

CHAPTER 3

Consumer Mathematics: Insurance

What will you learn?

- Risk and Insurance Coverage

Why study this chapter?

The knowledge on risk and insurance as a financial protection is very important for every individual as a preparation for the future. It is also very important in personal financial management because we might use a part of our income for insurance.

Do you know?

In Malaysia, the insurance industry is controlled and regulated by Bank Negara Malaysia under the Insurance Act 1996 which replaces the Insurance Act 1963. This act complies with the regulations of insurance and serves as basic legislation that controls the insurance business in Malaysia. Apart from this, this act empowers Bank Negara Malaysia to determine matters in accordance with the provisions of the act.



For more information:



bit.do/DoYouKnowChap3

WORD BANK



deductible
general insurance
life insurance
rate
co-insurance
coverage
policy
premium
risk

deduktibel
insurans am
insurans hayat
kadar
ko-insurans
perlindungan
polisi
premium
risiko



We often come across news and headlines in the media of families being affected by disasters such as flood, fire, theft and accidents. Have you ever thought that you and your family might face such a disaster in the future? If so, is your family ready for it?

If it happens to us, we would definitely have to bear the financial losses. Therefore, it is very important for you to understand the importance of insurance because insurance helps us to face uncertainties and losses.

3.1 Risk and Insurance Coverage

What is the meaning of risk and the importance of insurance coverage?

Risk

Do you know that every one of us is exposed to danger that might happen to us, our family or our assets?



Learning Standard

Explain the meaning of risk and the importance of insurance coverage, hence determine the types of life insurance and general insurance for protecting a variety of risks.

Info Bulletin

Important elements in the definition of risk:

- (i) Risk is unpredictable
- (ii) Risk involves loss

A road accident that injures the driver and passengers, damage of property in a fire, expensive medical bills due to critical illness and others may occur in life. It is certain that these incidents cause us to bear some losses. The fact that we are exposed to such losses and the uncertainty of whether these incidents could happen to us, create a risk in our lives. Therefore, in general, **risk** is the possibility of a disaster that cannot be avoided.

As a pupil, facing risks is unavoidable. The risks that you might face are meeting an accident on the way to school, getting injured in a football game or falling down the stairs while going to the library.

In spite of being careful and practising a healthy lifestyle, there are still some risks you might face. Hence, with insurance that is available to all ages, you will be given a financial protection if unfortunate events happen to you.

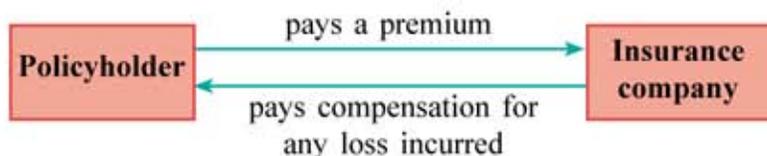
Critical Mind

Which of the following is the risk that can be measured by money? Discuss.

- (i) The risk in buying a second-hand car.
- (ii) The risk in investing in stock market.
- (iii) The risk of a motorcycle being stolen.

Insurance

Insurance is intended to transfer risks from individuals to insurance organisations. It is a contract signed between the insurance company and the insurance owner. Under this contract, the insurance company promises to pay compensation for the loss covered in the policy, in return for the premium paid by the policyholder.



The amount of compensation payable to the policyholder is only the amount of the loss suffered. This is because the key principle in the insurance system is to restore the financial position of the policyholder to the pre-loss condition, which is also known as the **principle of indemnity**. Therefore, the insurance principle will not allow the policyholder to gain profit from the insurance purchased.

Insurance cannot prevent a loss from occurring but can help to reduce financial burden borne by a policyholder in the occurrence of losses or accidents. This is because buying an adequate sum of insurance removes the uncertainty of financial loss in the occurrence of the loss insured.

What are life insurance and general insurance?

Insurance can be divided into two main types, namely life insurance and general insurance. Both of these insurances protect different risks.

Info Bulletin

Insurance company

The party that agrees to pay compensation for the losses of the agreed terms.

Policyholder (Insurance owner)

The individual who will claim and receive compensation for the losses.

Insurance contract

A policy and an evidence of an agreement made between the insurance company and the policyholder.

Premium

An amount of money payable by the policyholder to the insurance company.

Info Bulletin

Principle of indemnity:

Insurance companies will pay compensation to policyholders in the occurrence of a loss insured for an amount not exceeding the loss incurred, subject to the sum insured.

MIND MOBILISATION 1 Group

Aim: To determine the importance of insurance to cover various types of risks.

Steps:

1. Divide the class into several groups.
2. Each group has to search newspaper articles or online news related to disasters that have befallen an individual or a family.

3. Based on the situation in the news, identify the types of losses suffered and types of risks covered by insurance.

Situation	Type of loss suffered	Type of risk covered by insurance

4. Present your findings in a Gallery Walk.

Discussion:

Why is insurance important to policyholder?

The results of Mind Mobilisation 1 show that insurance is important in protecting different types of risks from accidental losses and can cause the policyholder to bear a financial loss.

