

CWMP — Paper 3 – Risk Management and Insurance, Retirement and Estate Planning

Complete Book | Table of Contents | 22 chapters + 8 sections

Module A — Risk Management and Insurance

CH-1	Principles of Risk Management	2
CH-2	Introduction to Insurance	6
CH-3	Insurance Regulator and Allied Bodies; Overview of the Insurance Sector in India	10
CH-4	Life Insurance (Part 1): Products, Group Schemes and Human Life Value	15
CH-5	Life Insurance (Part 2): Underwriting, Premiums, Policy Servicing and Claims	19
CH-6	General Insurance (Part 1): Market Structure and Personal Lines	24
CH-7	General Insurance (Part 2): Commercial Lines, Documentation and Claims	28
CH-8	Health Insurance	34
CH-9	Grievance Redressal Mechanism	38
CH-10	Insurance Intermediaries and Others (Surveyors, TPAs, Medical Examiners, Repositories)	41

Module B — Retirement Planning

CH-11	Principles of Retirement and Retirement Objectives	47
CH-12	Retirement Needs Analysis and Projections	51
CH-13	Potential Sources of Retirement Cash Flow	55
CH-14	Retirement Cash Flow, Withdrawal Projections and Strategies	59
CH-15	Pension Reforms and Retirement Products in India	63
CH-16	Employee Benefits on Superannuation: Payment of Gratuity Act, 1972	68

Module C — Estate Planning

CH-17	Estate Planning and Wealth Distribution Goals, Estate Planning Process	73
CH-18	The Indian Succession Act, Governing Principles and Applicability	78
CH-19	Types of Wills in India and Requirements of Valid Will	82
CH-20	Administration of Estate in a Testamentary Succession	87
CH-21	Other Tools and Methods: Will Substitutes – Tenancies, Survivorship Accounts, Nominations	93
CH-22	Gifts, Trusts & Family Arrangements in Estate Planning	98

Additional Resources

—	Case Studies — Module A: Risk Management and Insurance	104
—	Case Studies — Module B: Retirement Planning	112
—	Case Studies — Module C: Estate Planning	116
—	Mega Tests — Mega Test 1 — 100 Questions (Full Syllabus)	122
—	Mega Tests — Mega Test 2 — 100 Questions (Full Syllabus)	131
—	Mega Tests — Mega Test 3 — 100 Questions (Full Syllabus)	141
—	Mega Tests — Mega Test 4 — 100 Questions (Full Syllabus)	149
—	Mega Tests — Mega Test 5 — 100 Questions (Full Syllabus)	158

CH-1

Principles of Risk Management

Topic 1 — Fundamentals of Risk Management

Risk is uncertainty about the occurrence of a loss — the chance that the actual outcome is worse than the expected outcome.

Concept	Meaning
Risk	Uncertainty concerning the occurrence of a loss; the outcome is not known in advance
Uncertainty	Doubt about the future; probabilities may not be known at all
Chance of loss	Probability that a loss will occur — number of losses ÷ number of exposure units
Objective risk	Relative variation of actual loss from expected loss; it falls as the number of exposure units rises
Subjective risk	A person's own perception of risk, shaped by attitude and state of mind
Loss exposure	Any situation in which a loss is possible, whether or not it actually occurs

- **Risk management** — A systematic process to identify, measure and treat loss exposures at the lowest cost.
- **Scope** — It applies to households, banks, businesses and governments alike.
- **Not elimination** — Risk can rarely be removed; it is accepted, reduced, shared or transferred.

Objectives of risk management

Stage	Objectives
Pre-loss	Economy — prepare for losses at the least cost; reduce anxiety; meet legal and contractual obligations such as a lender's insurance condition
Post-loss	Survival; continued operation; stability of income or earnings; continued growth; social responsibility towards employees, customers and the community

Remember this

- Chance of loss = probability; objective risk = spread of actual around expected losses. Objective risk falls as exposure units rise.

Topic 2 — Meaning and Treatment of Risk

Risk treatment means choosing the method, or the mix of methods, for dealing with each identified loss exposure.

