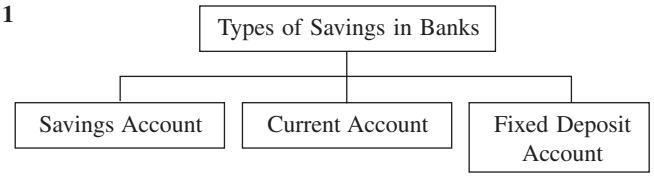
Fully-Worked Solutions

CHAPTER 3 Consumer Mathematics: Savings and Investments, Credit and Debt

UPSKILL 3.1A

1



2 (a) Fixed deposit (b) Real estate
(c) Current account (d) Unit trust
(e) Share (f) Savings account

3 (a) $I = Prt$

$= 8\,000 \times \frac{2.2}{100} \times 1\frac{6}{12}$

$= \text{RM}264$

$\therefore$ His total savings $= \text{RM}8\,000 + \text{RM}264$
$= \text{RM}8\,264$

(b) $I = Prt$

$= 8\,000 \times \frac{2.2}{100} \times 2$

$= \text{RM}352$

$\therefore$ His total savings $= \text{RM}8\,000 + \text{RM}352$
$= \text{RM}8\,352$

The longer the savings period in the bank, the higher the amount of interest earned. Thus, the final total savings also increases.

4 (a) $I = Prt$

$= 5\,000 \times \frac{3}{100} \times 1$

$= \text{RM}150$

$\therefore$ His total savings $= \text{RM}5\,000 + \text{RM}150$
$= \text{RM}5\,150$

(b) $I = Prt$

$= 5\,000 \times \frac{4}{100} \times 1$

$= \text{RM}200$

$\therefore$ His total savings $= \text{RM}5\,000 + \text{RM}200$
$= \text{RM}5\,200$

For the same principal, when the interest rates increases, the final amount of savings also increases.

5 $P = \text{RM}4\,500$

$r = 2\% = \frac{2}{100}$
$= 0.02$

$n = \frac{12}{3} = 4$

$t = 3$ years

$MV = 4\,500\left(1 + \frac{0.02}{4}\right)^{(4)(3)}$

$= \text{RM}4\,777.55$

$\therefore$Puan Wee's total savings is RM4 777.55.

6 (a) $P = \text{RM}2\,000$

$r = 5\% = \frac{5}{100}$
$= 0.05$

$n = \frac{12}{6} = 2$

$t = 5$ years

$MV = 2\,000\left(1 + \frac{0.05}{2}\right)^{(2)(5)}$

$= \text{RM}2\,560.17$

$\therefore$Eng Soo's total savings is RM2 560.17.

(b) $P = \text{RM}2\,000$

$r = 5\% = \frac{5}{100}$
$= 0.05$

$n = \frac{12}{4} = 3$

$t = 5$ years

$MV = 2\,000\left(1 + \frac{0.05}{3}\right)^{(3)(5)}$

$= \text{RM}2\,562.76$

$\therefore$Eng Soo's total savings is RM2 562.76

When the compounding frequency increases, the matured value of savings also increases.

7 $MV = P\left(1 + \frac{r}{n}\right)^{nt}$

$16\,000 = P(1 + 0.06)^8$

$P = \frac{16\,000}{(1 + 0.06)^8}$

$= \text{RM}10\,038.60$

Therefore, an investment of RM10 038.60 is needed to earn RM16 000.

8 $MV = P\left(1 + \frac{r}{n}\right)^{nt}$

$14\,600 = P(1 + 0.04)^5$

$P = \frac{14\,600}{(1 + 0.04)^5}$

$= \text{RM}12\,000$

Therefore, an investment of RM12 000 is needed to earn RM14 600.

9 Profit per year $= \text{RM}640 \div 2$
$= \text{RM}320$

Percentage of profit annually $= \frac{320}{8\,000} \times 100\%$
$= 4\%$

10 Total return $= \text{RM}15\,450 - \text{RM}15\,000 + \text{RM}250$
$= \text{RM}700$

Percentage of total return $= \frac{700}{15\,000} \times 100\%$
$= 4.67\%$

UPSKILL 3.1B

1 Total pay out $= 6.5 + 2$
$= 8.5$ sen per unit

Total return $= 8.5 \times 8\,000$
$= 68\,000$ sen
$= \text{RM}680$

Initial investment $= 8\,000 \times \text{RM}1$
$= \text{RM}8\,000$

Return on investment $= \frac{\text{RM}680}{\text{RM}8\,000} \times 100\%$
$= 8.5\%$

