

# 主要國 保險計理人制度

1999. 8

崔 容碩 · 盧 秉鎰

保險開發院

保險研究所

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(Actuary)

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「Global Standard

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「Guidance

Notes」, 「Standards of Actuarial Practices」

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< 11>	(1997)	.....	13
< 12>	1 ( )	.....	13
< 13>	Waterloo	.....	51
< 14>	Waterloo	.....	52
< 15>	City Diploma	.....	53
< 16>	Macquarie	.....	55
< 17>	1999	.....	57
< 18>	1999	.....	58
< 19>		.....	59
< 20>	(1999)	.....	65
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(actuary)

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(Appointed actuary)

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(high risk)

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(catastrophe)

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(needs)

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(certificate)

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가 가 (valuation actuary), .

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(pricing actuary),

(reserving actuary) .

(fellow)

(student) . 가

(associate) .

「 actuary 」 가

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1)

4,300

1,100

50%

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300

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1) (<http://www.actuaries.org.uk>)

(Information about the faculty and Institute of Actuaries/ History and structure



2)

< 2> (1997 , )

162	452	58	672

: OECD, *Insurance Statistics Year Book*, 1990-1997.

9.8

0.6

2)

, , , 1995  
 16,942 6% 가  
 3) 1999 2 .

< 3> (1995 )

7,748	9,194	16,942

1998.11

of the profession) .

2) CAS, "Nonlife Actuaries Around the World", *Actuarial Review*, 1999.8

(<http://www.casact.org/pubs/actrev/aug99/nonlifeact.htm>) .

3) ([http://www.soa.org/soa\\_inf/hist.html](http://www.soa.org/soa_inf/hist.html)).

< 4>

(1998 11 )

1,789	1,270	3,059



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875	15	228	384	95	114	78	1,789

:  
(<http://www.casact.org.aboutcas/memst98.htm>)

< 5>

(1997 , )

1,442	3,342	297	5,081

: OECD, *Insurance Statistics Year Book*, 1990-1997.

3

0.3 가

3)

(The Canadian Institute of Actuaries)

(SOA)

(CAS)

(Fellow of The Canadian Institute

of Actuaries:FCIA)

가 .

< 6> (1995 )

1,975	1,225	3,200

:  
(<http://www.actuaries.ca/information/aboutactuaries/fact-e.htm>).

< 7> (1997 , )

52	90	9	151

: OECD, *Insurance Statistics Year Book*, 1990-1997.

3200

13 가

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4)

1996 1,320 . 921 121

105 700

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< 8>

921	37	362	1320



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446	74	115	10	171	105	921

: 1996.

< 9> (1997 , )

40	129	20	189

: OECD, *Insurance Statistics Year Book*, 1990-1997.

11.2 0.6 .

5)

. 1997 3 1,692

74 10

4 .<sup>4)</sup>

< 10> (1997 3 )

813	9	870	1,692

4) 가

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386	125	118	26	9	149	813

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< 11> (1997 , )

41	31	2	74

: OECD, *Insurance Statistics Year Book*, 1990-1997.

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< 12> 1 ( )<sup>5)</sup>

	9.8	3.0	13.0	11.2	9.4	3.5
	0.6	0.3		0.6	4.0	1.9

5)

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3.

. 가  
(appointed actuary)  
가 (independent actuary)

가.

(appointed actuary)

.  
(ongoing financial well being)

가

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1)

가)

(Insurance Company Act) 19

14 「Secretary of State」

6)

(fellow) 30 .7)

(certificate)

(continuing education)

「Friendly Society」

.8)

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6) Faculty of Actuaries, Institute of Actuaries 가

7) Insurance Company Regulation, Section 96 Subsection(1).

8) Friendly Society Act 1992 Section 44

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(certificate)

12

.9)

, 「Department of Trade and  
Industry : DTI」 (statutory Annual Return)

가 가

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- 가?
- (Faculty of Actuaries, Institute of Actuaries)  
「Guidance Notes」<sup>10)</sup> 가?

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Society

9) Insurance Company Act Section 18 Subsection (1), (2)

10)

「Guidance Notes」



가(valuation), (investigation)

「DTI」

( )

(ongoing financial well being)

(recommendations)

가

「DTI」가

「DTI」

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(Chief

Financial Officer:CFO)

가

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「Guidance Notes」

.<sup>11)</sup>

2)

가)

「NAIC Model Regulation」<sup>12)</sup>

가 (valuation law)

(statement of actuarial opinion)

(qualified actuary)

, (fraternal  
benefit society)

“ ”  
(American Academy  
of Actuaries: AAA)

.<sup>13)</sup> 「Model」

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11) Guidance Note 「GN1 Actuaries and Long- term Insurance Business」 .

12) NAIC, Actuarial Opinion and Momorendum regulation(1994) section 5. General Requirement .

13) “ ” 「Qualification Standard for Prescribed Statements of Actuarial Opinion(PASO)」 .

“ ” PASO ,  
PASO 12

“organized activity” 50% .