Technique	What it means	Example
Avoidance	The exposure is never acquired, or an existing one is abandoned	A family decides not to buy a motorcycle; a bank exits a hazardous loan segment
Loss prevention	Measures that reduce the frequency of loss	Fire-safety training, CCTV, dual-control locks, annual health check-ups
Loss reduction	Measures that reduce the severity once a loss occurs	Sprinklers, off-site data backup, fire-resistant record rooms
Retention	The person or firm bears the loss; active (planned) or passive (unaware)	Emergency fund, deductible, self-insurance fund

Technique	What it means	Example
Non-insurance transfer	Loss shifted to another party by a contract that is not insurance	Hold-harmless clause in a lease, hedging with forwards, leasing equipment
Insurance	Pure risk transferred to an insurer for a premium; losses are pooled	Fire policy on stock, term life cover, health cover

- **Risk control** — Avoidance, prevention and reduction change the frequency or severity of losses.
- **Risk financing** — Retention, non-insurance transfer and insurance pay for losses that still occur.
- **Avoidance limits** — It is not always possible; death, for example, cannot be avoided.
- **Lost benefits** — Avoiding an activity also gives up the income or utility it would bring.
- **Retention test** — Retain when no other method exists, the worst loss is affordable, or losses are predictable.

Remember this

- Prevention cuts **frequency**; reduction cuts **severity**; retention, transfer and insurance **finance** the loss.

Topic 3 — Types of Risk

Basis	Type	Meaning and example
Measurability	Financial / Non-financial	Financial: loss measurable in money, e.g. a house fire. Non-financial: choice of career or spouse
Change in economy	Static / Dynamic	Static: losses even in an unchanging economy — fire, theft, death; predictable and insurable. Dynamic: from changes in technology or tastes — obsolescence
Spread of loss	Fundamental / Particular	Fundamental: hits large groups — war, inflation, earthquake; often handled by government. Particular: hits individuals — theft of a car
Diversification	Diversifiable / Non-diversifiable	Diversifiable risk affects few units and can be cut by pooling. Systematic risk affects the whole market at once
Enterprise	Hazard, operational, financial, strategic	Enterprise risk management treats all of an organisation's risks together, not in silos

Personal, property and liability risks

Category	Main exposures	Typical tools
Personal	Premature death, outliving savings (longevity), poor health, disability, unemployment	Term cover, annuity or pension, health and disability cover, emergency fund
Property	Direct loss (physical damage) and indirect or consequential loss (lost rent, lost profit, extra expense)	Fire or home policy, motor own-damage, business interruption cover
Liability	Legal liability for bodily injury or property damage caused to others; defence costs	Motor third-party, public liability, professional indemnity, D&O cover

- **No ceiling** — Liability risk has no maximum upper limit; a court may award any amount.

- **Assets at stake** — A large award can attach the defendant's present and future assets.
- **Longevity** — Outliving savings is a personal risk that annuities and pensions address.

Remember this

- Fundamental risk → society or government; particular risk → individual and private insurance.

Topic 4 — Pure and Speculative Risk

Basis	Pure risk	Speculative risk
Possible outcomes	Loss or no loss only	Loss, no loss or gain
Examples	Fire, theft, accident, premature death	Buying shares, launching a product, open forex position, betting
Choice	Usually involuntary	Voluntarily assumed for a possible gain
Insurability	Generally insurable	Generally not insurable
Law of large numbers	Easier to apply	Harder to apply
Effect on society	A loss to society as well	Society may gain even when one party loses
Usual treatment	Insurance, prevention, retention	Diversification, hedging, position limits

- **Why insurers avoid speculative risk** — The gain element invites moral hazard and defeats pooling.
- **Predictability** — Loss patterns of business ventures change too fast for stable premium rating.
- **Exception** — Trade credit insurance covers buyer default, a risk arising from a business venture.