Life insurance

Life insurance guarantees the payment of a stated amount of monetary benefits to the policyholder upon the death of the insured, or under other circumstances specified in the contract. The risks covered by life insurance are as follows:



The purpose of life insurance is to provide financial protection to family members who depend on the policyholder, when the policyholder dies. However, if the policyholder is alive but suffers from a total and permanent disability, the policyholder may receive compensation from the insurance company in accordance with the terms set out in his/her life insurance policy.

General insurance

General insurance provides coverage against any loss or damage incurred, apart from the risks covered by life insurance. There are many types of general insurance that cover a variety of risks.

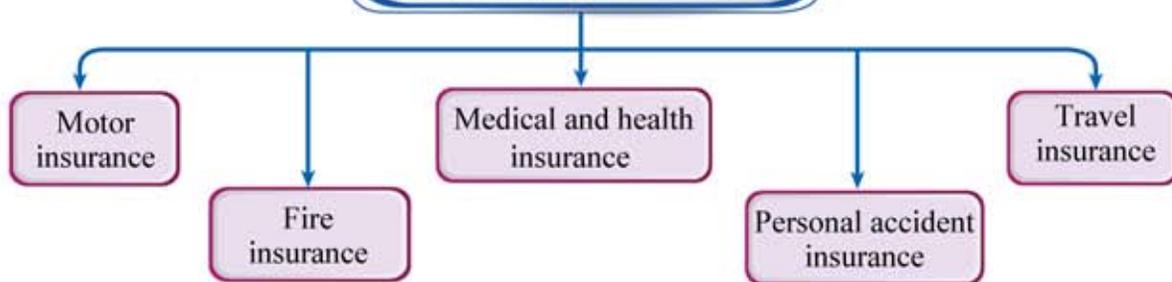


Actuary is an expert in managing and calculating risks in premium of insurance policy, annuity rate and others for an insurance company.



Will compensation be made if there is no loss incurred? Discuss.

Types of general insurance



Info Bulletin

Motor insurance is a compulsory insurance that every motor vehicle in Malaysia must have under the Road Transport Act 1987.

(i) Motor insurance

Motor insurance provides coverage against any loss or damage related to the use of a motor vehicle. The table below shows the four types of motor insurance policies that cover your vehicle.

Coverage \ Policy	Act	Third party	Third party, fire & theft	Comprehensive
Liability to third party due to injury and death.	Yes	Yes	Yes	Yes
Loss of property suffered by third party.	No	Yes	Yes	Yes
Loss to own vehicle due to accidental fire or theft.	No	No	Yes	Yes
Loss and damage to own vehicle due to accident.	No	No	No	Yes

A comprehensive policy provides a thorough protection compared to the other three policies as above. The similarity on these policies is to give a protection excluding the claims by the driver and passengers such as injury and death.

As an example, Agus was driving his car, with his friend, Faizal as a passenger. Agus lost control and knocked into another car driven by Devi. Agus, Faizal and Devi were injured, and Agus and Devi's cars were damaged.

Info Bulletin

In motor insurance,

- the first party → the driver (policyholder),
- the second party → the insurance company
- the third party → any other individuals that are involved in a accident caused by the driver, excluding the passenger

If Agus insured his car under the comprehensive policy, this policy will cover injury and car damage claimed by the third party, who is Devi and the loss and damage of Agus's car. However, the medical costs incurred by Agus and Faizal will not be covered.

Info Bulletin

Liability is the amount of debt that needs to be paid with money, goods or service.

(ii) Fire insurance

Fire insurance provides coverage against damage caused by fire, lightning and explosion that occur at home or business premise. Compensation will be paid by the insurance company to recover the policyholder's financial position, subject to the sum insured. For coverage other than fire, lightning and explosion, policyholder may incorporate additional coverages such as hurricane, flood, riot and others into the existing fire policy at an additional premium.

(iii) Medical and health insurance

Apart from the risk of death, you should also be aware of the risks of deteriorating health. This is because you may have to bear medical expenses such as hospitalisation and surgery costs. Some of the policies in this insurance are:

- hospitalisation and surgical insurance
- critical illness insurance
- disability income insurance
- hospital income insurance

Info Bulletin

Scan the QR code or visit bit.do/Chap3MHI for more information about medical and health insurance.



(iv) Personal accident insurance

Personal accident insurance provides coverage in the occurrence that the policyholder suffers a bodily injury, disability or death resulting directly from accident. This insurance is different from life insurance, and medical and health insurance.

Interactive Platform

Why is the medical and health insurance important even though the government provides medical and health services in government hospitals? Discuss.

(v) Travel insurance

Travel insurance protects policyholder against losses during travel whether by land, air or sea such as death and permanent disability, loss of luggage, passport and money, medical expenses and others.

The coverage period for most general insurance policies is one year or less than a year. The premiums are paid once only when you need the coverage of the policy.

Group insurance

Group insurance provides coverage to a group of individuals, typically employees in a company or pupils in schools and students in educational institutions.