(commissioner) (consulting  
 ), , .  
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 가 . 가  
 (asset adequacy analysis) (reserve)

「Valuation Law」 「Actuarial Standard Board」

14)

3)

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15)

選任

(superintendent)

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- 14) Standard of Actuarial Practice No22, No23 .  
 No.22, Statutory Statements of Opinion Based on Asset Adequacy Analysis by  
 Appointed Actuaries for Life or Health Insurers.  
 No.4, Statutory Statements of Opinion Not Including an Asset Adequacy  
 Analysis by Appointed Actuaries for Life or Health Insurers.  
 15) Insurance Company Act, Part Corporate Governance Division  
 Actuaries.

(CEO) (COO),  
(CFO) 가  
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15  
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16)  
가  
가 (generally accepted actuarial  
principle: GAAP) 21  
가(valuation)  
(actuary's opinion) 가  
가  
1 「GAAP」

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16) Insurance Company Act Part Corporate Governance Division .

(expected financial condition)

(CEO)

(CFO)

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「Consolidated Standard of Practice」

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(fellow)

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18) Australia Insurance Act division 3 .

19) Section 48, 49, 50 .

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가 , 가

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(statement of actuary's opinion)

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「Guidance Notes」 .20)

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(actuarial consulting firm) .

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가 (certification)

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가 (statutory duty)

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(independent actuary)

(investigation)

(actuarial reserve certification)

(opinion letter)

4.

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(transition rule)

2000

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## 「Dynamic Financial Analysis」

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2000

.<sup>21)</sup>

(Society of Actuaries:SOA)

8

(course)

Course 1

Course 6

(associate actuary)

Course 8

(research paper)

가 50 credit

(fellow actuary)

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Course 1. Mathematical Foundations of Actuarial Science

가

가

Course 2. Interest Theory, Economics and Finance.

Course 3 Actuarial Models

(technique)

가

, (contingency payment),

(compound distribution),

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21) (SOA) 「Education System Redesign」 internet  
site (<http://www.soa.org/eand/redsgn.html>).

Course 4. Actuarial Modeling  
(modeling process)

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Course 5. Application of Basic Principles

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가,

Course 6. Finance and Investments

, , ALM

Course 7. Applied Modelling

Course 8. Advanced Actuarial Practice

4

○ Individual Insurance

, 가 (pricing), 가 가(valuation),

○ Health, Group Life and Managed Care

(group coverage)

HMO

○ Investments

(ALM)

option pricing theory, ALM, solvency

○ Retirement Benefits

, 가, , funding,

(Casualty Actuarial  
Society: CAS) 2000  
22) Course 1 Course 4  
Course 5 Course 7  
(Associate) Course 8, 9  
(Fellow) .

Course 5 Introduction to Property & Casualty Insurance and Ratemaking

Course 6. Reserving Insurance Accounting Principles and Reinsurance

, 「Statement of Principles」, 「Dynamic  
Financial Analysis」, , , .

---

22) 1999 .

- Part 1. Calculus and Linear Algebra
- Part 2. Probability and Statistics
- Part 3A Applied Statistical Methods
- Part 3B Introduction to Property and Casualty Insurance
- Part 3C Numerical Methods
- Part 4A Interest and Life Contingencies
- Part 4B Credibility Theory and Loss Distributions
- Part 5A Principles of Economics, Theory of Risk and Insurance
- Part 5B Finance
- Part 6 Principles of Ratemaking and Data for Ratemaking
- Part 7 Premium, Loss, and Expense Reserves; Insurance Accounting,  
Expense Analysis, and Published Financial Information
- Part 8 Tort Law and Statutory Insurance; Regulation and Regulatory  
Issues
- Part 9 Advanced Techniques; Individual Risk Rating
- Part 10 Financial Operations of Insurance Companies; Reinsurance,  
Assets, Valuation, Solvency, and Capital.

Course 7. Annual Statement, Taxation, and Regulation(Canada/ U.S.)

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Course 8. Investment and Financial Analysis

, DFA, ALM, , 가 가

Course 9. Advanced Ratemaking, Rating Plans and Rate of Return

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SOA CAS

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, (Oxford) 「the

Faculty of Actuaries」 (Edinburg) 「Institute of

Actuaries」 . 2000

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200

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. 300 2 (second stage)

「associate」 가

「fellow」

- 101 Statistical Modelling
- 102 Financial Mathematics
- 103 Stochastic Modelling
- 104 Survival Models
- 105 Actuarial Mathematics 1 ( )
- 106 Actuarial Mathematics 2 ( )
- 107 Economics
- 108 Finance and Financial Reporting
- 109 Financial Economics
- 201 Communications
- 301 Investment and Asset Management
- 302 Life Insurance
- 303 General Insurance
- 304 Pensions and other benefits
- 401\* UK Fellowship Investment
- 402\* UK Fellowship Life Insurance
- 403\* UK Fellowship General Insurance
- 404\* UK Fellowship Pensions and other benefits

400

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FIA(Fellow of Institute of Actuaries) FFA(Fellow of Faculty of Actuaries)가 .