2 $MV = P\left(1 + \frac{r}{n}\right)^{nt}$

$38\,705.65 = 20\,000\left(1 + \frac{r}{1}\right)^{15}$

$\frac{38\,705.65}{20\,000} = \left(1 + r\right)^{15}$

$$\left(\frac{38\,705.65}{20\,000}\right)^{\frac{1}{15}} = 1 + r$$

$$1 + r = 1.045$$

$$r = 0.045$$

$$= \frac{4.5}{100}$$

$$= 4.5\%$$

3 (a) $4\,000 + \frac{4\,000}{2} = 6\,000$ units

(b) $(6\,000 \times \text{RM}7.30) - (4\,000 \times \text{RM}10.50)$
$= \text{RM}1\,800$

4 (a) $6\,000 + \frac{6\,000}{4} = 7\,500$ units

(b) Adjusted price $= \frac{6\,000}{7\,500} \times \text{RM}4.00 = \text{RM}3.20$

(c) Initial investment value $= 6\,000 \times \text{RM}4 = \text{RM}24\,000$
Total return $= (7\,500 \times \text{RM}3.75) - \text{RM}24\,000$
$= \text{RM}4\,125$

Return on investment $= \frac{4\,125}{24\,000} \times 100\%$

$= 17.19\%$

5 (a) Yes. They received the same amount of dividend.

(b) Dividend received $= 10\,000 \times 4.2$ sen
$= 42\,000$ sen
$= \text{RM}420$

(c) Adjusted price after payment of dividend $= (94 - 4.2)$ sen
$= 89.8$ sen

6 Return on investment
= Rent + Capital gain
= RM50 000 + (RM450 000 – RM25 000 – RM315 000 – RM2 500 – RM9 000 – RM3 000)
= RM145 500

Return on investment(ROI) $= \frac{\text{RM}145\,500}{\text{RM}250\,000} \times 100\%$

$= 58.2\%$

7 Total rent = RM245 000
Initial investment = Price of house
= RM800 000
Capital gain = Sale price – Balance loan – Loan amortised – Down payment – Agent's commission – Legal charges during purchase
= RM1 291 000 – RM430 000 – RM515 000 – RM120 000 – RM30 000 – RM8 000 – RM7 500
= RM180 500

Total return
= Capital gain + Rental
= RM180 500 + RM245 000
= RM425 500

Return on investment

$= \frac{\text{Total return}}{\text{Intial investment}} \times 100\%$

$= \frac{425\,500}{800\,000} \times 100\%$

$= 53.19\%$

UPSKILL 3.1C

1 (a) Mira:

Total units of shares $= \frac{\text{RM}70\,000}{\text{RM}7} = 10\,000$

Average cost per unit $= \frac{\text{RM}70\,000}{10\,000} = \text{RM}7.00$

Rebecca:

Month	Total investment	Price per unit (RM)	Number of share units
Jan	RM7 000	7.00	1 000
Feb	RM7 000	6.80	1 029
March	RM7 000	6.50	1 077
April	RM7 000	6.40	1 094
May	RM7 000	6.10	1 148
June	RM7 000	6.40	1 094
July	RM7 000	6.80	1 029
August	RM7 000	6.90	1 014
Sept	RM7 000	7.10	986
Oct	RM7 000	7.00	1 000
	Total = RM70 000		Total = 10 471 units

Total units of shares = 10 471

Average cost per unit $= \frac{\text{RM}70\,000}{10\,471 \text{ units}} = \text{RM}6.69$

(b) Rebecca is a wise investor for practising the cost averaging strategy that helped her to accumulate more shares with the same amount of money.

2 (a) Average cost $= \frac{1\,000(4.80 + 4.50 + 4.00 + 3.90 + 3.80)}{1\,000(5)}$

$= \text{RM}4.20$

(b) Profit $= 5\,000(\text{RM}4.40 - \text{RM}4.20)$
$= \text{RM}1\,000$

3 (a) Encik Sulaiman:
The level of risk for property (apartments) is moderate.
Encik Muthalib:
The level of risk for both savings and fixed deposit are low.

(b)

Encik Sulaiman	Encik Muthalib
Total rental per year = RM1 500 × 12 = RM18 000 ROI $= \frac{\text{RM}18\,000}{\text{RM}400\,000} \times 100\%$ $= 4.5\%$	Interest of savings per year = 1% × RM200 000 $= \frac{1}{100} \times \text{RM}200\,000$ = RM2 000 Interest of FD per year = 4% × RM200 000 $= \frac{4}{100} \times \text{RM}200\,000$ = RM8 000 Total return per year = RM10 000 ROI $= \frac{\text{RM}10\,000}{\text{RM}400\,000} \times 100\%$ $= 2.5\%$

Encik Sulaiman is a wise investor because his return on investment value is higher than Encik Muthalib.