- **Group insurance for organisation**

Financial protection is provided to employees of an organisation in the events of death, disability, hospitalisation and surgery under certain policy and coverage limit. With this insurance, the employees of the company will enjoy proper protection from their employer.

- **Group insurance for pupils**

Financial protection is provided to pupils in the events of death, paralysis, disability and wheelchair allowance under certain policy and coverage limit. For example, Ministry of Education Malaysia has implemented a protection scheme for pupils of government schools and government-aided schools under the *Takaful Pelajar Sekolah Malaysia* (TPSM) scheme.

Info Bulletin



mySalam
Perindungan Masyarakat

The mySalam national health protection scheme is an initiative started by the government which aims to provide 8 million Malaysian citizens with free takaful protection. Visit mysalam.com.my for more information.

Generally, the reasons you should get an insurance are as follows.

- ✓ As a financial aid to the family in the occurrence of your disability, critical illness or death
- ✓ Managing living expenses, debts and commitments in the event that you are unable to work
- ✓ Paying for high medical expenses
- ✓ As compensation for losses incurred

Self Practice 3.1a

1. Based on the situation below, answer the following questions.

Encik Daud buys an insurance policy to cover himself in case of an accident from *Syarikat Insurans Bersatu* for RM300 000 with a monthly payment of RM100.

- (a) Who is the insurance company and the policyholder?
- (b) How much is the coverage limit?
- (c) How much is the monthly premium?
- (d) State the risk to be insured.

2.

One day, Melisa's car collided with another car in an accident and she was at fault. Both cars were badly damaged, and the other driver suffered a broken leg. Melisa wants to file a claim for the damage for both cars, as well as the medical expenses for the driver of the other car.

Based on the scenario above, state the claim that Melisa can make from her insurance company if she insures her car under the third party policy.

How to investigate, interpret and perform calculations involving insurance rates and premiums?

Learning Standard

Investigate, interpret and perform calculations involving insurance rates and premiums.

Example 1

The table below shows the premiums for travel insurance offered by *Syarikat Insurans PQ Bhd.* to countries in Asia and Europe.

Number of days	Policyholder (RM)		Policyholder and spouse (RM)		Family (RM)	
	Asia	Europe	Asia	Europe	Asia	Europe
1 – 5	39	53	69	98	87	133
6 – 10	58	79	107	150	136	184
11 – 18	79	127	152	246	218	304
Annual premium (18 – 69 years old)	230	280	–	–	–	–

- What are the factors that influence the difference in premiums for the travel insurance?
- Why is the premium higher for a longer travel period?
- Shahir's work as a photographer requires him to visit many countries in Europe within a year. He will visit a country for 12 to 15 days. Which insurance is suitable for Shahir to buy in relation to his job? Give your reason.

Solution:

- Destination, duration of travel and number of people insured.
- A longer travel period increases the probability of loss to the policyholder while abroad.
- Shahir should buy annual premium travel insurance for countries in Europe as it is more economical than buying insurance for 11 to 18 days per trip.

How to calculate a premium for life insurance?

For life insurance, the amount of premium paid depends on the chosen face value, age, gender and smoking status. This premium calculation is based on a premium rate schedule for every RMx face value.

$$\text{Premium} = \frac{\text{Face value of policy}}{\text{RMx}} \times \left(\begin{array}{l} \text{Premium rate} \\ \text{per RMx} \end{array} \right)$$

Example 2

The annual premium rate schedule per RM1 000 face value of a yearly renewable term insurance offered by *Syarikat Insurans XYZ* is as follows.

Age	Male (RM)		Female (RM)	
	Non-smoker	Smoker	Non-smoker	Smoker
35	2.12	2.72	1.45	1.78
36	2.18	2.80	1.50	1.84
37	2.26	2.91	1.56	1.93
38	2.36	3.05	1.63	2.03
39	2.49	3.23	1.71	2.14
40	2.66	3.47	1.80	2.26

- (a) Why does the premium rate increase
- as the age increases?
 - for a smoker?
- (b) Based on the table, calculate the annual premium for each of the following situations.
- Mr Guan wants to buy an insurance policy worth RM100 000. He is 39 years old, healthy and a non-smoker.
 - Madam Shapuva is 36 years old, healthy and a non-smoker. She wants to buy an insurance policy worth RM250 000 and wants to add on a critical illness policy. *Syarikat Insurans XYZ* offers a critical illness policy with a coverage of 30% of basic face value and the premium rate is RM1.77 per RM1 000 based on Madam Shapuva's age and health status.

Solution:

- (a) (i) Premium rate increases with increasing age because the life expectancy of each person decreases with age.
- (ii) The probability of a smoker being exposed to illness is higher than that of a non-smoker who lives a healthy lifestyle.

Info Bulletin

- The premium rate schedule provides the gross amount of premium charged to the policyholder.
- The face value of policy is the amount of money chosen by the policyholder to obtain insurance coverage. This amount will be paid to the beneficiaries in the occurrence of death or total and permanent disability of the policyholder on the policy's maturity date.

