Answer Key

Chapter 1

The two primary goals of any insurer are to ensure solvency and increase profitability. Select the true statements about solvency and profitability.

A. Solvency is defined as a company's overall degree of success in generating returns for its owners.

✓ **B. Capital is generally measured by comparing a company's assets to its liabilities.**

C. The most significant liability for an insurer is employee wages.

✓ **D. All other factors being equal, the greater the risk associated with an investment, the greater the potential return on the investment.**

It's true that companies generally measure capital by comparing their assets to their liabilities, and that greater risks on an investment imply greater potential returns on that investment. However, **profitability** is a company's overall degree of success in generating returns for its owners, and the most significant liability for an insurer is its **contractual reserves**. We'll explain these concepts further in this chapter.

All of the following are benefits of strong solvency EXCEPT:

A. Increased ability to withstand economic downturns
B. **Increased regulatory scrutiny**
C. Higher quality ratings from rating agencies
D. Greater customer confidence

Strong solvency results in **decreased** regulatory scrutiny.

Which of the following investment transactions typically represent a LOWER risk with LOWER potential returns? (Choose all that apply.)

- ✓ **A. Owning a short-term investment**
- ✓ **B. Owning an investment with good liquidity**
- C. Issuing a new product that has high initial costs
- D. Owning an investment that pays returns in a foreign currency
- ✓ **E. Investing in a U.S. Treasury bond**

Owning a short-term investment, owning an investment with good liquidity, and investing in a U.S. Treasury bond are all examples of investment transactions with lower risks and lower potential returns.

True/False: Enterprise risk management (ERM) identifies and quantifies risks from potential threats and focuses on operations of one functional area of the company.

A. True
B. False

This statement is false. ERM identifies and quantifies risks from potential threats and potential opportunities and focuses on operations *throughout* an organization.

Select the statements that describe Seastone Life's risk tolerance.

- **A. Seastone will not invest more than 1.5% of its general account assets in stocks.**
- B. Seastone takes a conservative approach to investing, prioritizing strong solvency over increasing profitability.
- **C. Seastone seeks a 95% probability of maintaining its current AAA rating.**

The first and third statements are quantitative, and therefore describe Seastone's risk tolerance. The second statement is qualitative, and therefore describes Seastone's risk appetite.

True/False: A data scientist's work is more strictly regulated than an actuary's work.

A. True
B. False

This statement is false. Actuarial work must adhere to strictly regulated methods and tests, while data scientists answer primarily to company management.

Which type of actuary is responsible for preparing actuarial reports for insurers and reviewing the assumptions behind proposed products?

A. Risk actuary
B. Appointed actuary
C. Pension actuary
D. Resource & environment actuary

Appointed actuaries are generally expected to provide impartial advice to a client, which is particularly useful when reviewing a proposed product's assumptions.

True/False: Valuation is calculating the monetary value of a company's assets, liabilities, and capital for accounting and financial reporting purposes.

A. True

B. False

This statement is true. Actuaries are vital to calculating valuation because valuation examines not only the resources that a company has, but the resources that a company can be expected to have in the near future.

The practice of coordinating the administration of an insurer's investments with the administration of its obligations to customers so as to achieve the best possible effects is known as

A. reinsurance
B. reserve valuation
C. insurtech
D. asset-liability management (ALM)

ALM coordinates assets such as an insurer's investments, and liabilities such as an insurer's obligations to its customers.

Chapter 1 Practice Questions

Chapter 1

Chapter 2

In what ways do regulators ensure the solvency of an insurance company?

- **A. Impose minimum capital requirements as a prerequisite to an insurer's obtaining a license to conduct insurance business**
- **B. Monitor and assess the solvency of all licensed insurers on an ongoing basis**
- **C. Impose minimum capital and surplus requirements for insurers and for each product line**
- **D. Place restrictions on insurers' investment holdings**

All of these are ways in which regulators ensure the solvency of an insurer. Let's learn more about these requirements.

True/False: An insurer should hold as much contractual reserves as possible to maintain capital adequacy.

A. True
B. False

This statement is false. A company that holds too much in reserves is using its capital inefficiently. Holding too much in reserves may prevent an insurer from investing capital in growth opportunities and realizing expected profitability.

The brief document that states that a company's reserves are adequate for the anticipated cash flows arising from the insurer's contractual obligations given the assets supporting them is known as the

A. actuarial opinion

B. actuarial memorandum

The actuarial memorandum is a lengthy formal report containing documentation supporting the conclusion expressed in the actuarial opinion.

True/False: Under principles-based reserving, life insurers must establish statutory reserves for their products based on prescribed formulas and assumptions.

A. True
B. False

This statement is false. Under principles-based reserving (PBR), actuarial assumptions and reserve levels change as the economic environment and other risk factors change so that reserves an insurer holds are based on the insurer's own experience and risks, unless the reserves resulting from prescribed factors are higher than those from credible insurer experience.

The legal minimum standard of capital that an insurer must maintain in order to be considered solvent by regulatory authorities is known as

A. regulatory capital
B. rating agency capital
C. economic capital

An insurer needs to meet regulatory minimum standards in order to do business.

The tool to monitor solvency that determines the minimum capital level of an insurer based on the insurer's size and risk profile as identified by a specific risk-weighted formula based on contingency risks is known as

A. the Financial Analysis and Solvency Tracking (FAST) System
B. the Insurance Regulatory Information System (IRIS)
C. the Own Risk and Solvency Assessment (ORSA)
D. risk-based capital (RBC) requirements

RBC requirements are established by the NAIC model law called the Risk-Based Capital for Insurers Model Act.

A state insurance department is particularly concerned that one insurer's actual experience with mortality rates, operating expenses, and policyholder behavior will differ significantly from the actuarial assumptions used in the product's financial design. In this case, the state insurance department is concerned about which of the following contingency risks?

A. Asset risk
B. Pricing risk
C. Interest-rate risk
D. General management risk

Pricing risk is particular to an insurer's technical product design, which concerns itself with all of these factors.

Regulators have determined that an insurer has an RBC ratio of 65%. The mandated step regulators will take is to

A. place the insurer under administrative supervision
B. require the insurer to take specific actions described in the Model Hazardous Condition Regulation
C. place the insurer in liquidation, transferring all of the insurer's business to other insurers or selling the insurer's assets and terminating its business
D. place the insurer in receivership so that an individual or team can actively monitor the insurer's ongoing operations

At an RBC ratio below 70%, regulators are mandated to take an insurer into receivership. From there, the insurer may be rehabilitated or placed into liquidation.