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23)				
. Part				
가				
Macquarie University	Melbourne University			
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Macquarie University	Melbourne University			
(accreditation)		(exemption process)		
. Part		(Associate)		
Part	. Part			10
IAA	1	1	5	.
6				
(accredited member)				
3				
. Part 24)				
23)				
(The Institute of Actuaries of Australia:IAA) internet site ( <a href="http://www.actuaries.asn.au/">http://www.actuaries.asn.au/</a> )				
syllabus				
24) 2000				



Financial Mathematics  
 Statistics  
 Economics  
 Accounting & Finance  
 Actuarial Mathematics  
 Further Actuarial Mathematics  
 Statistics for Insurance  
 Actuarial Statistics

Part

Actuarial Control Cycle

Part

Investment Management  
 Life Insurance  
 General Insurance  
 Superannuation and Other Employee Benefits  
 Finance

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25) (Institute of Actuaries of Japan)  
 (<http://www.iaj-web.or.jp/exam/index.html>).

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・ 「Global Standard Guide line」<sup>26)</sup>

(International Actuarial Association:IAA)<sup>27)</sup>

1994

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26) International Actuarial Association, *IAA Education Guideline and Syllabus*, 1998.  
27)

「Observer Member」

ASTIN (Actuarial Studies In Non-life insurance),  
AFIR (Actuarial Approach for Financial Risks)  
IACA (International Association of Consulting Actuaries)

(<http://www.actuaries.org>)

1998

「IAA」

2005

「IAA」

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28) 「IAA」

1 Financial Mathematics

2. Probability and Mathematical Statistics

3. Economics

4. Accounting

5. Modelling

6. Statistical Method

7. Actuarial Mathematics

8. Investment and Asset Management

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28) Proceedings of 25th International Congress Of Actuaries, "Japan"

9. Principles of Actuarial management

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10. Professionalism

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가. 「Actuarial Standards of Practice」

1)

(American Academy of Actuaries:AAA)

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29) 가

(Actuarial Standard Board:ASB)<sup>30)</sup>

「AAA」

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「code of conduct」

「Precept 4」

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30) ASB

AAA

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「exposure draft」

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「exposure draft」가

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「Actuarial

Standard Board Procedures Manual 1997」

「AAA」

31)

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4 (section) . Section

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Section

, (communications and disclosures)

### **Actuarial Standards of Practice**

No.1, The Redetermination(or Determination) of Non- Guaranteed Charges  
and/ or Benefits for Life Insurance and Annuity Contracts

No.2, Recommendations for Actuarial Communications Related to Statements  
of Financial Accounting Standards Nos. 87 and 88

No.3, Practices Relating to Continuing Care Retirement Comm- unities

No.4, Measuring Pension Obligations

No.5, Incurred Health Claim Liabilities

No.6, Measuring and Allocating Actuarial Present Values of Retiree Health  
Care and Death Benefits

No.7, Performing Cash Flow Testing for Insurers

No.8, Regulatory Filings for Rates and Financial Projections for Health Plans

No.9, Documentation and Disclosure in Property and Casualty Insurance  
Ratemaking, Loss Reserving, and Valuations

---

31) AAA (<http://www.actuary.org/standard.htm>) .



- No.10, Methods and Assumptions for Use in Stock Life Insurance  
Company Financial Statements Prepared in Accordance with GAAP
- No.11, The Treatment of Reinsurance Transactions in Life and Health  
Insurance Company Financial Statements
- No.12, Concerning Risk Classification
- No.13, Trending Procedures in Property/ Casualty Insurance  
Ratemaking
- No.14, When to Do Cash Flow Testing for Life and Health Insurance  
Companies
- No.15, Dividend Determination and Illustration for Participating Individual  
Life Insurance Policies and Annuity Contracts
- No.16, Actuarial Practice Concerning Health Maintenance Organizations  
and Other Managed-Care Health Plans
- No.17, Expert Testimony by Actuaries
- No.18, Long-Term Care Insurance
- No.19, Actuarial Appraisals
- No.20, Discounting of Property and Casualty Loss and Loss Adjustment  
Expense Reserves
- No.21, The Actuary's Responsibility to the Auditor
- No.22, Statutory Statements of Opinion Based on Asset Adequacy Analysis by  
Appointed Actuaries for Life or Health Insurers
- No.23, Data Quality
- No.24, Compliance with the NAIC Life Insurance Illustrations Model  
Regulation
- No.25, Credibility Procedures Applicable to Accident & Health, Group Term  
Life, and Property/ Casualty Coverages
- No.26, Compliance with Statutory and Regulatory Requirements for the  
Actuarial Certification of Small Employer Health Benefit Plans
- No.27, Selection of Economic Assumptions for Measuring

Pension Obligations

- No.28, Compliance with Statutory Statement of Actuarial  
Opinion Requirements for Hospital, Medical, and Dental Service or  
Indemnity Corporations, and for Health Maintenance Organizations
- No.29, Expense Provisions in Property/ Casualty Insurance Ratemaking
- No.30, Treatment of Profit and Contingency Provisions and the Cost of  
Capital in Property/ Casualty Insurance Rate making
- No.31, Documentation in Health Benefit Plan Ratemaking
- No.32, Social Insurance
- No.33, Actuarial Responsibilities with Respect to Closed Blocks in Mutual  
Life Insurance Company Conversions

