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

Alec James van Rassel

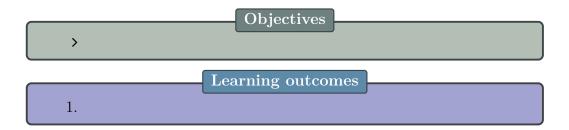
## Table des matières

|   | Information  | 4  |
|---|--|----|
|   | Autres ressources  | 5  |
|   | Notes sur les vidéos YouTube                               | 5  |
| 1 | Time Value of Money  | 7  |
|   | Information  | 7  |
|   | Résumés des chapitres                                      | 8  |
|   | XX. Title-of-ASM-chapter                                   | 8  |
|   | Notes sur les vidéos YouTube                               | 8  |
| 2 | Topic: Annuities / cash flows with non-contingent payments | 9  |
|   | Information  | 9  |
|   | Résumés des chapitres                                      | 10 |
|   | XX. Title-of-ASM-chapter                                   | 10 |
|   | Notes sur les vidéos YouTube                               | 10 |
| 3 | Topic : Loans  | 11 |
| - | Information  | 11 |
|   | Résumés des chapitres                                      | 12 |
|   | XX. Title-of-ASM-chapter                                   | 12 |
|   | Notes sur les vidéos YouTube                               | 12 |
| 4 | Topic: Bonds   | 13 |
|   | Information  | 13 |
|   | Résumés des chapitres                                      | 13 |
|   | XX. Title-of-ASM-chapter                                   | 13 |
|   | Notes sur les vidéos YouTube                               | 13 |
| 5 | Topic : General Cash Flows and Portfolios                  | 14 |
| _ | Information  | 14 |
|   | Résumés des chapitres                                      | 14 |
|   | XX. Title-of-ASM-chapter                                   | 14 |
|   | Notes sur les vidéos VouTube                               | 14 |

| 6 | Topic: Immunization                    | 15 |
|---|--|----|
|   | Information                            | 15 |
|   | Résumés des chapitres                  | 15 |
|   | XX. Title-of-ASM-chapter               | 15 |
|   | Notes sur les vidéos YouTube           |    |
| 7 | Topic : Interest Rate Swaps            | 16 |
|   | Information                            | 16 |
|   | Résumés des chapitres                  |    |
|   | XX. Title-of-ASM-chapter               |    |
|   | Notes sur les vidéos YouTube           |    |
| 8 | Topic : Determinants of Interest Rates | 17 |
|   | Information                            | 17 |
|   | Résumés des chapitres                  |    |
|   | XX. Title-of-ASM-chapter               |    |
|   | Notes sur les vidéos YouTube           |    |

Preliminary

## Information



## Autres ressources



Subjects of study

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

### 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 inter- > Discount rate (rate of disest);
    - count);
  - > Simple interest;
- $\rightarrow$  Convertible *m*-thly  $(\dots?)$ ;
- > 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; > Discount factor;
- > Equation of value.

- 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 interst,

calculate any of the other items;

d) Write the equation of value given a set of cash flows and interest rate.

# Related lessons ASM > XX. Title-of-ASM-chapter Vidéos YouTube >

## Résumés des chapitres

```
XX. Title-of-ASM-chapter
```

## 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;
  - > Annuity-due;
  - > Perpetuity;
  - > Payable *m*-thly or continously;
  - > Level payment annuity;
- > Arithmetic increasing/decreasing annuity;
- > Geometric increasing/decreasing 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;
- > Futur 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.

Related lessons ASM
> XX. Title-of-ASM-chapter

Vidéos YouTube
>

Résumés des chapitres

XX. Title-of-ASM-chapter

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;

> Final payment;

> Interest;

- Drop payment;

> Term of loan;

- Baloon payment.
- > Outstanding balance;
- > Amortization.

- b) Calculate:
  - > The missing item given any 4 of:
    - Term of loan;
- Payment period;

- Interest rate;
- Payment amount;
- 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.

#### Related lessons ASM

> XX. Title-of-ASM-chapter



## Résumés des chapitres

XX. Title-of-ASM-chapter

## 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;

> Par value / Face value;

- > Term of bond;
- > Redemption value;
- > Callable / Non-callable.
- 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.

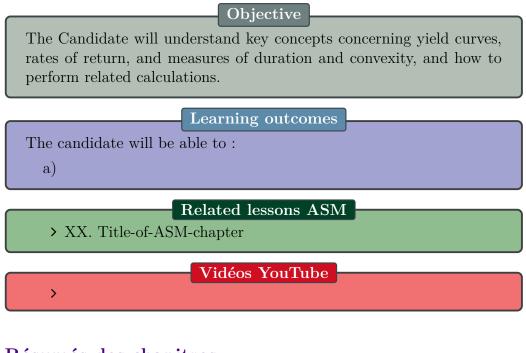


## Résumés des chapitres

```
XX. Title-of-ASM-chapter
```

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

### Information

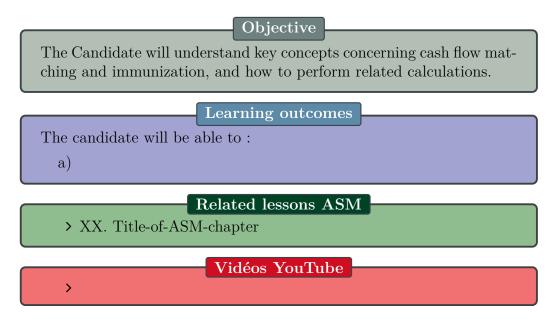


## Résumés des chapitres



## 6 Topic: Immunization (10%-15%)

## Information

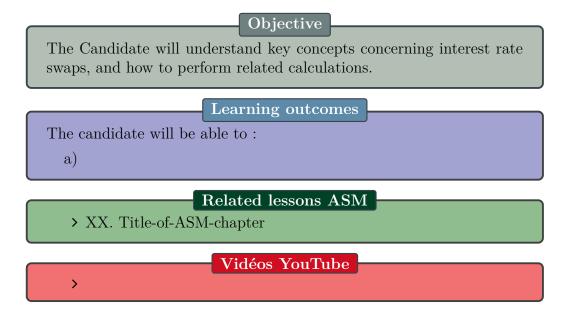


## Résumés des chapitres

```
XX. Title-of-ASM-chapter
```

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

## Information



## Résumés des chapitres

```
XX. Title-of-ASM-chapter
```

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

## Information