Example: Officer Kavita owns a flat worth ₹70 lakh and shares worth ₹15 lakh. A fire in the flat is a **pure risk** she can insure. A fall in share prices is a **speculative risk** she manages by diversification.

Remember this

- Insurance covers **pure** risks; speculative risks are managed by diversification and hedging.

Topic 5 — Perils and Hazards

- **Peril** — The cause of loss, such as fire, flood, theft, collision or death.
- **Hazard** — A condition that increases the chance or the size of a loss from a peril.
- **Loss** — An unintentional decline in, or disappearance of, economic value.

Hazard	Meaning	Example	Insurer's response
Physical	A physical condition that raises frequency or severity	Faulty wiring, chemicals stored near a boiler	Inspection, higher rate, warranties
Moral	Dishonesty of the insured — deliberate loss or exaggerated claim	Arson to claim money, inflated repair bills, hidden illness	Careful underwriting, investigation, exclusions
Morale (attitudinal)	Carelessness or indifference because insurance exists	Leaving a car unlocked because it is insured	Deductibles, co-payment, no-claim bonus
Legal	Features of the legal system that raise frequency or severity	Large court awards, liberal interpretation of wordings	Pricing and precise policy wording

Example: A taxi owner insures his vehicle. A collision is the **peril**; bald tyres are a **physical hazard**; staging an accident is

moral hazard; careless driving because 'the insurer will pay' is **morale hazard**.

Remember this

- Peril causes the loss; hazard increases it. Moral = dishonesty; morale = carelessness.

Topic 6 — Risk Management Process and Measurement of Loss Exposures

1. **Identify loss exposures** — Use checklists, financial statements, inspections, flowcharts and past loss records.
2. **Measure and analyse** — Estimate frequency, severity, maximum possible loss and probable maximum loss.
3. **Select techniques** — Choose the best mix of control and financing for each exposure.
4. **Implement** — Budget for retention, install controls, buy insurance and assign responsibility.
5. **Monitor and review** — Revisit the plan after life events, new assets or changes in law.

Measure	Meaning
Loss frequency	Number of losses in a period ÷ number of exposure units
Loss severity	Size of a loss; average severity = total loss amount ÷ number of losses
Maximum possible loss	The worst loss that could ever happen to the exposure
Probable maximum loss	The worst loss likely to happen, given existing controls

$$\text{Expected loss} = \text{Frequency} \times \text{Average severity} = \sum p_i x_i$$

$$\sigma = \sqrt{\sum p_i (x_i - EL)^2}$$

N1. [Numerical] A trader's annual loss distribution is: no loss with probability 0.90, ₹50,000 with probability 0.07 and ₹5,00,000 with probability 0.03. Find the expected loss and the standard deviation.

Item	Value
Loss ₹0	p = 0.90
Loss ₹50,000	p = 0.07
Loss ₹5,00,000	p = 0.03

Solution:

Formula:

$$EL = \sum p_i x_i,$$

$$\sigma = \sqrt{\sum p_i (x_i - EL)^2}$$

$$EL = 0.07 \times 50,000 + 0.03 \times 5,00,000 = 3,500 + 15,000 = ₹18,500.$$

$$\text{Variance} = 0.90 \times 18,500^2 + 0.07 \times 31,500^2 + 0.03 \times 4,81,500^2 = 7,33,27,50,000.$$

$$\sigma = \sqrt{7,33,27,50,000} \approx ₹85,631$$

Answer: Expected loss is ₹18,500 a year, but the standard deviation of about ₹85,631 shows a rare ₹5 lakh loss dominates the risk.

Remember this

- Expected loss shows the average; standard deviation shows how far actual losses may stray from it.

Topic 7 — Basic Risk Management Assumptions and Techniques

Basic assumptions

- **Identifiable** — Loss exposures can be found and listed before a loss occurs.
- **Measurable** — Losses can be expressed in money and their probability estimated from past data.



- **Stable pattern** — Past loss experience is a fair guide to future losses.
- **Risk aversion** — The decision-maker prefers a small certain cost to a large uncertain loss.
- **Cost-benefit** — No technique should cost more than the reduction in loss it brings.