**Actuarial Compliance Guidelines**

- No.1, An Actuary's Guide to Compliance with Statement of Financial  
Accounting Standards No. 87
- No.2, For Statement of Financial Accounting Standards No. 88
- No.3, For Statement of Financial Accounting Standards No. 106 Emplo  
-yers' Accounting for Postretirement Benefits Other Than Pensions
- No.4, Statutory Statements of Opinion Not Including an Asset Adequacy  
Analysis by Appointed Actuaries for Life or Health Insurers

. **「 Standards of Practice 」**

1)

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「 Due Process for

Approval of Standards of Practice」

2)

「Consolidated Standards of Practice」

## **PART 1 GENERAL**

1. Introduction
2. Definitions
3. Judgement
4. Application
5. Work

## **PART 2 CAPITALIZED VALUES**

6. Scope
7. Method
8. Assumptions
9. Transfer Value from a Registered Pension Plan
10. Capitalized Value of Pension Plan Benefits for a Marriage Breakdown
11. Prescribed assumptions on Economic Matters

## **PART 3 PENSION PLANS**

12. Scope
13. Method
14. Assumptions
15. Funding

16. Accounting in the Plan's Financial Statements
17. Accounting in the Sponsor's Financial Statements
18. Reporting

#### **PART 4 INSURERS**

19. Work of the Appointed Actuary
20. Published Financial Statements
21. Valuation of Policy Liabilities: General
22. Valuation of Policy liabilities: P & C Insurance
23. Valuation of Policy liabilities: Personal Insurance
24. Dynamic Capital Adequacy Testing
25. Participating Policyholders

#### **Due Process for Approval of Standards of Practice**

. 「Guidance Notes」<sup>32)</sup>

1)

(the Councils of the faculty and Institute of Actuaries) 「Guidance Note」

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(draft)

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32)

(<http://www.actuaries.org.uk/home2.html>)

Publication

Manual of Actuarial Practice (Guidance Notes)

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2)

- GN1 Actuaries and long-term insurance business
- GN2 Financial Condition Reports
- GN3 Certificates for the Secretary of State for Social Security and the  
Department of Health and Social Services for Northern Ireland
- GN4 Insolvency of employers: safeguard of occupational  
pension scheme contributions
- GN5 Actuaries advising non-UK long-term insurers on  
financial soundness
- GN6 Advice on Policyholders Protection Act 1975
- GN7 The role of actuaries in relation to financial statements of insurers  
and insurance groups writing longterm business and their relation -ship  
with auditors
- GN8 Additional guidance for Appointed Actuaries and appropriate  
actuaries
- GN9 Retirement benefit schemes - actuarial reports
- GN10 Valuation of reversions and life interests
- GN11 Retirement benefit scheme - transfer values
- GN12 General insurance business: actuarial reports
- GN13 Actuarial statements required in connection with the Statements of  
Financial Accounting Standards No 87 and No 88
- GN15 Transfer of long-term business of an authorized  
insurance company - role of the independent actuary
- GN16 Retirement benefit schemes - bulk transfers
- GN17 Accounting for pension costs under Statement of  
Standard Accounting Practice No 24
- GN18 Certificate of loss reserves for the International Insurers

Department

- GN19 Retirement benefit schemes - winding-up and scheme asset deficiency
- GN20 Actuarial reporting under the Lloyd's valuation of liabilities rules
- GN21 Actuarial reporting on post-retirement medical plans
- GN22 Disclosure - PIA rules
- GN23 Life insurance company take-overs
- GN24 The actuary as expert witness
- GN25 Investments - derivative instruments
- GN26 Pension fund terminology
- GN27 Retirement benefit schemes-minimum funding requirement
- GN28 Retirement benefit schemes-adequacy of benefits for contracting-out on or after 6 April 1997
- GN29 Occupational pension schemes - actuaries advising the trustees or a participating employer
- GN30 Compensation for professional shortcomings
- GN31 Actuaries and appropriate personal pension schemes in terms of the Pensions Act 1995
- GN32 Actuaries and friendly societies: general insurance business
- GN33 Actuarial reporting for Lloyd's Syndicates writing US business

. 「 Professional Standards 」 「 Guidance Notes 」

1)

Notes 」 「 Professional Standards 」 「 Guidance  
Notes 」 . 「 Professional Standards 」

가 . 「Guidance Notes」 , 「Professional Standards」 , 가 「Professional Standards」 . 「Guidance Notes」 .33) , , , .

2)

#### **Investment Standards**

PS101 Investment Performance Measurement and Presentation

Investment Guidance Notes

GN 150 Treatment of Deferred Tax Liability for Unrealised Capital Gains

GN 151 Investment Advice

#### **Life Insurance Standards**

PS200 Actuarial Reports and Advice to a Life Insurance Company

Life Insurance Guidance Notes

GN250 The Appointed Actuary

GN252 Actuarial Appraisals of Life Insurance Business

#### **General Insurance Standards**

PS300 Actuarial Reports and Advice on Outstanding Claims in General Insurance

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33) (actuarial certificate)  
(Mandatory Guidance Notes) .