One entity that is important in shaping insurance prudential regulation internationally is the Conference of Sponsoring Organizations of the Treadway Commission (COSO). One true statement about COSO is that

A. it provides a forum for discussing bank supervision matters worldwide
B. it is responsible for the Insurance Capital Standard (ICS), designed to provide a uniform approach to RBC requirements among insurance supervisors across jurisdictions.
C. **it provides frameworks and guidance on enterprise risk management, internal control, and fraud defense**
D. it is a European-sponsored solvency standard for insurance companies designed to support solvency testing and supervision in the public interest.

These frameworks and guidance that COSO provides are principles-based.

Mountaintop Insurance issues a loan to Spruce Pine Financial. Six months later, Spruce Pine fails to make scheduled payments and goes bankrupt, and cannot pay back the loan in full. Mountaintop suffers a loss and its solvency is affected. The type of risk that this scenario describes is

A. default risk
B. regulatory risk
C. mortality risk
D. event risk

In the context of investing, default risk is the type of credit risk that involves the risk that an insurer will not receive the cash flows to which it is entitled because a party with which the insurer has a financial arrangement is late with payments or entirely fails to fulfill its debt obligations.

Mountaintop Insurance owns bonds that generate payments based on a fixed 5 percent rate. During a period of inflation, the inflation rate increases by 3%. As a result, the bond payments cannot purchase as much goods and services as Mountaintop planned, and Mountaintop has lost purchasing power. The type of risk that this event describes is

A. reputation risk
B. inflation risk
C. reinvestment-rate risk
D. downgrade risk

Inflation risk is the risk that the price of goods and services will increase over time, causing a decline in the value of investments and returns.

Mountaintop Insurance received an unusually high number of claims and didn't have enough cash on hand to pay the benefits due. In order to meet its contractual obligations, Mountaintop had to sell existing assets below their underlying value. The type of risk that this scenario describes is

A. operational risk
B. liquidity risk
C. fraud risk
D. distribution risk

Liquidity risk is the risk that an asset might not be easily sold for its underlying value.

Chapter 2 Practice Questions

Chapter 2

1. 1
2. 3
3. 2
4. 2
5. 4
6. 2
7. 2
8. 4
9. 3

Chapter 3

Which of the following basic risk management strategies do insurers commonly use? Choose all that apply.

- **A. Avoiding risk**
- **B. Accepting risk**
- **C. Controlling risk**
- **D. Transferring risk**
- **E. Exploiting risk**

Insurers commonly use all of these risk management techniques. You'll learn more about them in this lesson.

Through its distribution channels, an insurer hears that its customers are very concerned about paying for long term care. The insurer creates a universal life product with a long-term care rider to satisfy this need and issues policies to customers. This rider is an example of the insurer

A. accepting and controlling risk
B. avoiding and transferring risk
C. controlling and transferring risk
✓ **D. exploiting and accepting risk**

When the insurer takes advantage of an opportunity presented by a risk, such as creating a rider to satisfy a customer need, this is an example of exploiting a risk. By issuing policies to customers, the insurer is accepting risk.

True/False: In companies that employ a chief risk officer [CRO], the CRO typically reports to the risk committee.

A. True
B. False

This statement is false. The CRO typically reports to the chief executive officer (CEO) and the board of directors.

True/False: Between the risk committee, compliance function, and internal audits, the compliance function typically examines the company's records, policies, and procedures and reports their findings directly to the board of directors and the CEO.

A. True
B. False

This statement is false. The internal audit function typically completes these activities. The compliance function establishes policies and procedures that the company must follow to satisfy the regulatory requirements of the jurisdictions in which it operates.

Match each example to the correct line of defense.

1. first line of defense
2. second line of defense
3. third line of defense

A. At Bright Light Insurance, this line of defense provides expertise on effective risk management practices, communicates risk taxonomies, and assists risk owners in identifying material risk exposures. **2**

B. Polar Insurance operational managers identify and assess risk within their unit on a day-to-day basis, ensuring controls are in place, and taking corrective actions when needed. **1**

C. Rainbow Insurance provides independent assurance to the board of directors and senior management on the effectiveness of the company's governance, its risk management practices, and its internal controls. **3**

The first description is an example of the second line of defense. The second description is an example of the first line of defense. The third description is an example of the third line of defense.

True/False: Unlike traditional risk management, enterprise risk management (ERM) includes not only the potential for loss but the potential for taking advantage of an opportunity.

A. True

B. False

This statement is true. ERM also works to improve the overall risk-return profile of an organization and proposes that risk management is every employee's responsibility.

A risk management framework is a set of components and principles that supports risk management throughout an organization. Match each statement with the correct framework by typing the correct number choice in the blank.

1. ORSA ERM Framework
2. COSO ERM Framework
3. ISO 31000 Standard

A. Five interrelated components, including governance and culture; strategy and objective setting; performance; review and revision; and information, communication and reporting are supported by a set of twenty principles. **2**

B. This international standard lists eight principles believed to be crucial for a company to successfully manage its risk exposures. **3**

C. Each U.S. insurer is required to maintain and continually assess its risk management framework and solvency position in an annual summary. **1**

The first statement describes the COSO ERM Framework. The second statement describes the ISO 31000 Standard. The third statement describes the ORSA ERM Framework.

A risk management strategy that involves holding an asset with characteristics that counterbalance one or more of the risks in the investor's risk array is known as

A. diversification
B. hedging
C. cash-flow matching
D. duration matching

Holding two assets with offsetting risk characteristics is a simple example of hedging.

The ALM report that specifies the details of all investment portfolio transactions is known as the

A. duration gap report
B. Actuarial Opinion and Memorandum (AOM)
C. crediting-rate resolution
D. investment activity report

This report is typically the most detailed and most frequently produced of all reports in a formal ALM system.

Courser Life Insurance tracks risk exposures and management activity using metrics that indicate the level of operational risk exposures at a given point of time in order to help the company forecast future occurrences and take timely action. This type of tool is a

A. key risk indicator (KRI)
B. risk map
C. control self-assessment
D. loss-incident database

By monitoring KRIs, Courser can determine if the company's operational risk exposures are within its stated risk tolerance.