Info Bulletin

Yearly renewable term insurance provides protection for one year and can be renewed for the next year as stipulated by the insurance company.

(b) (i) From the table, the premium rate is RM2.49.

Mr Guan's annual premium

$$= \frac{\text{RM}100\,000}{\text{RM}1\,000} \times \text{RM}2.49$$

$$= \text{RM}249.00$$

(ii) From the table, the premium rate is RM1.50.

The total coverage for critical illness

$$= \frac{30}{100} \times \text{RM}250\,000$$

$$= \text{RM}75\,000$$

Madam Shapuva's annual premium

= Annual basic premium + Annual additional premium for critical illness

$$= \frac{\text{RM}250\,000}{\text{RM}1\,000} \times \text{RM}1.50 + \frac{\text{RM}75\,000}{\text{RM}1\,000} \times \text{RM}1.77$$

$$= \text{RM}375 + \text{RM}132.75$$

$$= \text{RM}507.75$$

How to calculate a premium for motor insurance?

Motor insurance is calculated based on the Motor Tariff that provides the minimum premium for the insurance coverage. These tariffs are regulated by law. The amount of the premium depends on the factors such as the type of vehicle and its usage, the engine capacity, the type and amount of coverage desired. The premiums charged are different for each motor policy.

Depending only on the engine capacity of vehicle



Info Bulletin

- (i) Tariff is a list of fixed prices used to organise and control premium charges and wording of policies under the insurance act.
- (ii) Insurance companies will add additional charges to the minimum premium such as operating expenses, agent commissions, additional coverages and others.

The table below shows the premium rates under the Motor Tariff for motor policies issued in Peninsular Malaysia, Sabah and Sarawak.

Engine capacity not exceeding (cc)	Peninsular Malaysia		Sabah and Sarawak	
	Comprehensive policy (RM)	Third party policy (RM)	Comprehensive policy (RM)	Third party policy (RM)
1 400	273.80	120.60	196.20	67.50
1 650	305.50	135.00	220.00	75.60
2 200	339.10	151.20	243.90	85.20
3 050	372.60	167.40	266.50	93.60
4 100	404.30	181.80	290.40	101.70
4 250	436.00	196.20	313.00	110.10
4 400	469.60	212.40	336.90	118.20
Over 4 400	501.30	226.80	359.50	126.60

* For comprehensive policy, the rate charged is for the first RM1 000 of the sum insured

Source: Schedule of Motor Tariff 2015

The formulae to calculate the basic premium of the comprehensive policy:

- For Peninsular Malaysia, the basic premium
= Rate for the first RM1 000 + RM26 for each RM1 000 or part thereof on value exceeding the first RM1 000
- For Sabah and Sarawak, the basic premium
= Rate for the first RM1 000 + RM20.30 for each RM1 000 or part thereof on value exceeding the first RM1 000



Visit the General Insurance Association of Malaysia (PIAM) website for more information on general insurance services in Malaysia.
<http://www.piam.org.my/>

Example 3

Encik Ramli owns and uses a Proton Exora 1.6 in Peninsular Malaysia. The information of the car is as follows:

Sum insured	: RM60 000
Age of vehicle	: 5 years
Engine capacity	: 1 600 cc
NCD	: 25%



Calculate the gross premium for Encik Ramli's car under the comprehensive policy, the third party, fire and theft policy, and the third party policy.

Solution:

For comprehensive policy:

(a) The first RM1 000	RM305.50
(b) $RM26 \times 59$ (each RM1 000 balance)	RM1 534
(c) Basic premium = (a) + (b)	RM1 839.50
(d) NCD 25%	RM459.88
(e) Gross premium = (c) – (d)	RM1 379.62

Refer to the table.

$$\frac{60\,000 - 1\,000}{1\,000} = 59$$

$$0.25 \times 1\,839.50 = 459.88$$

For third party, fire and theft policy:

(a) Basic premium	RM1 379.63
(b) NCD 25%	RM344.91
(c) Gross premium = (a) – (b)	RM1 034.72

$$0.75 \times 1\,839.50 = 1\,379.63$$

$$0.25 \times 1\,379.63 = 344.91$$

For third party policy:

(a) Basic premium	RM135.00
(b) NCD 25%	RM33.75
(c) Gross premium = (a) – (b)	RM101.25

Refer to the table.

$$0.25 \times 135.00 = 33.75$$

Info Bulletin

No Claim Discount (NCD) clause will be issued if no claim is made against your policy within the period of coverage before the policy renewal is made. As such, the premiums payable can be reduced by your NCD eligibility. You will lose your entire NCD eligibility when a personal or third-party claim is made against your policy. NCD eligibility depends on your vehicle class and the number of years of continuous driving experience without claim.

However, the premiums payable may differ from the actual value of the premiums that the insurance company may charge. There are additional charges which are payable by the policyholder such as commission to the agent, service tax and stamp duty.

Self Practice 3.1b

- The table below shows some of the benefits of personal accident insurance offered by *Syarikat Insurans RST*.