## **General Insurance Guidance Notes**

GN351 Premium Rate Certification for the NSW Motor Accidents Scheme

## **Superannuation Standards**

PS400 Investigation of Defined Benefit Superannuation Funds

PS401 Summaries of Actuarial Reports on the Financial Condition of Defined Benefit Superannuation Funds

PS402 Determination of Accrued Benefits for Defined Benefit Superannuation Funds

## **Superannuation Guidance Notes**

GN450 Cost of Death and Disability Benefits

GN451 Unsegregated Superannuation Liabilities

GN452 Segregated Assets

GN454 AAS 25 "Accrued Benefits" under Defined Benefit Superannuation Funds

GN455 Pre 1 July 1988 Funding Credits (PJFCs)

GN456 Preparation of Benefits Certificates Required under the Superannuation Guarantee (Administration) Act 1992

GN457 Benefit Certificates for "Deemed" Defined Benefit Funds

GN458 Level of Employer Support - Guideline 13 of the Guidelines for the Avoidance of Discrimination on the Grounds of Sex, Marital Status or Pregnancy in Relation to Superannuation

GN459 Payments from Superannuation Funds to Employers

GN460 Prudential Reporting to Trustees and the Regulator

GN461 Funding and Solvency Certificates

GN462 Calculations Relating to Transitional Reasonable Benefit Limits

GN464 Determination of Allocated Surplus Amounts for the Purposes of the Superannuation Contributions Tax (Assessment and Collection) Act



**Other Standards/ Guidance Notes**

PS500 Continuing Professional Development

PS551 Actuaries and Auditors "The Auditor's use of the work of the Actuary and the Actuary's use of the work of the Auditor in connection with the preparation and audit of a Financial Report"

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**6.**

(continuing

education) .

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가 Ball State University, Drake University,  
Univ. of Iowa, Univ. of Pennsylvania (Wharton School), Univ. of  
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Concordia University, Ecole d'actu-  
-ariat, Universite Laval, Simon Fraser University, Univ. of Alberta, Univ.  
of Calgary, Univ. of Manitoba, University de Montreal, Univ. of Toronto,  
University of Waterloo, Univ. of Western Ontario, York University

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34)

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(<http://www.casact.org/links/links.htm>)

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CAS

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- \* Actuarial Mathematics
- \* Life, Health and Pension Coverages
- \* Pricing and Valuation
- \* Investment of Insurance Funds
- \* Design, Marketing and Risk Selection
- \* Funding and Financial Reporting
- Risk Theory
- Loss Distributions and Credibility
- Introduction to the Mathematics of Demography
- Selection of Risks I
- \* Selection of Risks II
- Introduction to Pension Mathematics
- \* Funding of Pension Plans
- \* Analysis of Financial Statements
- \* Taxation of Life Insurance
- Insurance Law
- Topics in Property/ Casualty Insurance
- Casualty Insurance II
- \* Credibility Theory and Experience Rating.
- \* Investments
- \* Insurance and Pension Information Systems
- \* Valuation of Liabilities

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36)

*setosa.uwaterloo.ca/Stats\_Dept.html*

([http://](http://setosa.uwaterloo.ca/Stats_Dept.html)

- \* Mathematical Methods of Loss Reserving
- \* Social Insurance
  - Modern Financial Theory
- \* Group Life and Health Insurance
  - Topics in Actuarial Science
  - Seminar in Actuarial Science

Mathematics of Investment  
Mathematics of Finance  
Introduction to Actuarial Mathematics  
Life Contingencies 1  
Life Contingencies 2  
Graduation of Life Tables  
Introduction to Casualty Insurance  
Loss Models  
Credibility and Ruin Theory  
Analysis of Mortality Data  
Introduction to Demographic Statistics  
Mathematical Models in Finance  
Basic Pension Mathematics  
Insurance Law  
Casualty Insurance

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Financial Risk Management and Control (66 hours)

Computing:Spreadsheets and Statistical Packages (12hours)

### Part 2

Strategy and Business (18 hours)

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Investment and Asset Management (36 hours)

Life Insurance (36 hours)

General Insurance (36 hours)

Pensions (36 hours)

Derivative Securities. (36 hours in term 2)

Marketing of Insurance and Related Financial Services. (36 hours)

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Optional Courses Actuarial History and Philosophy(1 unit)  
Generalised Linear Models(1 unit)  
Generalised Additive Models(1 unit)  
Multi-State Models (1 unit)  
Financial and Risk Management in Commercial Banks(1 unit)  
Life Office Modelling. Prerequisite: Life Insurance(1 unit)  
Stochastic Modelling(1 unit)  
Asset-liability Management(1 unit)  
Treasury and Corporate Risk Management(1 unit)  
Property Investment Analysis and Securitisation.(2 units)  
Reinsurance (2 units)  
Marine, Aviation and Transport Insurance.(2 units)  
Claims Management. (2 units)  
Equity Investment Management. (2 units)  
Fixed Income Portfolio Management. (2 units)

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(Transactions of 25th Internal Congress of Actuaries National Report-Australia

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Introduction to Actuarial Studies  
Mathematics of Finance  
Accounting 1A  
Macroeconomic Principles  
Actuarial Modelling  
Accounting 1B  
Microeconomic Principles  
Actuarial Management  
Survival Models  
Mathematical Theory of Insurance  
Quan. Methods for Asset Liability Management  
Contingent Payments  
Macroeconomic Analysis

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Univ. of Bern, Univ. of Copenhagen,  
Univ. of Amsterdam, Universidade Technica de Lisboa  
. Univ. of Cape Town  
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PD 50 unit

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40) 「Professional Development Requirement」 .