Chapter 3 Practice Questions

Chapter 3

1. 3
2. 4
3. 1
4. 3
5. 1
6. 2
7. 4
8. 4
9. 3
10. 1
11. 1
12. 4

Chapter 4

Financial modeling plays a large role in product development. How do you think insurers use financial models? (Choose all that apply.)

- **A. To estimate future cash inflows and outflows**
- **B. To estimate future values for assets, reserves, capital, and expenses**
- **C. To determine the value of an insurance company, new product, or product line**
- **D. To evaluate how future economic and regulatory environments might affect an insurer's financial health**
- **E. To analyze risks that threaten an insurer's solvency**

Insurers use financial modeling for all of these purposes. Let's learn more.

Select the term that correctly completes each statement. An insurer is modeling the effect of investment earnings on the interest-crediting rate for a proposed annuity. As investment earnings increase, the interest-crediting rate increases. In this model, the investment earnings are an example of an (**input** / **output**) and a/an (**dependent variable** / **independent variable**).

A. input / dependent variable
B. input / independent variable
C. output / dependent variable
D. output / independent variable

Changes in an independent variable, in this case the investment earnings, influence the behavior of a dependent variable, which in this case is the interest-crediting rate.

Insurers typically derive financial model inputs from which sources? (Choose all that apply.)

- **A. Actuarial assumptions**
- **B. Internal and industry experience data**
- **C. Regulatory requirements**
- **D. Estimates of possible future conditions**

Insurers use all of these sources for financial model inputs. The accuracy of the inputs affects the success or failure of new and existing products.

Chevalier Life Insurance is modeling a new product. For one key variable, Chevalier applies an assumption that is selected randomly from a specified statistical distribution applied across multiple simulations or scenarios. What type of assumption is Chevalier using for this variable?

A. Fixed
B. Dynamic
C. Stochastic

Analysts use stochastic assumptions when variables are unknown and cannot be easily modeled using a dynamic formula.

Assumptions dictated by regulation or by policy or contract terms are typically

A. fixed assumptions
B. dynamic assumptions
C. stochastic assumptions

Fixed assumptions are usually determined by regulations or by contract or policy terms.

Quality data relies on a number of characteristics. One of these characteristics is the degree to which information gathered through data analysis meets the needs of users. This data characteristic is known as

A. appropriateness
B. accuracy
C. **relevance**
D. coherence

Appropriateness, accuracy, and coherence are all important characteristics for quality data, but if data does not meet the needs of its users, the data lacks relevance.

True/False: Experience data provides insurers with valuable information about how financial variables behaved in the past and how these variables can be expected to behave in the future if future conditions do not follow historical trends.

A. True
B. False

This statement is false. Experience data provides information about how variables will behave if future conditions remain stable.

The process of estimating values outside of a known range on the basis of other values derived from direct observation is known as

A. trend analysis
B. an experience study
✓ **C. extrapolation**

Extrapolated values are expected to follow the characteristics and behaviors of known values.

True/False: When using deterministic modeling, one potential risk is that a poorly constructed model can produce greatly distorted outcomes and lead to false confidence in the results.

A. True
B. False

This statement is false. The risk described is inherent to stochastic modeling, which creates a large number of scenarios, conducts numerous process iterations as needed, and produces output data that can be described in the form of a probability distribution. Even a small error, if magnified over the course of thousands of model iterations, can be greatly magnified and create greatly distorted outcomes.

Select the term that correctly completes each statement. Two true statements about deterministic and stochastic modeling are that (**deterministic** / **stochastic**) modeling results do not automatically account for probability and risk, and that (**deterministic** / **stochastic**) modeling can evaluate input and output values that are outside the range of real-world observations.

A. Deterministic / deterministic
B. Deterministic / stochastic
C. Stochastic / deterministic
D. Stochastic / stochastic

Because randomness is integral to stochastic modeling, stochastic modeling is more appropriate for considering probability and risk and evaluating values that have not yet been observed.

True/False: Optimization models typically produce results in the form of single-value estimates.

A. True

B. False

That's correct! This statement is true. Both deterministic and optimization models produce single-value estimates known as point estimates. Stochastic models provide results in the form of probability distributions, which include both data values and the probability of observing each value.

True/False: The two portions of a normal curve known as tails fall within one standard deviation on either side of the mean.

A. True

B. False

This statement is false. The tails are the portions of the normal curve that extend beyond three standard deviations on either side of the mean.

True/False: Most real-world observations are distributed normally; that is, they create a normal curve.

A. True
B. False

This statement is false. Most real-world observations are non-normal distributions, in which the number of values on one side of the mean is greater than the number of values on the other side of the mean.

True/False: In a non-normal distribution, the mean is not generally equal to the median and mode.

A. True
B. False

This statement is true. The mean is generally equal to the median and mode in a **normal** distribution.

Insurers typically measure the severity of tail risk by calculating the conditional tail expectation (CTE), which is

A. a measure of the dispersion of values in a data set around the mean of the data set

✓ **B. the average of all values within a specified range of the probability distribution**

C. a statistical parameter that describes the lack of symmetry in a probability distribution

D. a statistical parameter that describes the shape of a probability distribution

To measure the severity of tail risk in a distribution, insurers typically compare the CTE with some measure of profitability such as internal rate of return.

True/False: Scenario testing for financial modeling generally involves testing a mix of optimistic, moderate, and pessimistic scenarios with at least one worst-case scenario.

A. True

B. False

This statement is true. Scenario testing involves a mix of scenarios so that insurers can better estimate the likelihood and potential impact of both optimistic and pessimistic outcomes.

True/False: Sensitivity analysis measures the amount of the change in a dependent variable created by a change in an independent variable.

A. True
B. False

This statement is false. Scenario testing measures the amount of change in a dependent variable created by a change in an independent variable. Sensitivity analysis measures how much change in the independent variable is necessary to create a change in the dependent variable.

Chapter 4 Practice Questions

Chapter 4

Chapter 5

True/False: New products always hold more risk for an insurance company than older, well-established products.

A. True
B. False

This statement is false. It's true that new products carry a certain amount of risk because an insurer doesn't have the same history and experience for these products compared with existing, similar products. In addition, when developing a new product a company incurs new costs while perhaps missing out on a chance to develop an alternative product that might have been more profitable. However, if an existing product does not address current and/or future needs, is not timely, or is not competitive, the existing product can be more risky to keep than developing a new one. Let's learn more about insurers' new product considerations.