4 Initial investment = RM300 000
Total return = RM180 000 + (RM750 000 – RM570 000 – RM30 000 – RM16 000 – RM4 200 – RM20 000)
= RM289 800

Return on investment

$= \frac{\text{RM}289\,800}{\text{RM}300\,000} \times 100\%$

$= 96.6\%$

UPSKILL 3.2

1 5% of RM10 500 $= \frac{5}{100} \times \text{RM}10\,500$

$= \text{RM}525 > \text{RM}50$

$\therefore$ Minimum payment = RM525

2 (a) 5% of the balance

$= \frac{5}{100} \times \text{RM}890.34$

$= \text{RM}44.52 < \text{RM}50$

$\therefore x = 50$

(b) Interest charged $= 18\% \times \text{RM}890.34 \times [10 \div 365]$

$= \text{RM}4.39$

Late payment charge $= 1\% \times (\text{RM}890.34 + \text{RM}4.39)$

$= \text{RM}8.95$

$= \text{RM}10.00$ ← RM10 ≤ late payment charge ≤ RM100

Current amount (outstanding balance) in December

$= \text{RM}890.34 + \text{RM}10 + \text{RM}4.39$

$= \text{RM}904.73$

3 Actual price $= \text{HKD}4650 + \text{HKD}120 + (1\% \times \text{HKD}4650)$

$= \text{HKD}4770 + \frac{1}{100} \times \text{HKD}4650$

$= \text{HKD}4770 + \text{HKD}46.50$

$= \text{HKD}4816.50$

$= \frac{4816.50}{100} \times \text{RM}59.57$

$= \text{RM}2\,869.19$

4 Car loan = Price of car – 20% down payment

$= \text{RM}138\,000 - \left(\frac{20}{100} \times \text{RM}138\,000\right)$

$= \text{RM}110\,400$

Interest $= \text{RM}110\,400 \times \frac{2.5}{100} \times 9$

$= \text{RM}24\,840$

Total loan repayment $= P + Prt$

$= \text{RM}110\,400 + \text{RM}24\,840$

$= \text{RM}135\,240$

Monthly instalment $= \frac{\text{RM}135\,240}{(9 \times 12)\text{ months}}$

$= \text{RM}1\,252.22$

5 $A = P + Prt$

$= \text{RM}20\,000 + \left(\text{RM}20\,000 \times \frac{3.8}{100} \times 8\right)$

$= \text{RM}20\,000 + \text{RM}6\,080$

$= \text{RM}26\,080$

Monthly instalment $= \frac{\text{RM}26\,080}{(8 \times 12)\text{ months}}$

$= \text{RM}271.67$

6 **First month**

First month interest $= \text{RM}20\,000 \times \frac{5}{100} \times \frac{1}{12}$

$= \text{RM}83.33$

Loan at the end of first month $= \text{RM}20\,000 + \text{RM}83.33$

$= \text{RM}20\,083.33$

Balance after first instalment $= \text{RM}20\,083.33 - \text{RM}350$

$= \text{RM}19\,733.33$

Second month

Balance of the loan at the beginning of second month

$= \text{RM}19\,733.33$

Second month interest $= \text{RM}19\,733.33 \times \frac{5}{100} \times \frac{1}{12}$

$= \text{RM}82.22$

Loan at the end of second month $= \text{RM}19\,733.33 + \text{RM}82.22$

$= \text{RM}19\,815.55$

Balance after second instalment $= \text{RM}19\,815.55 - \text{RM}350$

$= \text{RM}19\,465.55$

Third month

Balance of the loan at the beginning of third month

$= \text{RM}19\,465.55$

Third month interest $= \text{RM}19\,465.55 \times \frac{5}{100} \times \frac{1}{12}$

$= \text{RM}81.11$

Loan at the end of third month $= \text{RM}19\,465.55 + \text{RM}81.11$

$= \text{RM}19\,546.66$

Balance after third instalment $= \text{RM}19\,546.66 - \text{RM}350$

$= \text{RM}19\,196.66$

Fourth month

Balance of the loan at the beginning of fourth month

$= \text{RM}19\,196.66$

Fourth month interest $= \text{RM}19196.66 \times \frac{5}{100} \times \frac{1}{12}$