## CAS

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April	Financial Risk Management Managing Asset and Investment Risk
May	Dynamic Financial Analysis
June	Reinsurance Principles of Finance Practical Applications of Loss Distribution
July	Advanced Dynamic Financial Analysis Dynamic Financial Analysis
September	Casualty Loss Reserve Seminar CAS/ CIA Appointed Actuary Seminar
October	Dynamic Financial Analysis Health and Managed Care

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42) 1970 Proceeding CAS 「Digital Library」

43) CAS (<http://www.casact.org/conedu/coneduc.htm>)

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July	Capital Management for Life Offices UK Forum for Genetics and Insurance
September	Investment Benchmarks and Indices Seminar Investment Strategy for Pensions Actuaries Health Care Conference
October	The Lloyd's Actuary General Insurance Convention
November	Market-based related pensions actuarial valuation methods versus a risk-based capital approach Life Convention

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(<http://www.actuaries.org.uk/home3.html>)

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: A.M. Best Company, *Best's Insolvency Study : L/H* 1976 1991, 1992  
 \_\_\_\_\_, *Best's Insolvency Study : P/C* 1969 1990, 1991

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A.M. Best Company, *Best's Insolvency Study : L/H Insurers* 1976 1991, 1992

\_\_\_\_\_, *Best's Insolvency Study : P/C Insurers* 1969 1990, 1991

Australian Insurance Institute, *Australian Insurance Legislation*, 1998

Colin H.H. McNaiva, *Consolidated Insurance Company Act of Canada : Regulation and Guideline*, 1998

International Actuarial Association, *IAA Education Guideline and Syllabus*, 1998.

NAIC, *Actuarial Opinion and Momorendum Regulation*, 1994

OECD, *Insurance Statistics Year Book*, 1999

Office of International Congress of Actuaries(ICA), *Transactions of 25th International Congress of Actuaries*, 1995

HMSO, *Insurance Company Act*, 1982

《 》

American Academy of Actuaries (AAA)

(<http://www.actuary.org>)

Actuarial Standards Board (ASB)

*(<http://www.actuary.org/asb.htm>)*

Canadian Institute of Actuaries (CIA)

*(<http://www.actuaries.ca>)*

Casualty Actuarial Society (CAS)

*(<http://www.casact.org>)*

City University, London, England

*(<http://www.city.ac.uk/actuarial>)*

Conference of Consulting Actuaries

*(<http://www.ccactuaries.org>)*

Institute of Actuaries of Japan (IAJ)

*(<http://www.iaj-web.or.jp>)*

International Actuarial Association (IAA)

*(<http://www.actuaries.org>)*

Macquarie University, Sydney, Australia

*(<http://www.f.s.mq.edu.au/acsf/index.html>)*

Society of Actuaries (SOA)

*(<http://www.SOA.org>)*

The Institute of Actuaries of Australia

*(<http://www.actuaries.asn.au>)*

The Institute of Actuaries/ The Faculty of Actuaries

*(<http://www.actuaries.org.uk>)*

University of Waterloo

*([http://setosa.uwaterloo.ca/Stats\\_Dept/homepage.html](http://setosa.uwaterloo.ca/Stats_Dept/homepage.html))*

## 1. FINANCIAL MATHEMATICS

**Aim:**

To provide a grounding in the techniques of financial mathematics and their applications.

**Topics:**

- Introduction to asset types and securities markets
- Interest, yield and other financial calculations
- Investment risk, introduction to stochastic interest and discount
- Market models - e.g. term structure of interest rates and cash flow models

**Indicative Reading:**

Core Reading (Subject A1 - Subject 102), Faculty and Institute of Actuaries  
Mathematics of Finance, J J McCutcheon and W F Scott

## 2. PROBABILITY AND MATHEMATICAL STATISTICS

**Aim:**

To provide a grounding in probability and mathematical statistics.

**Topics:**

- Concepts of probability
- Random variables and their characteristics
- Methods and properties of estimation
- Correlation and regression analysis
- Hypothesis testing and confidence intervals
- Data analysis

**Indicative Reading:**

Mathematical Statistics, John E Freund, Prentice Hall, International Editions

Subject C1 Core Reading/ Subject 101 Core Reading

Faculty and Institute of Actuaries

### **3. ECONOMICS**

**Aim:**

To provide a grounding in the fundamental concepts of both micro and macroeconomics.

**Topics:**

- Microeconomics
- Macroeconomics

**Indicative Reading:**

Core Reading for Subject 107, Faculty and Institute of Actuaries

There are many suitable textbooks at an introductory undergraduate level although most will have a fairly strong national bias.

Economics

Begg, Fischer and Dornbusch, published by McGraw-Hill, would be suitable for the UK.

### **4. ACCOUNTING**

**Aim:**

To provide the ability to interpret the accounts and financial statement of companies.

**Topics:**

- Basic principles of accounting - including the role of accounting standards

- Different types of business entity
- Basic structure of company accounts
- Interpretation and limitation of company accounts

**Indicative Reading:**

Accounting texts tend to be too detailed and country specific, although the very introductory parts of standard accounting courses may be suitable. Other suitable texts are likely to be written for general management studies rather than for accountants. On the analysis of accounts, most books written for investment analysts are likely to contain too much industry and country detail. A treatment at a suitable level is provided, for example, in the chapter "Analysing Financial Performance" in Principles of Corporate Finance, by Brealey and Myers, published by McGraw-Hill.