Risk management matrix

Frequency	Severity	Appropriate technique
Low	Low	Retention
High	Low	Loss prevention and retention
Low	High	Insurance (transfer)
High	High	Avoidance

Cost of risk = Retained losses + Premiums + Risk control costs + Administration costs

N2. [Numerical] Shree Traders has two exposures: about 12 breakages a year averaging ₹4,000 each, and a 0.5% annual chance of a ₹60 lakh fire. Its net worth is ₹25 lakh. A fire policy costs ₹45,000 a year. Decide the treatment and find the budgeted cost.

Item	Value
Breakages	12 a year × ₹4,000
Fire	$p = 0.005$, loss ₹60,00,000
Fire premium	₹45,000
Net worth	₹25,00,000

Solution:

Formula:

$$EL = \text{Frequency} \times \text{Severity}$$

Expected breakage loss = $12 \times 4,000 = ₹48,000$ — high frequency, low severity: prevent and retain.

Expected fire loss = $0.005 \times 60,00,000 = ₹30,000$ — low frequency, high severity: insure.

Premium loading = $45,000 \div 30,000 - 1 = 50\%$, but an uninsured fire would exceed the ₹25 lakh net worth.

Budgeted cost = 48,000 retained + 45,000 premium = ₹93,000.

Answer: Retain breakages and insure fire; the firm swaps an uncertain ₹60 lakh exposure for a known ₹93,000 a year.

Remember this

- Low frequency–high severity → insure; high–high → avoid; high–low → prevent and retain; low–low → retain.

Topic 8 — Personal Risk Tolerance and Management

- **Risk tolerance** — The level of uncertainty or loss a person can accept while pursuing goals.
- **Risk capacity** — The objective financial ability to absorb a loss without harming goals.
- **Risk willingness** — The subjective, psychological comfort with uncertainty and loss.
- **Prudent rule** — Advice should follow the lower of capacity and willingness.

Factor	Effect on tolerance
Age and time horizon	Younger clients with long horizons can usually absorb more short-term volatility
Income stability	Steady salary raises capacity; irregular business income lowers it
Dependants and liabilities	More dependants and loans reduce capacity and raise the need for life cover
Wealth and liquidity	Larger liquid reserves allow higher deductibles and more retention
Knowledge and experience	Better understanding usually raises willingness
Behavioural biases	Loss aversion lowers willingness; overconfidence overstates it

Risk profile	Typical traits	Risk handling choices
Conservative	Low capacity or low willingness	Low deductibles, wide insurance, larger emergency fund
Moderate	Balanced capacity and willingness	Standard covers with moderate deductibles
Aggressive	High capacity and high willingness	Higher deductibles, retain small losses, insure only large ones

Managing personal risks

- **1. List exposures** — Income loss on death or disability, medical costs, property and liability.
- **2. Quantify** — Estimate income needs, medical costs and asset values.
- **3. Choose tools** — Emergency fund for small losses; insurance for large ones.
- **4. Review** — Update after marriage, childbirth, a home loan or retirement.
- **Suitability** — SEBI-registered investment advisers must profile a client's risk and ensure suitable advice.

Example: Meera, 32, holds a secure job, has no loans and ₹20 lakh of savings, yet panics at any fall in value. Her **capacity is high but willingness is low**, so her adviser recommends a moderate plan she can stay with.

Remember this

- Capacity = ability (objective); willingness = attitude (subjective). Use the **lower** of the two.

Topic 9 — Insurance as a Tool for Risk Management

Insurance transfers a pure risk to an insurer, which pools many similar exposures and pays the losses of a few from the premiums of many.

- **Pooling** — Losses of a few are shared by all members of the group.
- **Fortuitous losses** — Only unforeseen, accidental losses are paid.
- **Risk transfer** — An uncertain large loss is exchanged for a certain small premium.
- **Indemnification** — The insured is restored to about the same financial position as before the loss.