Benefit	Total coverage (RM)	Annual premium based on occupation	
		Class 1 & 2 (RM)	Class 3 (RM)
Accidental death	100 000	364.75	1 065.40
Total and permanent disability	200 000		
Permanent disability	150 000		

- * Class 1 – Occupation in low risk industries and in office.
- * Class 2 – Occupation involving non-manual works with semi-hazardous industry.
- * Class 3 – Occupation involving manual works and use of tools or machinery.

In your opinion, what makes the premium for class 3 occupation higher than class 1 and class 2?

2. The table below shows the annual premium rate per RM1 000 face value of a renewable life insurance offered by an insurance company.

Age	Male (RM)		Female (RM)	
	Non-smoker	Smoker	Non-smoker	Smoker
27	2.12	2.72	1.18	1.40
28	2.12	2.73	1.19	1.42
29	2.12	2.75	1.21	1.44
30	2.12	2.79	1.23	1.46

Based on the face value of RM120 000,

- (a) calculate the annual premium for a 29-year-old man who smokes and a 29-year-old man who does not smoke.
 (b) calculate the annual premium for a 30-year-old woman who smokes and a 30-year-old woman who does not smoke.
3. Encik Zakri stays in Peninsular Malaysia. He wants to buy a motor insurance policy. The following is the information regarding the vehicle he wants to insure.

Sum insured	: RM85 000
Age of vehicle	: 6 years
Engine capacity	: 2 494 cc
NCD	: 30%

Calculate the gross premium for the comprehensive policy, the third party, fire and theft policy, and the third party policy based on the Schedule of Motor Tariff 2015.

How to solve problems involving insurance?

The loss you incur is RM5 500. The insurance company will pay RM5 300. The balance of RM200 will be borne by you.

Why can't I receive full compensation?



There are several provisions in the insurance contract that may cause the policyholder to receive compensation less than the actual loss and hence have to bear part of the loss. Amongst these provisions are **deductible** and **co-insurance**, which is also known as joint insurance.

Learning Standard

Solve problems involving insurance including deductible and co-insurance.

Smart Tips

Read the insurance policy contract carefully before you agree to buy the insurance policy and get a clearer explanation from your insurance agent.

What is deductible?

Deductible is an amount that must be borne by the policyholder before they can make a claim from the insurance company. Deductible is commonly found in the contract of property insurance, medical and health insurance and motor insurance. This provision is not in the life insurance and personal liability insurance.

Example 4

Madam Suhaila has purchased motor insurance for her car with a deductible provision of RM300. During the insurance coverage period, Madam Suhaila suffered three accidents. The losses suffered in March, July and August were RM2 800, RM250 and RM400 respectively. State whether Madam Suhaila can make a claim for the losses suffered. If yes, state the amount of compensation that can be claimed for each loss.

Solution:

Month	Loss (RM)	Can make a claim?	Amount of compensation (RM)
March	2 800	Yes	2 500
July	250	No	None
August	400	Yes	100

The amount of the loss exceeds the deductible amount. Hence, a claim can be made.

Amount of compensation
= RM2 800 – RM300
= RM2 500

The amount of the loss is less than the deductible amount. Hence, a claim cannot be made for this loss.

The amount of the loss exceeds the deductible amount. Hence, a claim can be made. Amount of compensation = RM400 – RM300 = RM100

In motor insurance, the policyholder is responsible for a compulsory deductible of RM400 if the insured vehicle is driven by an individual who is not named in the policy, who is named in the policy but is under 21 years old, and who is the holder of a provisional (L) driving licence or the holder of a full driving licence of less than 2 years. Other deductibles are at the discretion of the insurance company.

Example 5

Cher Lin has a medical insurance policy with a deductible of RM30 000 per year with an annual limit of RM300 000. In the first year of her insured period, Cher Lin had been hospitalised for appendix surgery and the treatment cost was RM8 000. In the following year, Cher Lin underwent heart surgery and the treatment cost was RM210 000. State the amount borne by Cher Lin and the amount paid by the insurance company for the first and the second year of her insurance period.

Solution:

First year:

Treatment cost = RM8 000

The treatment cost is less than the deductible amount.

Amount borne by Cher Lin = RM8 000

Second year:

Treatment cost = RM210 000 ← The treatment cost is more than the deductible amount.

Amount covered by Cher Lin = RM30 000

Amount paid by the insurance company

= RM210 000 – RM30 000 ← Treatment cost – deductible

= RM180 000

What is co-insurance in property insurance?

Co-insurance is the cost sharing of the loss between the insurance company and the policyholder.

For the co-insurance clause in property insurance, the policyholder is required to insure his property at a certain amount based on the percentage of co-insurance determined by the insurance company from the insurable value of the property. If this co-insurance provision is not met, the policyholder will have to bear some of the losses together with the insurance company.

Therefore, if the policyholder wishes to recover full compensation for the partial loss incurred, he must insure the property in accordance with his co-insurance provisions.