Other suitable texts might be the training manual for the Investment Management Certificate of the Institute for Investment Management and Research (IIMR) and the Core Reading for Subject 108, Faculty and Institute of Actuaries.

## **5. MODELLING**

**Aim:**

To provide an understanding of the principles of modelling and its applications.

**Topics:**

- Model structures
- Selection process
- Calibration
- Validation
- Scenario setting
- Sensitivity testing

- Limitations

**Indicative Reading:**

Core Reading (Subject 103), Faculty and Institute of Actuaries

Introduction to Actuarial Modelling

James C Hickman North American Actuarial Journal (1:3)

Current Actuarial Modelling Practice and Related Issues and Questions

Angus S Macdonald North American Actuarial Journal (1:3)

## **6. STATISTICAL METHODS**

**Aims:**

To provide the skills and expertise in the use of models appropriate for the understanding of risk in a range of actuarial work.

**Topics:**

- Statistical models, such as regression and time series
- Survival and multi-state models
- Risk models (individual and collective)
- Parametric and non parametric analysis of data
- Graduation principles and techniques
- Estimation of frequency, severity and survival distributions
- Credibility theory
- Ruin theory

**Indicative Reading:**

Actuarial Mathematics, Bowers et al

Casualty Actuarial Society textbooks for their examinations 3 and 4

Subject C2 Core Reading/ Subject 104 and 106 Core Reading,

Faculty and Institute of Actuaries

## **7. ACTUARIAL MATHEMATICS**

### **Aim:**

To provide the skills and expertise in the mathematics that are of particular relevance to actuaries working in life insurance, pensions, health care and general insurance.

### **Topics:**

- Actuarial mathematics as applied to life insurance, pensions, health care and general insurance
- Types of products and plans - individual, group and social insurance arrangements
- Pricing or financing methods of products and plans
- Reserving
- Reinsurance

### **Indicative Reading:**

Life Insurance Mathematics, Gerber

Actuarial Mathematics (Part A), Bowers et al

Core Reading for Subjects 104 and 105, Faculty and Institute of Actuaries

Casualty Actuarial Society textbooks for their examinations 5 and 6

Actuarial Practice of General Insurance

Hart, Buchanan and Howe, Institute of Actuaries of Australia

Subject G Core Reading - Subject 303, 403 Core Reading

Faculty and Institute of Actuaries.

## **8. INVESTMENT AND ASSET MANAGEMENT**

### **Aim:**

To develop the ability to apply actuarial principles to the valuation, appraisal, selection and management of investments.



**Topics:**

- The objectives of institutional and individual investors
- Types of investment (bonds, shares, property and derivatives)
- Regulation and taxation of investments
- Valuation of investments
- Portfolio selection - incorporating assessment of relative value
- Performance measurement
- Portfolio management

**Indicative Reading:**

Most investment textbooks are either too theoretical or too practical, not mathematical enough and country specific. There are however several US textbooks which contain some material which would be appropriate. These include:

**Investments**

Sharpe, W F (1978) published by Prentice Hall, New Jersey  
Modern Portfolio Theory and Investment Analysis (5th edition)

Elton, E J and Gruber, M J (1995) published by Wiley Radcliffe  
Parts of the textbook currently being prepared by the Society of Actuaries

Panjer H H (ed.)(1998) Financial Economics : with Applications to  
Investments, Insurance and Pensions might also be suitable.

Options, Futures and Other Derivatives (3rd edition)

Hull, J C (1997) published by Prentice Hall International

The relevant parts of Core Reading for Subjects 1 - 2, 109 and 301

Faculty and Institute of Actuaries

**9. PRINCIPLES OF ACTUARIAL MANAGEMENT****Aim:**

To develop the ability to apply the principles of actuarial planning and control needed for the operation of risk related programs on sound financial

lines.

**Topics:**

- The general operating environment
- Assessment of risks
- Product design and development
- Pricing and assumptions
- Reserving and valuation of liabilities
- Asset and liability relationships
- Monitoring the experience
- Solvency of the provider
- Calculation and distribution of profit (surplus)

**Indicative Reading:**

Core reading Subjects 302, 303, 304 - F, G, H

Faculty and Institute of Actuaries

Actuarial Control Cycle, Institute of Actuaries of Australia

Pensions - see Annotated Reading List for Pensions

Faculty and Institute of Actuaries

General Insurance - Actuarial Practice of General Insurance

Hart, Buchanan and Howe, IoAA

## **10. PROFESSIONALISM**

**Aim:**

To develop awareness of professionalism issues and the importance of professionalism in the work of an actuary.