Requisite of an insurable risk	Reason
Large number of similar exposure units	Allows the law of large numbers to predict losses
Accidental and unintentional loss	Intentional losses would make outcomes unpredictable and invite fraud
Determinable and measurable loss	Cause, time, place and amount must be provable
No catastrophic loss to the pool	Too many units must not suffer loss at the same time
Calculable chance of loss	Needed to compute a fair premium
Economically feasible premium	Premium must be affordable relative to the possible loss

Benefits of insurance	Costs of insurance
Indemnifies losses so families and firms recover	Expense and profit loading above expected loss
Reduces worry and fear	Fraudulent claims (moral hazard)
Provides long-term funds for investment	Inflated claims and carelessness (morale hazard)
Encourages loss prevention and supports credit	Some risks remain uninsurable



- **Best fit** — Insurance suits low-frequency, high-severity losses that a household cannot absorb.
- **Combination** — A deductible retains small losses and transfers large ones, lowering premium.
- **Credit link** — Banks require insurance of hypothecated stock and mortgaged property to protect their security.

Remember this

- Insurance does not prevent loss; it **redistributes** the financial cost of the losses of a few among many.

CWMP | Module A | CH-1 | MCQs

Q1. A shopkeeper stores fireworks next to the main electrical panel of his shop. For a fire insurer, this condition is best described as a: [Ref: Topic 5, p. 3]

- (a) Physical hazard that raises the chance and size of a fire loss
- (b) Moral hazard, arising from the shopkeeper's dishonest intentions
- (c) Peril, because it is the direct cause of a fire loss
- (d) Morale hazard caused by the shopkeeper's insurance cover

Q2. After buying comprehensive motor cover, Raman stops locking his car because 'the insurer will pay'. Which hazard is this, and what tool best curbs it? [Ref: Topic 5, p. 3]

- (a) Morale hazard — curbed by deductibles and a no-claim bonus
- (b) Moral hazard — curbed by raising the sum insured on the car
- (c) Physical hazard — curbed by an annual vehicle inspection
- (d) Legal hazard — curbed by tighter policy wording on theft

Q3. Which of the following are pure risks? (i) Fire in a warehouse (ii) Fall in the price of shares held (iii) Premature death of a breadwinner (iv) Launch of a new product [Ref: Topic 4, p. 3]

- (a) (i), (ii) and (iii) only
- (b) (ii) and (iv) only
- (c) (iii) only
- (d) (i) and (iii) only

Q4. A transport firm suffers frequent and severe accident losses on a landslide-prone hill route. Under the risk management matrix, the most appropriate technique is: [Ref: Topic 7, p. 3]

- (a) Retention through a self-insurance fund for the route
- (b) Insurance with a low deductible for every trip
- (c) Avoidance — withdraw from operating on that route
- (d) Loss reduction alone, keeping operations unchanged

Q5. A bank's cash van makes 200 trips a year. Past data show one robbery in every 400 trips, with an average loss of ₹8,00,000. The expected annual robbery loss is: [Ref: Topic 6, p. 3]

- (a) ₹4,00,000
- (b) ₹8,00,000
- (c) ₹2,00,000
- (d) ₹16,00,000

Q6. Which of the following is an example of a non-insurance transfer of risk? [Ref: Topic 2, p. 2]

- (a) Installing sprinklers in a godown to limit any fire damage to stock
- (b) A lease clause making the tenant bear all liability claims
- (c) Keeping an emergency fund of six months' expenses
- (d) Closing down a product line with heavy recall losses

Q7. As an insurer adds more independent and similar exposure units to its pool, objective risk: [Ref: Topic 1, p. 2]

- (a) Rises, because more units can now suffer a loss
- (b) Stays unchanged, because each unit's chance of loss is unchanged
- (c) Becomes zero once the pool crosses one thousand units
- (d) Declines, because actual losses come closer to expected losses

Q8. Cities A and B each have 10,000 houses and expect 100 fires a year. Actual fires range from 95 to 105 in City A and from 80 to 120 in City B. Which statement is correct? [Ref: Topic 1, p. 2]