Info Bulletin

- (i) Clause is a part of a written legal document.
- (ii) The insurable value of property is the actual value of assets, the cost of replacement of the property or any other value stated in the valuation clause of insurance policy.

$$\begin{aligned} \text{Amount of required insurance} \\ = \text{Percentage of co-insurance} \times \text{Insurable value of property} \end{aligned}$$

1 If the insured value = amount of required insurance

Amount of compensation
= Amount of loss – Deductible

where the amount of loss \leq the amount of insurance purchased.

2 If the insured value < amount of required insurance

Amount of compensation

$$= \left(\frac{\text{Amount of insurance purchased}}{\text{Amount of required insurance}} \right) \times \left(\text{Amount of loss} \right) - (\text{Deductible})$$

3 Suffered a total loss

Amount of compensation

$$= \left(\text{Amount of insurance purchased} \right) - (\text{Deductible})$$

Smart Tips

With deductible provision and co-insurance in insurance policy, the premium becomes lower.

Encik Ismail wants to buy fire insurance for his house. The insurable value of the house is RM350 000. The fire insurance policy he wants to buy has a co-insurance provision to insure 80% of its insurable value and a deductible of RM2 000.

- Calculate the amount of insurance required by Encik Ismail for the house.
- Encik Ismail's house caught on fire and the amount of loss is RM25 000. Calculate the amount of compensation that Encik Ismail will receive if he insures his house
 - at the amount of required insurance,
 - at a sum of RM150 000. Hence, calculate the co-insurance penalty.
- Encik Ismail's house suffered a total loss. If he insured his house at a sum of RM200 000, calculate the amount compensation he will receive.

Solution:

$$\begin{aligned} \text{(a) Amount of required insurance} &= \frac{80}{100} \times \text{RM}350\,000 \\ &= \text{RM}280\,000 \end{aligned}$$

$$\begin{aligned} \text{(b) (i) Amount of compensation} &= \text{RM}25\,000 - \text{RM}2\,000 \\ &= \text{RM}23\,000 \end{aligned}$$

- (ii) $\text{RM}150\,000 < \text{RM}280\,000$. The sum insured is less than the amount of required insurance.

$$\begin{aligned} \text{Amount of compensation} &= \frac{\text{RM}150\,000}{\text{RM}280\,000} \times \text{RM}25\,000 - \text{RM}2\,000 \\ &= \text{RM}13\,392.86 - \text{RM}2\,000 \\ &= \text{RM}11\,392.86 \end{aligned}$$

$$\begin{aligned} \text{Co-insurance penalty} &= \text{RM}25\,000 - \text{RM}11\,392.86 \\ &= \text{RM}13\,607.14 \end{aligned}$$

$$\begin{aligned} \text{(c) Amount of compensation} &= \text{RM}200\,000 - \text{RM}2\,000 \\ &= \text{RM}198\,000 \end{aligned}$$

Info Bulletin

The amount that policyholders bear on the partial loss incurred as a result of not meeting the co-insurance provision is known as the co-insurance penalty.

Co-insurance penalty is equivalent to 46.4% of the total loss

Amount of loss borne by Encik Ismail
 $= \text{RM}350\,000 - \text{RM}198\,000$
 $= \text{RM}152\,000$

If the policyholder insures his property with a higher amount than the amount of required insurance under the co-insurance provision, the compensation calculated using the co-insurance formula will exceed the amount of actual loss incurred. However, the insurance company will only pay the compensation not exceeding the amount of actual loss and the maximum payment for a loss will be equal to the total face value of the insurance purchased by the policyholder.

What is co-insurance in health insurance?

In health insurance contracts, co-insurance is stipulated by the percentage participation clause, particularly for the major medical insurance policy. In this clause, policyholder is required to bear a portion of the medical costs covered by the contract at an agreed rate after taking into account the deductible provisions, if any. For example, 80/20 co-insurance percentage participation means that the insurance company will bear 80% of the medical costs covered by the policy and 20% will be borne by the policyholder.

Example 7

Madam Chen has a major medical insurance policy with a deductible provision of RM500 and a 75/25 co-insurance percentage participation clause in her policy. Calculate the cost borne by the insurance company and Madam Chen herself if the medical cost covered by her policy is RM20 600.

Solution:

Medical cost after deductible

$$= \text{RM}20\,600 - \text{RM}500$$

$$= \text{RM}20\,100$$

The cost borne by the insurance company

$$= \frac{75}{100} \times \text{RM}20\,100$$

$$= \text{RM}15\,075$$

The cost borne by Madam Chen

$$= \frac{25}{100} \times \text{RM}20\,100 + \text{RM}500 \quad \leftarrow \text{Deductible}$$

$$= \text{RM}5\,525$$

Guidelines to choose your best insurance:

Find out the total coverage needed.

Understand the scope of the coverage, the terms and conditions of the policy.

Compare the premium rates and insurance benefits.

Avoid unnecessary coverage.

Smart Tips

The deductible provision must be met by the policyholder before she can receive the benefits of the insurance she has purchased.