Blue Hawk Financial Company generally employs a new product strategy that involves offering previously unknown products. Blue Hawk's strategy is commonly known as

A. cost leadership
B. focused differentiation
C. **first mover**
D. fast follower

A first mover strategy involves attempting to be the first to offer a particular product or service.

True/False: Most insurers employ only one product development strategy for all of their product lines.

A. True
B. False

This statement is false. If a company has the resources and knowledge to support multiple strategies, it can offer a more diverse range of products to a more diverse market. This approach makes it more likely that even when one product is underperforming, other product lines may be doing well.

Select the term that correctly completes each statement. Shelf life refers to how long an insurer can offer a product in the marketplace before it becomes obsolete and needs to be revised, repriced or retired. In general, (**whole life** / **term life**) insurance products tend to have a shorter shelf life.

A. whole life
B. term life

Indexed life insurance products also generally have a shorter shelf life, while life insurance products with riders tend to have a longer shelf life.

Vibrant Insurance employs a product management group that performs hands-on development of a new product. This group includes representatives from marketing, actuarial, underwriting, contract administration, investments, IT, customer service, legal, and accounting areas. This group is known as a

A. marketing committee
B. risk committee
✓ **C. product development team**

Product development is a vital activity for a company, and requires the efforts of a cross-functional team that represents a large variety of company functions.

True/False: When a company creates a product that is new to the market or the company, the filing process often takes longer than it would if the company modified an existing product.

A. True

B. False

This statement is true. The more innovative the product, the more time it typically takes for regulators to be satisfied that the new product is fully compliant.

True/False: During the idea screening process, a company searches for new ideas by conducting market research, engaging in special projects, and monitoring its own and its competitors' products.

A. True
B. False

This statement is false. This statement describes the idea generation process. During idea screening, the product development team quickly and inexpensively evaluates new product ideas to separate workable ideas from those that have little or no potential.

Deep Ocean Insurance is determining whether it has the capability to take a new product to market. During this process, the company looks at its operational and technical abilities to see whether Deep Ocean can structure the proposed product to be competitive and profitable, and whether the insurer's current resources, employees, systems, and technological capacity can support the product. This information indicates that Deep Ocean is currently working on a

A. product proposal
B. feasibility study
C. market analysis
D. marketing projection

To evaluate whether a product can meet its objectives, the feasibility study considers information gathered from other processes such as the market analysis.

Chapter 5 Practice Questions

Chapter 5

1. 1
2. 2
3. 2
4. 4
5. 2
6. 2
7. 4
8. 1
9. 4
10. 3

Chapter 6

We've talked about how risk affects a company's decisions during product development. Which stage of the product development process do insurers usually consider the most important in terms of managing risk?

A. Technical product design

B. Product introduction

C. Product monitoring, evaluation, and feedback

Insurers generally consider technical product design the most important phase of product development, in terms of managing risk. Let's learn more.

True/False: In determining a product's financial design, an insurer incorporates product components that must meet the valuation standards specific to the actuarial profession, such as the Actuarial Standards of Practice (ASOPs) set by the Actuarial Standards Board (ASB).

A. True

B. False

This statement is true. The ASOPs are an example of external standards for financial design.

True/False: In general, experience data based on past trends has very high credibility, because trends are likely to continue over a long future period.

A. True
B. False

This statement is false. Past trends have limited credibility because over a long future period, a trend is likely to cease or be supplanted by another trend.

The death benefit for a specific block of policies is $50,000,000. The estimated mortality rate for the group of insureds is 3%. What is the projected cost of the block's death benefits for that year?

A. $1,500,000
B. $16,666,667
C. $50,000,000
D. $150,000,000

The projected cost of the block's death benefits is found by multiplying the potential benefit amount payable by the probability that the benefit will be payable ($50,000,000 x 0.03 = $1,500,000).

Which of the of the following product design features is NOT likely to increase policyholder behavior risk?

A. Provisions for surrenders and withdrawals
B. Scheduled premiums
C. Options for reinstatement and conversion
D. Secondary guarantees

Scheduled premiums are not likely to increase policyholder behavior risk, but flexible premiums, which allow customers to select the timing and amount of premium payments, can make it harder to predict the timing and amount of premium income.

Select the term that correctly completes each statement. Insurers credit investment returns and interest to customer accounts differently, depending on the product. For example, for fixed whole life insurance, the cash value grows at a (**guaranteed fixed rate** / **rate that reflects the actual investment results**). For a variable annuity, the accumulation value grows at a (**guaranteed minimum crediting rate** / **rate that reflects the actual investment results**).

A. guaranteed fixed rate / guaranteed minimum crediting rate
✓ **B. guaranteed fixed rate / rate that reflects the actual investment results**
C. rate that reflects the actual investment results / guaranteed minimum crediting rate
D. rate that reflects the actual investment results / rate that reflects the actual investment results

Insurers typically credit fixed products with a guaranteed rate, and credit variable products with the actual investment results.

True/False: Hedge costs are not affected by a volatile market, because costs are determined when the offsetting types of securities are chosen.

A. True
B. False

This statement is false. Hedge costs are expenses for trading and holding derivative securities. In a volatile market, the hedging program may make adjustments so frequently that the hedge costs quickly increase.

Which of the following characteristics may cause premium structures for individual life insurance products to vary? (Choose all that apply.)

- **A. Insureds' risk characteristics**
- **B. Policy face amount**
- **C. The company's financial results for the product**
- **D. Contract language that allows the company to adjust product charges to reflect the company's anticipated future interest and mortality**

All of these characteristics influence premium structures for individual life insurance.

Select the term that correctly completes each statement. To ensure that a new product is fully supported, an insurer typically categorizes billing as (**Day 1** / **Day 2**) functionality and commission payment as (**Day 1** / **Day 2**) functionality.

- **A. Day 1 / Day 1**
- B. Day 1 / Day 2
- C. Day 2 / Day 1
- D. Day 2 / Day 2

An insurer must be able to bill customers and pay commissions as soon as a product is launched.

Which of the following corrective actions can an insurer take when sales of a new product are poor? (Choose all that apply.)