- (a) Both chance of loss and objective risk are higher in City B
- (b) Chance of loss is higher in City B, but objective risk is the same
- (c) Chance of loss is the same, but objective risk is higher in City B
- (d) Objective risk is higher in City A because its range is narrower

Q9. A severe earthquake damages lakhs of homes across a State at the same time. This risk is best classified as: [Ref: Topic 3, p. 2]

- (a) A particular risk confined to individual owners
- (b) A fundamental risk affecting a large group at once
- (c) A speculative risk, as land values may rise afterwards
- (d) A dynamic risk arising from a change in tastes

Q10. Meera, 32, has a secure job, no loans and ample savings but becomes anxious at any loss in value. Her adviser should: [Ref: Topic 8, p. 4]

- (a) Treat her capacity as high but willingness as low, and advise a level she can hold
- (b) Advise an aggressive plan because her financial capacity is high
- (c) Ignore her attitude because capacity alone decides risk tolerance
- (d) Treat her capacity as low because she is still young and early in career

Q11. Which of the following is NOT a requisite of an ideally insurable risk? [Ref: Topic 9, p. 4]

- (a) There should be a large number of similar, independent exposure units
- (b) The chance of loss should be calculable
- (c) The loss should be intentional so that its cause can be proved
- (d) The premium should be economically feasible

Q12. A firm's retained losses are ₹48,000, insurance premiums ₹45,000, risk-control spending ₹12,000 and risk administration costs ₹5,000 a year. Its annual cost of risk is: [Ref: Topic 7, p. 3]

- (a) ₹93,000
- (b) ₹1,05,000
- (c) ₹60,000
- (d) ₹1,10,000

Q13. Retention is generally the most suitable way to handle a loss exposure when: [Ref: Topic 2, p. 2]

- (a) Losses are fairly predictable and the worst loss is affordable
- (b) The possible loss could be larger than the firm's entire net worth
- (c) Losses are rare but could be catastrophic when they occur
- (d) The firm has no past data on the frequency of losses

Q14. Arrange the steps of the risk management process in order: P. Select techniques Q. Identify loss exposures R. Monitor and review S. Measure and analyse T. Implement [Ref: Topic 6, p. 3]

- (a) S, Q, P, R, T
- (b) Q, P, S, T, R
- (c) P, Q, S, T, R
- (d) Q, S, P, T, R

Q15. Consider: (i) Insurance prevents losses from occurring. (ii) Insurance replaces an uncertain large loss with a certain small cost. (iii) The insurer pays the losses of a few from the contributions of many. Which are correct? [Ref: Topic 9, p. 4]

- (a) (i), (ii) and (iii)
- (b) (ii) and (iii) only
- (c) (i) and (iii) only
- (d) (ii) only

Answer key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	a	4	c	7	d	10	a	13	a
2	a	5	a	8	c	11	c	14	d
3	d	6	b	9	b	12	d	15	b

CH-2 Introduction to Insurance

Topic 1 — History and Evolution of Insurance

Global origins

- **Spreading cargo** — Ancient Chinese and Babylonian traders split goods across many boats to avoid total loss.
- **Bottomry** — A loan on a ship was written off if the vessel sank; the lender charged extra for that risk.
- **Marine insurance** — Lloyd's coffee house in London became the centre of marine underwriting in the late 17th century.
- **Fire insurance** — The Great Fire of London (1666) led to the first fire insurance offices.
- **Life insurance** — Mortality tables later allowed level premiums, the basis of modern life insurance.

Evolution in India

- **Ancient texts** — Manusmriti, Yajnavalkya Smriti and Kautilya's Arthashastra describe pooling resources for calamities.