Smart Tips

The difference between deductible and co-insurance:

- Deductible is an amount the policyholders must pay in advance regardless of the amount of eligible benefits.
- Co-insurance is a cost sharing where the policyholders borne a certain percentage of the loss with the insurance company.

Critical Mind

Why is there no penalty for health insurance?

Example 8

Jesnita wants to buy a medical insurance policy for herself. She compares the benefits of the policy plans from two different insurance companies, XX and YY.

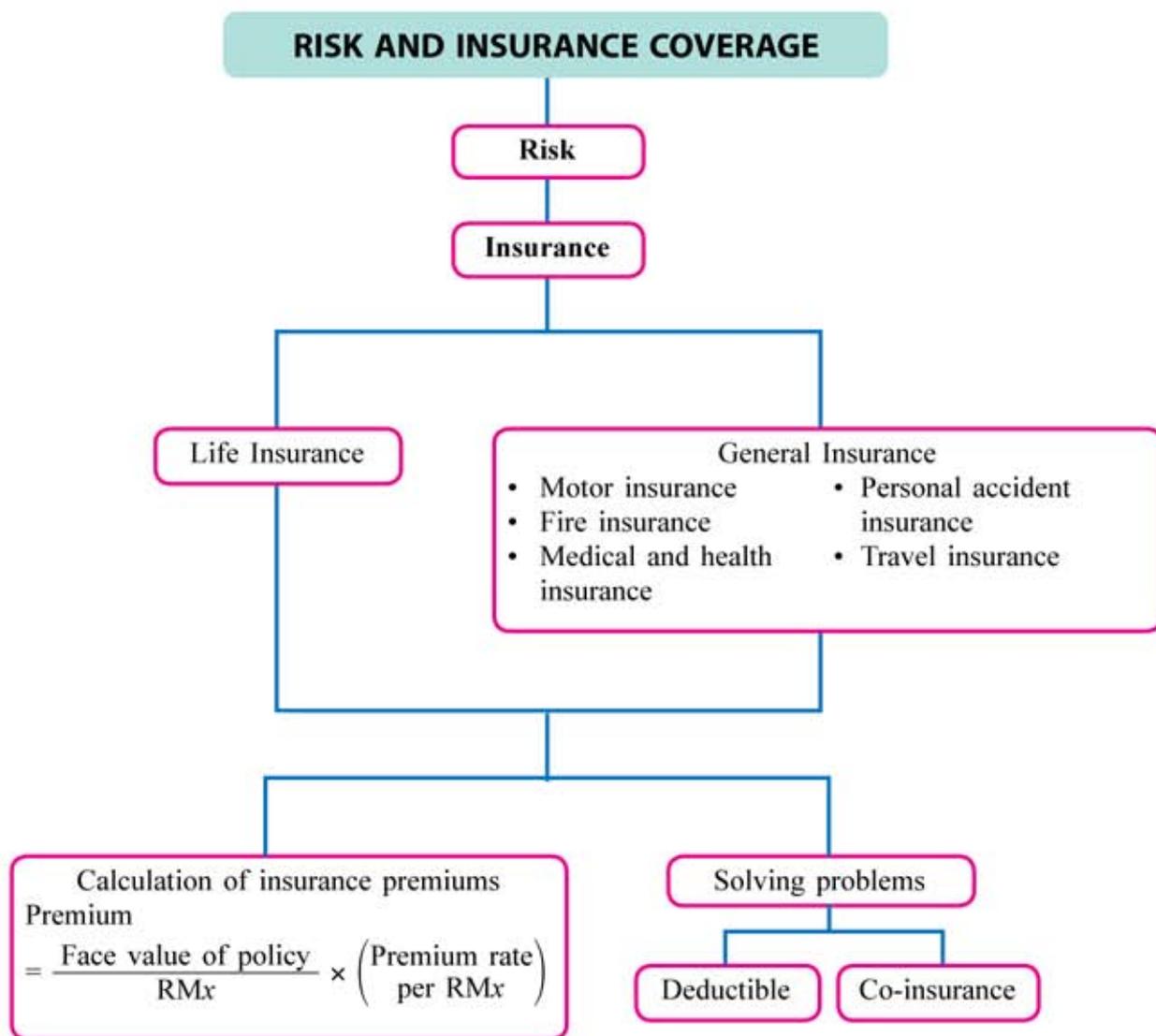
Benefit \ Insurance company	XX (RM)	YY (RM)
Overall annual limit	50 000	50 000
Hospital room and board	160 (maximum 365 days per annum)	200 (maximum 200 days per annum)
Intensive care unit	As charged (maximum 90 days per annum)	400 (maximum 90 days per annum)
Daily government hospital cash allowance	100 (maximum 365 days per annum)	50 (maximum 200 days per annum)
Annual premium	506.02	637.02

Based on the table, which insurance policy plan is better for Jesnita? Justify your answer.

Solution:

The XX policy plan is better because even though both provide the same overall annual limit of RM50 000, the annual premium for XX is lower than YY. Besides, the benefits offered are better in terms of coverage period, which is whole year-round for hospital room and board, and daily government hospital cash allowance. In addition, there is no coverage limit for intensive care unit because the compensation is paid according to the amount charged to the policyholder, unlike YY which has a limit of RM400 for the same coverage period.