- **A. Providing new training for sales agents**
- B. Pulling the product from the market and replacing products already issued
- **C. Changing the product's underwriting guidelines**
- **D. Using a different distribution system**

While most of these actions are potential corrective actions for a product with poor sales, an insurer cannot replace products already issued. The insurer can, however, pull the product from the market while determining how best to service the products already issued.

Select the term that correctly completes each statement. An example of an adverse deviation is when an insurer's actual benefit payments are (**greater** / **less**) than the benefit payment assumptions used in product design.

A. greater
B. less

An adverse deviation creates a decrease in actual profitability compared to assumed profitability. If the insurer paid less benefits than it had assumed, then the insurer has experienced a favorable deviation.

Chapter 6 Practice Questions

Chapter 6

Chapter 7

Select the terms that correctly complete the statement. An insurer's product design decisions are based on the concept of the time value of money, which means that the value of a sum of money changes over time if invested with positive interest. According to this principle, the value of a sum of money received in the present would be (**lesser** / **greater**) than the value of the same sum of money received five years from now.

A. lesser
✓ **B. greater**

Assuming that interest rates remain positive, the sum received earlier is worth more than the sum received later because the earlier sum has more opportunity to earn interest.

True/False: Life insurers typically invest general account funds in high-quality bonds and other conservative assets because policyholders and contract owners bear the investment risk associated with the general account.

A. True
B. False

This statement is false. Insurers invest general account funds in conservative assets because the **insurance company** bears the investment risk associated with the general account.

When investment earnings are expressed as a percentage of the principal, they are called

A. compound interest
B. dividends
C. the rate of return

The rate of return shows how much an investment has earned in comparison to the principal. If an asset earns more than one form of earnings, the total rate of return is determined by summing all the earnings and dividing by the principal.

Select the terms that correctly complete the statement. When calculating the present value (PV) of a sum money, an increase in the number of (**compounding periods** / **discounting periods**) results in (**a decrease** / **an increase**) in the PV of the sum.

A. compounding periods / a decrease
B. compounding periods / an increase
✓ **C. discounting periods / a decrease**
D. discounting periods / an increase

A greater number of discounting periods means that a sum gains value more quickly over time, and therefore a smaller amount of money is needed in the present to achieve the goal of a specific sum of money in the future.

Ying Guo invests $200,000 in an asset that pays 2% interest, compounded yearly. Assuming the interest rate remains the same throughout, what would the FV of Ms. Guo's investment be in five years? An FVIF table is provided.

Periods (*n*)	Interest rate (*i*)	
1%	2%	5%
1	1	1
1.010	1.020	1.050
2	2	2
1.020	1.040	1.103
3	3	3
1.030	1.061	1.158
4	4	4
1.041	1.082	1.216
5	5	5
1.051	1.104	1.276

A. $204,000
B. $210,000
C. $220,600
✓ **D. $220,800**

We determine the FV of this sum as follows: $200,000 × FVIF (5, 2%) = $200,000 × 1.104 = $220,800.

Austen Hardwick intends to invest in an asset that pays 1% simple interest, and he wants his investment to be worth $500,000 in five years' time. By calculating the PV of this sum, how much money would Mr. Hardwick have to invest in this asset? A PVIF table is provided.

Periods (*n*)	Interest rate (*i*)	
1%	2%	5%
1		
0.990		
0.980		
0.952		
2		
0.980		
0.961		
0.907		
3		
0.971		
0.942		
0.864		
4		
0.961		
0.924		
0.823		
5		
0.951		
0.906		
0.784		

✓ A. **$475,500**
B. $476,000
C. $495,000
D. $495,500

We determine the PV of this sum as follows: $500,000 × PVIF (1%, 5) = $500,000 × 0.951 = $475,500.

Tourmaline Financial Services offers a product with a guaranteed interest-crediting rate of 2%. The rate of return on Tourmaline's investments that support this product is 4%. The interest spread for this product is

A. 2%

B. 4% 4% – 2% = 2%

C. 6% 4% – 2% = 2%

D. 8% 4% – 2% = 2%

The product's interest spread is equal to the investments' rate of return – the product's guaranteed interest-crediting rate, or **2%** [4% – 2% = 2%].

According to the prospective valuation method, the formula for calculating the cash value of a fixed life insurance product is stated as:

A. future value of present benefits + future value of present premiums
B. future value of present benefits – future value of present premiums
C. present value of future benefits + present value of future premiums
✓ **D. present value of future benefits – present value of future premiums**

The prospective valuation method looks at a product's future cash flows.

True/False: Accumulation units represent ownership shares in a fixed account in a variable deferred annuity.

A. True
B. False

This statement is false. Accumulation units represent ownership shares in subaccounts in a variable deferred annuity.

Spread compression is most likely to occur in an environment of

A. rising market interest rates
B. falling market interest rates
C. sustained low market interest rates

An insurer's interest rate is likely to narrow when customers demand higher interest rates that are competitive with higher market interest rates.

Tourmaline Financial Services creates a product that is projected to earn $500,000 over five years. Tourmaline calculates the present value of the product's total earnings over that period as $379,000. Tourmaline's initial investment in the product is $250,000. The product's net present value over the five-year period is

A. $121,000
B. $129,000
C. $250,000

The product's net present value is equal to the product's total present value for the period minus the product's initial investment, or $129,000 [$379,000 – $250,000 = $129,000].

Select the terms that correctly complete the statement. Using internal rate of return (IRR) as a guideline, a company is likely to reject a proposed product if the projected IRR is (**greater than** / **less than**) the product's (**risk-adjusted IRR** / **cost of capital**).

A. greater than / risk-adjusted IRR
B. greater than / cost of capital
✓ **C. less than / risk-adjusted IRR**
D. less than / cost of capital

Insurers use risk-adjusted IRR to take into consideration the level of risk in a proposed product's cash flows.

True/False: The profit margin for a life insurance or annuity product with multiple premiums is calculated by dividing the future value of the product's profits by the future value of the product's sales revenue.

A. True

B. False

This statement is true. Future value calculations are necessary because the insurer can invest some premium income to generate further income while the product is still in force.

Chapter 7 Practice Questions

Chapter 7

1. 2
2. 2
3. 4
4. 1
5. 2
6. 2
7. 3
8. 1
9. 1
10. 4
11. 1
12. 3
13. 2
14. 4

Chapter 8

There are many types of mortality tables because many factors can affect mortality: age, sex, family medical history, and more. Which of the following statements are true about mortality risk characteristics? (Choose all that apply.)

