate will be able to :

a) Define and recognize the *definitions* of the following terms :

- | | |
|-------------------------------------|-------------------------------------|
| › Interest rate (rate of interest); | › Discount rate (rate of discount); |
| › Simple interest; | › Convertible m -thly (...?); |
| › Compound interest; | › Nominal rate; |
| › Accumulation function; | › Effective rate; |
| › Future value; | › Inflation; |
| › Current value; | › Real rate of interest; |
| › Present value; | › Force of interest; |
| › Net present value; | › Equation of value. |
| › Discount factor; | |

b) Given any 3 of :

- | | | |
|-------------------|------------------|-----------------|
| › Interest rate; | › Present value; | › Future value, |
| › Period of time; | › Current value; | |

calculate the remaining item using *simple* or *compound* interest;
Solve time value of money equations involving variable force of interest;

- c) Given any 1 of :
- › Effective interest rate ;
 - › Nominal interest rate convertible m -thly ;
 - › Force of interest,
- calculate any of the other items ;
- d) Write the equation of value given a set of cash flows and interest rate.

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Vidéos YouTube

- ›

Résumés des chapitres

XX. Title-of-ASM-chapter

- ›

Notes sur les vidéos YouTube

2 Topic : Annuities / cash flows with non-contingent payments (exam weight)

Information

Objective

The Candidate will be able to calculate present value, current value, and accumulated value for sequences of non-contingent payments.

Learning outcomes

The candidate will be able to :

a) Define and recognize the *definitions* of the following terms :

- | | |
|---------------------------------------|--|
| › Annuity-immediate ; | › Arithmetic increasing/decreasing annuity ; |
| › Annuity-due ; | |
| › Perpetuity ; | › Geometric increasing/decreasing annuity ; |
| › Payable m -thly or continuously ; | |
| › Level payment annuity ; | › Term of annuity ; |

b) For each of the following types of annuity / cash flows, given sufficient information of :

- | | |
|----------------------|--------------------|
| › Immediate or due ; | › Interest rate ; |
| › Present value ; | › Payment amount ; |
| › Future value ; | |
| › Current value ; | › Term of annuity, |

calculate any remaining item.

The types are :

- › Level annuity, finite term ;

- › Level perpetuity ;
- › Non-level annuities / cash flows ;
 - Arithmetic progression, finite term and perpetuity ;
 - Geometric progression, finite term and perpetuity ;
 - Other non-level annuities / cash flows.

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Notes sur les vidéos YouTube

3 Topic : Loans (10%-20%)

Information

Objective

The Candidate will understand key concepts concerning loans and how to perform related calculations.

Learning outcomes

The candidate will be able to :

a) Define and recognize the *definitions* of the following terms :

- › Principal ;
- › Interest ;
- › Term of loan ;
- › Outstanding balance ;
- › Final payment ;
- Drop payment ;
- Balloon payment.
- › Amortization.

b) Calculate :

- › The missing item given any 4 of :
 - Term of loan ;
 - Interest rate ;
 - Payment amount ;
 - Payment period ;
 - Principal.
- › The outstanding balance at any point in time ;
- › The amount of interest and principal repayment in a given payment ;
- › Similar calculations to the above when refinancing is involved.

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Notes sur les vidéos YouTube

4 Topic : Bonds (10%-20%)

Information

Objective

The Candidate will understand key concepts concerning bonds, and how to perform related calculations.

Learning outcomes

The candidate will be able to :

a) Define and recognize the *definitions* of the following terms :

- | | |
|------------------------------|----------------------------|
| › Price ; | › Yield rate ; |
| › Book value ; | › Coupon ; |
| › Amortization of premium ; | › Coupon rate ; |
| › Accumulation of discount ; | › Term of bond ; |
| › Redemption value ; | › Callable / Non-callable. |
| › Par value / Face value ; | |

b) Given sufficient partial information about the items listed below, calculate any of the remaining items :

- › Price, book value, amortization of premium, accumulation of discount ;
- › Redemption value, face value ;
- › Yield rate ;
- › Coupon, coupon rate ;
- › Term of bond, point in time that a bond has a given book value, amortization of premium, or accumulation of discount.

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5 Topic : General Cash Flows and Portfolios (15%-20%)

Information

Objective

The Candidate will understand key concepts concerning yield curves, rates of return, and measures of duration and convexity, and how to perform related calculations.

Learning outcomes

The candidate will be able to :

a)

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Notes sur les vidéos YouTube

6 Topic : Immunization (10%-15%)

Information

Objective

The Candidate will understand key concepts concerning cash flow matching and immunization, and how to perform related calculations.

Learning outcomes

The candidate will be able to :

a)

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7 Topic : Interest Rate Swaps (0-10%)

Information

Objective

The Candidate will understand key concepts concerning interest rate swaps, and how to perform related calculations.

Learning outcomes

The candidate will be able to :

a)

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8 Topic : Determinants of Interest Rates (0-10%)

Information

Objective

The Candidate will understand key concepts concerning the determinants of interest rates, the components of interest, and how to perform related calculations.

Learning outcomes

The candidate will be able to :

a)

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Notes sur les vidéos YouTube