Summary Arena



Reflection

At the end of this chapter, I can



explain the meaning of risk and the importance of insurance coverage, hence determine the types of life insurance and general insurance for protecting a variety of risks.

investigate, interpret and perform calculations involving insurance rates and premiums.

solve problems involving insurance including deductible and co-insurance.

MINI PROJECT

Information about Encik Farhan:

Occupation: Police officer

Net salary per month: RM4 300

Monthly gross expenses: RM3 000

Monthly savings: RM500

Number of dependents: 3

Health status: Good



The above information is about Encik Farhan who has worked as a police officer for 7 years. He wants to buy life insurance that protects him and his family members. In your group, obtain information on life insurance policies from the internet. Select the best life insurance policy for Encik Farhan and his family members. Give your reason and present to the class.

Extensive Practice

Scan the QR code or visit
bit.do/QuizE03 for interactive quiz



UNDERSTAND

1. Give three examples of insurable risks faced by a retailer who owns a shop.
2. Why is the principle of indemnity important in an insurance contract?

- What is the difference between personal accident insurance, life insurance, and medical and health insurance?
- An insurance company pays compensation for the motor insurance claim of a policyholder. The claim includes third-party damage and fire suffered by the policyholder's car. State the possible motor insurance policy purchased by the policyholder.

MASTERY

- Vanitha bought a car from her friend without buying new motor insurance for the car because the existing motor insurance has not expired. She also did not contact the Road Transport Department Malaysia (JPJ) to change the ownership of the car to her name. One day, she was involved in an accident and the front part of her car was damaged.

Based on the situation, can Vanitha make a claim from the insurance company that insured the car? Give your justification.

- Syarikat Insurans ABC* offers two life insurance plans with annual premium rates per RM1 000 face value as shown in the table on the right. The premium rates are for healthy and non-smoking men.

Plan / Age	35 years old	45 years old
5-year term	RM5.24	RM7.96
Yearly Renewable Term	RM4.03	RM5.52

- Rizqi is 35 years old, a healthy and non-smoking man. He wants to buy a yearly renewable term plan of RM150 000. Calculate the monthly premium he has to pay.
 - Vincent wants to buy a 5-year term with a face value of RM100 000. He is 45 years old, a healthy and non-smoking man. Calculate his annual premium.
 - If Vincent buys a yearly renewable term plan with a face value of RM100 000, what is the difference in his annual premium, compared to the 5-year term plan?
- Salleh's motorcycle is covered with a motor insurance with a deductible of RM150. During the insurance coverage period, Salleh suffered three accidents with losses of RM90, RM240 and RM300. State whether Salleh could claim for the losses. If yes, state the amount of compensation that can be claimed for each loss he suffered.

CHALLENGE

- In 2019, Madam Karen was diagnosed with cancer and underwent surgery to treat her illness. The total surgery and treatment cost was RM130 000. In the following year, Madam Karen had an accident that fractured her arm. The treatment cost for her arm was RM12 000. If Madam Karen has a medical insurance policy within the two years with a deductible of RM5 000 per year and the annual limit of RM150 000, state the amount borne by Madam Karen and the amount of compensation paid by the insurance company for each treatment received in the two years.



9. Mr Gailang wants to buy fire insurance for his house. The insurance company estimates that the house's insurable value is RM1.3 million. The fire insurance policy that he wants to buy has a co-insurance provision of 70% of his property's insurable value and a deductible of RM3 000.
- Calculate the amount of required insurance for Mr Gailang.
 - Mr Gailang's house caught on fire and his amount of losses was RM205 000. Calculate the amount of insurance purchased by Mr Gailang if he received a compensation of
 - RM202 000
 - RM120 000
10. Encik Adam's house is insured with fire insurance with a co-insurance provision of 80% of his property's insurable value. The house's insurable value is RM250 000.
- Calculate the amount of required insurance for Encik Adam.
 - Encik Adam has insured his house according to the amount in (a). If his house is completely burnt down, will he receive the compensation amount of RM250 000? Give your justification.
11. Sofia's medical cost covered by her insurance policy is RM10 800. She wants to claim compensation from her major medical insurance policy with a deductible allocation of RM300 and a co-insurance percentage participation of 80/20. Calculate the amount borne by Sofia and the amount of compensation she received.



EXPLORING MATHEMATICS

According to the data from Bank Negara Malaysia, only 41 percent of Malaysians are covered with at least one insurance policy at the moment.

Source: Berita Harian, 29 July 2019, Government targets national insurance penetration rate to breach 75 percent in 2020

During Mathematics Week at school, your group needs to give a speech on the lack of awareness of having an insurance policy among Malaysians. Your speech must include the following aspects:

- ✓ The factors affecting a lack of awareness towards having insurance among Malaysians
- ✓ The importance of having an insurance as a protection

Discuss this in your group and choose a presenter to give the speech in class.