- ✓ **A. A resident of Japan will generally live longer than a resident of the United States.**
- ✓ **B. A person who has been recently underwritten for a life insurance policy will generally live longer than a person who has not been recently underwritten for a policy.**
- C. A person who owns a life insurance policy on her own life will generally live longer than the annuitant of a personal annuity.

The first and second statements are true. However, annuitants tend to live longer than life insureds. We'll explore how these factors inform the types of mortality tables that insurers use.

The number of deaths that actually occur in a given cohort is known as

- ✓ **A. mortality experience**
- B. experience mortality rates
- C. basic mortality rates

Experience mortality rates are based on historical experience, and basic mortality rates have been smoothed to minimize any extreme values.

Mortality that has been adjusted to reflect a hypothetical or assumed number or rate of deaths in a given group of people is known as

- A. expected mortality
- ✓ **B. assumed mortality**

Actuaries modify expected mortality rates, which are the statistically likely mortality rates, to create assumed mortality rates.

Metric Life Insurance is designing a mortality table for women with a base cohort of 100,000 members. At the age of 49, the number of living members in the cohort is 95,802. At the age of 50, the number of living members in the cohort is 95,529. The survival rate of the cohort at age 50, calculated to three decimal points, is

A. 0.003
B. 0.045
C. 0.955
✓ **D. 0.997**

The survival rate for a given year is calculated by dividing the number of survivors (95,529) by the size of the cohort (95,802), as follows: (95,529 ÷ 95,802 = **0.997**).

One type of mortality table is inherently more conservative because it always has a safety margin built into its rates. This type of table is a/an

A. life insurance mortality table
B. annuity mortality table
C. basic mortality table
D. valuation mortality table

Many of the values in a valuation mortality table are prescribed or determined by regulators.

A mortality table that shows the mortality rates of people who have recently been underwritten for life insurance policies is known as a/an

A. select mortality table

B. ultimate mortality table

People whose risk characteristics have been recently evaluated are likely to have better mortality risk characteristic for a period following the evaluation.

A product design team working for Metric Life Insurance anticipates that recent medical advances may cause mortality rates to decline slightly in the near future. To anticipate this potential change in mortality, the team decides to adjust their mortality tables by multiplying the mortality rates by 80 percent. This adjustment is an example of the

A. projection method

B. setback method

The projection method multiplies mortality rates by a factor smaller than 100 percent if mortality rates are expected to decline, or by a factor larger than 100 percent if mortality rates are expected to increase.

Comet Life Insurance is designing a one-year term life insurance product. Comet's product-specific mortality tables, given a starting cohort of 100,000 women, list the mortality rate for 45-year-old women as 0.0031. Therefore, Comet estimates that the mortality cost for a policy with a $200,000 face amount issued to a 45-year-old woman would be

A. $310
B. $620
C. $199,380

The mortality cost for the one-year term life policy is calculated as the probability of dying multiplied by the average face amount, or (0.0031 × $200,000 = **$620**).

The estimated benefit cost for a $5,000 annual income payment on a life annuity issued to a male aged 70, assuming a mortality rate of 0.0204 for males aged 70, is

A. $102.00
B. $510.00
C. $979.60
D. $4,898.00

The benefit cost for a $5,000 annual income payment on a life annuity issued to a male aged 70 is calculated as the probability of living multiplied by the average annual income payment, or [(1 – 0.0204) × $5,000 = 0.9796 × $5,000 = **$4,898.00**].

True/False: A positive mortality margin for a life annuity payout results from applying a lower mortality rate than would be found in a basic mortality table.

A. True

B. False

This statement is true. By assuming that more annuitants will survive to collect benefits, the insurer prepares for potential low-mortality scenarios where the insurer's cost of benefits is high.

Chapter 8 Practice Questions

Chapter 8

Chapter 9

As if it weren't complicated enough to design products while making assumptions for factors such as mortality and market performance, insurers also must make assumptions for how their customers use their products. Which of the following statements regarding policyholder behavior is *correct*?

A. A high lapse rate always reduces profitability for a life insurance product.

✓ **B. Paying flexible premiums after the first premium is an example of a policyholder behavior that can negatively affect a product's performance.**

C. Policyholders can always be trusted to exercise an ownership option, such as selling a contract, when the performance of that option is more advantageous to the policyholder than the benefits under contract itself would be.

D. Due to a high degree of randomness, insurers model policyholder behavior using stochastic modeling in most circumstances.

There are a wide range of policyholder behaviors that can affect a product's performance, from lapses and surrenders to the timing of premium payments. We'll look at the impact of these behaviors later in this chapter.

Select the terms that correctly complete the statement. Executive salaries are an example of a/an (**direct** / **indirect**) cost and a (**fixed** / **variable**) cost.

A. direct / fixed
B. direct / variable
C. **indirect / fixed**
D. indirect / variable

Executive salaries cannot be traced to any single product, and they remain relatively constant regardless of the number of contracts or policies sold.

True/False: A cost accounting system is useful in gathering an insurer's internal expense data for the purposes of cost control and accurate product design.

A. True
B. False

This statement is true. A cost accounting system enables the process of cost accumulation, which provides detailed internal expense data.

True/False: Insurers typically calculate unit costs for fixed expenses as a percentage of an important contractual amount, such as the contract's death benefit.

A. True
B. False

This statement is false. Insurers typically calculate unit costs for fixed expenses as a flat amount per contract, and unit costs for **variable** expenses as a percentage of an important contractual amount.

True/False: Under marginal costing, indirect expenses are not allocated to products.

A. True
B. False

This statement is true. Full costing counts both direct and indirect expenses, while marginal costing counts only direct expenses.

True/False: For the purposes of cost allocation, an indirect expense is one example of a cost object.

A. True
B. False

This statement is false. Cost allocation is the process of matching indirect expenses to cost objects such as product lines, specific products, specific customers, and so on.

Select the terms that correctly complete the statement. In 2020, Vessel Life Insurance records a commission payment to a sales agent, Ms. Truong. The payment is equal to 4% of the premiums received for a policy that Ms. Truong sold to a customer in 2018. In 2019, Ms. Truong also stopped representing Vessel. This payment is an example of a (**first-year** / **renewal**) commission and a (**vested** / **nonvested**) commission.