**Topics:**

- Characteristics and standards of a profession
- Code of conduct and practice standards
- The regulatory roles of actuaries
- The professional role of the actuary

**Indicative Reading:**

Professionalism Course: Participants Course Notes

Faculty and Institute of Actuaries

Professional Ethics Course: Handouts, Society of Actuaries

Code of Conduct - relevant actuarial body

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## 保險開發院 (KIDI) 發刊物 案內

### 研究報告書

- 96-1 損害保險 價格自由化 以後 保險市場 展望 對應方案, 1996. 4
- 96-2 保險會社 綜合金融機關化 戰略, 1997. 2
- 96-3 自動車事故 被害者 社會的 保護制度 研究: 自動車保險 無保險  
運轉者 問題 中心 , 1997. 3
- 96-4 自動車保險 料率體系 適正性 分析 研究, 1997. 3
- 96-5 保險會計制度 研究, 1997. 3
- 96-6 分離計定制度 導入妥當性 細部導入方案, 1997. 3
- 96-7 社會環境變化 民營保險 役割 (I) : 總論, 1997. 3
- 96-8 生命保險 價格自由化 方案, 1997. 3
- 96-9 生命保險 募集組織 效率化 方案, 1997. 3
- 97-1 保證保險 發展方案 研究, 1997. 5
- 97-2 南北 經協 增大 統一 對備 保險產業 對應方案 研究 :  
, 1997. 11
- 98-1 保險產業 M&A 研究 : 主要國 M&A 趨勢 誘因  
, 1998. 1
- 98-2 生命保險會社 適正成長 研究, 1998. 2
- 98-3 生命保險 豫定事業費 合理的 決定 研究, 1998. 2
- 98-4 社會環境變化 民營保險 役割( ) : 年金改革 保險會社 役割, 1998. 3
- 98-5 主要國 活用事例分析 國內社 運用戰略, 1998. 3
- 98-6 保險企業 經營診斷 : 生命保險會社 中心 , 1998. 3
- 98-7 退職年金 計理 財政, 1998. 6
- 98-8 生命保險 豫定利率 安全性 分析 運用方案, 1998. 10
- 99-1 社會環境變化 民營保險 役割( ) : 醫療保險改革 保險會社 役割,  
1999. 2
- 99-2 自動車保險 自己負擔金制度 研究, 1999. 3
- 99-3 國民年金 民營化方案 研究, 1999. 3
- 99-4 損害保險 商品開發 戰略 研究, 1999. 3
- 99-5 生存分析技法(Survival Analysis) 利用 生命保險 失效・解約分析, 1999.3
- 99-6 保險詐欺 性向 規模推定 : 損害保險 中心 , 1999. 7

## 政策研究資料

- 97-1 金利變動 保險會社 金利 分析, 1997. 10  
97-2 '98年度 保險產業 展望 課題, 1997. 11  
98-1 '99年度 保險產業 展望 課題, 1998. 11

## 研究論文集

- 1 保險產業 規制 監督制度 未來, 1997. 6  
2 世界保險市場 變化 對應方案, 1998. 3  
3 第1回 全國大學生 保險懸賞論文集, 1998. 11

## 研究調查資料

- 96-1 主要國 保險 制度 關聯法規 現況, 1996. 2  
96-2 獨逸 保險監督法, 1996. 2  
96-3 主要國 生産物 賠償責任保險制度 運營現況, 1996. 10  
96-4 保險社 設立 研究, 1996. 12  
96-5 美國 保險會社 破産 支拂能力規制, 1997. 3  
97-1 國際保險 (IIS) 發表 論文集 (第 33次), 1997. 7  
97-2 太平洋保險會議 (PIC) 發表 論文集 (第 18次), 1997. 9  
98-1 專門職 危險 賠償責任保險 ( I ), 1998. 2  
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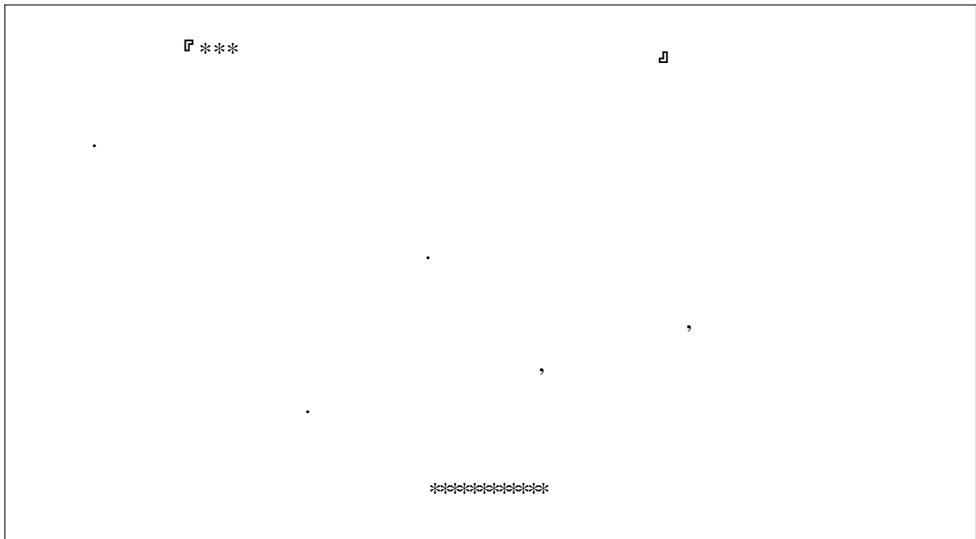
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