Milestone	Detail
Oriental Life Insurance Company (1818)	First life insurer in India, at Calcutta; failed in 1834
Triton Insurance Company (1850)	Early general insurer, set up at Calcutta
Bombay Mutual Life Assurance Society (1871)	Among the first Indian life insurers, insuring Indian lives at normal rates
Indian Mercantile Insurance Ltd (1907)	First company to transact all classes of general insurance
Indian Life Assurance Companies Act, 1912	First statutory measure to regulate life business
Insurance Act, 1938	Comprehensive law for life and non-life business; still the principal Act
LIC (1 September 1956)	245 Indian and foreign insurers and provident societies nationalised into LIC
GIBNA, 1972	General insurance nationalised from 1 January 1973; 107 insurers merged into four companies under GIC
Malhotra Committee (1993–94)	Recommended private entry and an independent regulator
IRDA Act, 1999	IRDA set up as statutory regulator in April 2000; private insurers allowed
Foreign investment cap	26% (2000) → 49% (2015) → 74% (2021) → 100% (2025 amendment, in force from 5 February 2026; automatic route from 2 May 2026)

Remember this

- LIC from 1 Sep 1956 (245 entities); general insurance nationalised from 1 Jan 1973 (107 insurers → 4 companies); FDI 26 → 49 → 74 → 100%.

Topic 2 — Principle of Risk Pooling

Risk pooling combines many similar, independent exposures so that the losses of a few are paid from the contributions of all.

- **Law of large numbers** — As exposure units increase, actual losses come closer to expected losses.
- **Pure premium** — The expected loss per exposure unit; each member's fair share of pooled losses.
- **Gross premium** — Pure premium plus a loading for expenses, commission, profit and contingencies.

- **Conditions** — Exposures should be homogeneous and largely independent of one another.
- **Reinsurance** — Insurers pool their own large or peak risks further with reinsurers.

$$\text{Pure premium} = \frac{\text{Expected claims}}{\text{Number of units}} = p \times SI$$

$$\text{Relative variation} = \frac{\sqrt{np(1-p)}}{np}$$

N3. [Numerical] An insurer pools 10,000 houses, each insured for ₹30 lakh. The chance of a total fire loss is 0.001 a year. Find the pure premium and the gross premium with a 30% loading on the pure premium.

Item	Value
Houses (n)	10,000
Sum insured	₹30,00,000
Probability (p)	0.001
Loading	30% of pure premium

Solution:

Formula:

$$\text{Gross premium} = \text{Pure premium} \times (1 + \text{loading})$$

$$\text{Expected losses} = 10,000 \times 0.001 = 10 \text{ houses.}$$

$$\text{Expected claims} = 10 \times ₹30,00,000 = ₹3,00,00,000.$$

$$\text{Pure premium} = ₹3,00,00,000 \div 10,000 = ₹3,000.$$

$$\text{Gross premium} = ₹3,000 \times 1.30 = ₹3,900.$$

Answer: Each owner pays ₹3,900 a year; the pool of ₹3 crore of pure premium meets the ten expected losses.

Houses in pool (p = 0.001)	Expected fires	Standard deviation	Relative variation
1,000	1	1.00	about 100%
10,000	10	3.16	about 32%
1,00,000	100	9.99	about 10%

Remember this

- A 100-fold larger pool cuts relative variation about 10-fold — the $\sqrt{n}$ effect behind pooling.

Topic 3 — Principles of Insurance — Overview and Utmost Good Faith

Principle	Essence	Applies to
Utmost good faith	Both parties disclose all material facts	All insurance
Insurable interest	The insured must suffer financially from the loss	All insurance
Indemnity	Restore the insured's position, never enrich	General insurance; not life or PA benefits
Subrogation	Insurer takes over the insured's recovery rights after paying	Indemnity contracts
Contribution	Insurers covering the same loss share it rateably	Indemnity contracts
Proximate cause	The dominant, efficient cause must be an insured peril	All insurance
Loss minimisation	Insured must act as a prudent uninsured person would	Mainly general insurance

- **Uberrimae fidei** — Insurance needs utmost good faith, not the 'buyer beware' rule of ordinary sales.
- **Material fact** — A fact that would influence an underwriter's decision to accept a risk or fix terms.
- **Duration** — The duty runs until the contract is concluded and revives at renewal, revival or alteration.