A. first-year / vested
B. first-year / nonvested
C. renewal / vested
D. renewal / nonvested

Because this contract is both a renewal commission and a vested commission, Ms. Truong can continue to receive commission payments after the first year even if she no longer represents Vessel.

Select the terms that correctly complete the statement. The (**lapse rate** / **surrender rate**) for a block of life insurance policies is the ratio of business in force that terminates for nonpayment of premium during a given period to the total business in force at the beginning of that period.

A. lapse rate

B. surrender rate

Both lapse rates and surrender rates are important for calculating a product's persistency.

When modeling potential policyholder behavior, if one or more of the underlying risks in the assumptions are nondiversifiable, the preferable modeling structure would be

A. fixed
B. dynamic
C. **stochastic**

Stochastic modeling is also preferable in modeling policyholder behavior when the volatility of outcomes is unknown or high, or when the company lacks an appropriate hedge for a given product risk.

The relative size of a margin is likely to be *larger* if

A. marketplace competition is weak

B. investment risk to the insurer is low

C. investment risk to the customer is high

D. the contract gives the customer shorter-term interest-rate guarantees

A margin is likely to be larger if marketplace competition is weak, and smaller if marketplace competition is strong, because a competitive market tends to drive prices down.

Select the terms that correctly complete the statement. Surrender charges are an example of (**administrative charges** / **transaction charges**).

A. administrative charges
✓ **B. transaction charges**

Surrender charges are assessed only if a policyholder or contract owner chooses to surrender the contract.

Select the terms that correctly complete the statement. A (**front-end charge** / **back-end charge**) is a sales charge assessed when an investor sells a security.

A. front-end charge
✓ **B. back-end charge**

Variable life insurance products are one type of product that may contain back-end charges.

Which of the following is *not* an example of a design adjustment that can help in mitigating risks for a fixed or fixed-rate product?

A. Designing a lower minimum guaranteed interest-crediting rate, where regulations permit.
✓ **B. Lengthening the guarantee period for minimum guaranteed interest-crediting rates.**
C. Decreasing current interest-crediting rates within allowable limits.
D. Limiting withdrawals of account values by monetary amount, frequency, and percentage of account value.

All of these design adjustments can help in mitigating risks *except* **lengthening the guarantee period for minimum guaranteed interest-crediting rates**. To control risks, an insurer would want to shorten the guarantee period.

Chapter 9 Practice Questions

Chapter 9

Chapter 10

Assume that a life insurance product offers all of the benefits below. The product's design must incorporate the cost of which benefits? (Choose all that apply.)

- ✓ **A. Nonforfeiture values**
- ✓ **B. Death benefits**
- ✓ **C. Benefits from policy riders**
- ✓ **D. Cash surrender values**

The life insurance product's design must incorporate the costs of all of these benefits. Let's review the key life insurance benefits before we get into cost calculations.

True/False: When a policyowner chooses to surrender a life insurance policy with an accumulated cash value, the insurer pays out the policy's nonforfeiture value.

A. True
B. False

This statement is false. In the case of a policy surrender, the insurer pays out the cash surrender value to the policyowner.

Under which life insurance policy rider does the insurer agree to pay a portion of the policy's face amount to the policyowner if the insured suffers from a specified disease?

A. Accidental death benefit
B. Critical illness benefit
C. Long-term care insurance benefit
D. Waiver of premium for disability benefit
E. Waiver of premium for payor benefit

Under the critical illness benefit, which is a type of accelerated death benefit, the insurer pays a portion of the policy's face amount to the policyowner.

Select the terms that correctly complete the statement. Typically, multiyear term life insurance policies are purchased by (**single** / **level**) premiums and whole life insurance policies are purchased by (**level** / **flexible**) premiums.

A. single / level
B. single / flexible
C. **level / level**
D. level / flexible

Typically, level premiums purchase multiyear term life insurance and whole life insurance policies.

To determine the cost of benefits for a block of one-year term life insurance policies, actuaries primarily focus on estimating the block's mortality cost.

A. True

B. False

This statement is true. Because they do not need to calculate nonforfeiture values for one-year term life policies, actuaries primarily focus on mortality cost when determining the cost of benefits. Finding the mortality cost for a block of one-year term life policies involves finding the present value of the block's future death benefits.

Which issues must be addressed by the cost of benefits calculations for multiyear term life insurance products but are not generally involved in the calculations for one-year term life products? (Choose all that apply.)

A. Flexible premiums
B. Level annual premiums
C. Lapse rates

Multiyear term life insurance products must address level annual premiums and lapse rates. Neither one-year nor multiyear term life insurance products have to account for flexible premiums.

True/False: To calculate the level annual premium (LAP) for a block of multiyear term life insurance policies, the insurer must find a set of equal annual premium payments for which the sum of the present values is equivalent to a given single premium.

A. True

B. False

This statement is true. The insurer applies present value interest factors (PVIFs) to the future values of the death benefits, finds the single premium, and uses PVIFs and the single premium to find the LAP.

True/False: When calculating the present value of the cost of benefits for whole life insurance products, actuaries must account for death benefits for a limited term and for cash value and surrender benefits.

A. True
B. False

This statement is false. When calculating the cost of death benefits for whole life products, actuaries must consider the entire time a policy remains in force during the lifetime of the insured, rather than for a limited number of years.

The type of universal life insurance product that offers certain principal value and earnings guarantees, but also offers the possibility of additional earnings by linking the policy's cash value to a published index is known as

A. Basic fixed universal life insurance
B. Indexed universal life insurance
C. Variable universal life insurance

Indexed universal life insurance offers the potential for additional gains in a policy's cash value by linking it to an index, such as the S&P 500.

The universal life insurance death benefit option in which the death benefit equals the policy's face amount plus the premiums paid is known as

A. Option A
B. Option B
C. **Option C**

Option C's death benefit equals the face amount plus premiums paid. Option A's death benefit equals the face amount, and Option B's death benefit equals the face amount plus the cash value.

Let's Review

Two monthly mortality rates apply to universal life insurance products. The monthly mortality rate that represents the expected mortality rate plus a mortality margin is called the

A. current mortality rate

B. guaranteed maximum mortality rate

The current mortality rate is generally lower than the guaranteed maximum mortality rate, which sets an upper limit on the mortality charge.

If the annual premium rate for a block of insurance policies is $3 per $1,000 of coverage, then what is the annual premium payment for a policy in the block that has a face value of $100,000?

A. $3
B. $30
C. **$300**
D. $3,000

The policy has 100 units of coverage, found as $100,000 ÷ $1,000. Therefore, the policy's annual premium payment is $300, found as $3 × 100.

Chapter 10 Practice Questions

Chapter 10

Chapter 11

In an annuity contract, the person whose life is used to determine the periodic income payments received from the insurance company is the

A. contract owner
B. annuitant
C. payee

The projected lifetime of the annuitant is one of the most critical factors in annuity product design.

Select the terms that correctly complete the statement. Deferred annuities provide the opportunity for a contract's invested premiums to grow during the (**accumulation** / **payout**) period. If the contract is annuitized, the maturity date marks the beginning of the (**accumulation** / **payout**) period.

A. accumulation / accumulation
B. accumulation / payout
C. payout / accumulation
D. payout / payout

The accumulation period ends either at the beginning of the payout period, or if the owner decides to surrender the contract.

True/False: For variable annuities, the insurer decides how to invest premiums and bears the investment risk.

A. True
B. False

This statement is false. The insurer decides how to invest premiums (and bears the investment risk) for *fixed* annuities. In addition, the insurer supports a fixed annuity's contractual guarantees through its general account assets. A variable annuity's contract owner selects subaccounts in an attempt to achieve greater investment growth. A variable annuity's accumulated value fluctuates with the performance of the selected subaccounts; therefore, the contract owner directly bears the investment risk associated with subaccount choices.

True/False: One of the steps in estimating the insurer's cost of future deferred annuity death benefits is applying an appropriate mortality rate to the remaining number of contracts within a given contract year.

A. True

B. False

This statement is true. In addition, insurers use a different set of mortality data for annuity products than they do for life insurance products.

Select the terms that correctly complete the statement. For deferred annuities, surrender rates are usually the (**highest** / **lowest**) during the early years of the accumulation period. For partial withdrawals, withdrawals in excess of the deferred annuity contract's allowable withdrawal rate are subject to separate (**shock lapses** / **surrender charges**).

A. highest / shock lapses
B. highest / surrender charges
C. lowest / shock lapses
✓ **D. lowest / surrender charges**

Surrender rates for deferred annuities tend to spike after the end of the contract's surrender charge period.

Select the terms that correctly complete the statement. The type of payout options that provide regular payments of either a designated amount or for a designated period and are not linked to any life expectancy or mortality risk are known as (**guaranteed** / **life**) annuity payout options. The payout option in which the insurer pays the same amount on a regular basis until the contract value is exhausted is called the fixed (**amount** / **period**) option.

A. guaranteed / amount
B. guaranteed / period
C. life / amount
D. life / period

Under these options, the insurer will pay the contract's entire accumulated value in payments of a fixed amount, for whatever period of time is necessary until the contract value is exhausted.

The life annuity payout option in which the insurer pays the beneficiary the difference if the annuitant dies *before* the total of the periodic income payments already made equals the amount paid for the annuity is called a

A. single life annuity
B. single life annuity with period certain
C. single life with refund annuity
D. joint life annuity
E. joint and survivor annuity

Under the single life with refund annuity payout option, the insurer guarantees to pay a refund to the beneficiary if, at the time of the annuitant's death, the total amount of periodic income payments made by the insurer is less than the amount the contract owner paid for the annuity. The beneficiary receives the difference of the premiums paid and the periodic income payments already made to the annuitant.

Select the terms that correctly complete the statement. Insurers estimate the cost of lifetime payout option guarantees based on the life expectancies of the annuitants. In general, the insurer will make *more* periodic income payments than projected if the actual mortality rate among a population of annuitants is (**higher** / **lower**) than expected. If the insurer makes *fewer* periodic income payments than projected, then the cost to the insurer will be (**higher** / **lower**) than expected.

A. higher / higher
B. higher / lower
C. lower / higher
✓ **D. lower / lower**

If the actual mortality rate is **lower** than expected, then the insurer makes more periodic income payments than projected and the cost is higher than expected. However, if the actual mortality rate is higher than expected, then the insurer makes fewer periodic income payments than projected and the cost is **lower** than expected.

For fixed indexed annuities (FIAs), the indexed-crediting provision that specifies that the contract's values are not reduced if the linked index decreases in value during a measurement period is called a

A. cap
B. floor provision
C. participation percentage provision
D. return of premium provision
E. yield spread provision

A floor provision specifies that the contract's values are not reduced if the linked index decreases and typically guarantees that the index credit for the contract's term cannot be less than zero.

Insurers can use several methods to calculate the index credits to award to an FIA contract. One method compares the reference index's value at the start of the contract term to the value at the end of the term to determine what, if any, interest has accrued because of a change in the index. This method is called the

A. annual reset method
B. high water mark method
C. **point-to-point method**

Under this method, if the value of the index at the end of the term is higher than the value at the beginning of the term, the contract's accumulated value will earn index credits.

True/False: An insurer administers variable annuity guarantee riders within its separate accounts.

A. True
B. False

This statement is false. Because variable annuity guarantee rider benefits are guaranteed, the insurer administers such riders within its general account, as it does with fixed annuities.

The form of variable annuity guaranteed minimum death benefits that resets the contract's death benefit at periodic intervals, based on growth in the accumulated value, is called the

A. annually compounded death benefit
B. highest anniversary value death benefit
C. ratcheted death benefit

Under the ratcheted death benefit, the insurer resets the contract's death benefit at periodic intervals, with common reset periods in the 4-6 year range.

One type of variable annuity living benefit guarantees, for a specified period, a minimum protected value against which a contract owner may make annual withdrawals of a specified amount without charge, even if the contract's accumulated value falls below the protected value. This type of living benefit rider is a

A. guaranteed lifetime withdrawal benefit
B. guaranteed minimum accumulation benefit
C. guaranteed minimum income benefit
D. guaranteed minimum withdrawal benefit

A guaranteed minimum withdrawal benefit guarantees annual withdrawals for a specified period.

True/False: An annuity product's technical design accounts for financial components such as total cost of benefits, investment earnings, and operating expenses.

A. True

B. False

This statement is true. In addition, an insurer's total cost of benefits for an annuity equals the sum of the present value of each potential benefit multiplied by the expected probability that each benefit will be payable.

Chapter 11 Practice Questions

Chapter 11