$= \text{RM}79.99$

Total interest for the first four months

$= \text{RM}83.33 + \text{RM}82.22 + \text{RM}81.11 + \text{RM}79.99$

$= \text{RM}326.65$

7

Monthly instalment to Bank *P*	Monthly instalment to Bank *Q*
$A = P + Prt$ $A = \text{RM}100\,000 + \text{RM}100\,000 \times \frac{2.8}{100} \times 9$ $= \text{RM}125\,200$ Monthly instalment $= \frac{\text{RM}125\,200}{(9 \times 12)\text{ months}}$ $= \text{RM}1\,159.26$	$A = P + Prt$ $A = \text{RM}100\,000 + \text{RM}100\,000 \times \frac{2.85}{100} \times 6$ $= \text{RM}117\,100$ Monthly instalment $= \frac{\text{RM}117\,100}{(6 \times 12)\text{ months}}$ $= \text{RM}1\,626.39$

Mr Raj should choose bank *P* because bank *P* charges lower interest compared to bank *Q*. The instalment is lower but longer period and will not burden Mr Raj.

Summative Practice 3

Section A

1 Total savings , $A = P + Prt$

$= \text{RM}12\,000 + \text{RM}12\,000 \times \frac{3.2}{100} \times 2$

$= \text{RM}12\,768$

Answer: **C**

2 Total savings, $A = P + Prt$

$7\,440 = P + P \times \frac{6}{100} \times 4$

$7\,440 = P + 0.24P$

$1.24P = 7\,440$

$P = \text{RM}6\,000$

Answer: **B**

3 Down payment $= \frac{15}{100} \times \text{RM}120\,000$

$= \text{RM}18\,000$

Amount of loan $= \text{RM}120\,000 - \text{RM}18\,000$

$= \text{RM}102\,000$

Total repayment, $A = P + Prt$

$= \text{RM}102\,000 + \left(\text{RM}102\,000 \times \frac{3.2}{100} \times 5\right)$

$= \text{RM}118\,320$

Monthly instalment $= \frac{\text{RM}118\,320}{(5 \times 12)\text{ months}}$

$= \text{RM}1\,972$

Answer: **D**

4 *Answer*: **D**

5 Dividend $= \frac{6}{100} \times \text{RM}5\,000$

$= \text{RM}300$

Answer: **C**

Section B

1

Hamid bought a single storey house by using a bank loan.	Savings account
Siti deposited RM8 000 in a bank for two years to obtain a higher interest rate.	Real estate
Shermaine saves RM2000 in a bank and she can withdraw her money at any time.	Shares
Shafiq bought 5 000 units of Petronas Chemical shares worth RM6.50 per share on Kuala Lumpur Stock Exchange.	Fixed deposit account

2

✓	(a) Apply and use one the credit card when needed to control overspending.
✓	(b) Use the credit card only to enjoy the benefits such as rewards and discounts which has not been offered by paying cash.
	(c) Make only a minimum payment upon receiving the credit card statement.
✓	(d) Make credit card payment within the interest free period and maintain a good repayment record.
✓	(e) Always check on the credit card's terms and conditions before applying.
	(f) Maxing out the credit card limit.

Section C

1 (a) 1. No need to carry large amount of cash.
2. Enjoy reward system in the form of cash rebate and point redemption
Or other suitable answers

(b) (i) Minimum payment $= \frac{5}{100} \times 2\ 000$

$= \text{RM}100$

(ii) Balance $= \text{RM}2\ 000 - \text{RM}200$
$= \text{RM}1\ 800$

$\text{Interest} = \frac{15}{100} \times \frac{10}{365} \times \text{RM}1\ 800$

$= \text{RM}7.40$

(iii) Latest outstanding balance
$= \text{RM}1\ 800 + \text{RM}7.40$
$= \text{RM}1\ 807.40$

(c) Loan $= 80\% \times \text{RM}85\ 800$
$= \text{RM}68\ 640$
Interest $= 2.7\% \times 5 \times \text{RM}68\ 640$
$= \text{RM}9\ 266.40$
Total repayment $= \text{RM}68\ 640 + \text{RM}9\ 266.40$
$= \text{RM}77\ 906.40$

$\text{Monthly instalment} = \frac{\text{RM}77\ 906.40}{5 \times 12}$

$= \text{RM}1\ 298.44$

2 (a)

Types of savings/ investment	Level of risk	Level of return	Level of liquidity
Fixed deposits	Risk free	Low	High
Real estate	Moderate	High	Low

(b) Ceria Bank

$MV = P\left(1 + \frac{r}{n}\right)^{nt}$

$= 50\ 000\left(1 + \frac{0.05}{2}\right)^{(2)(2)}$

$= \text{RM}55\ 190.64$

Bestari Bank

$MV = P\left(1 + \frac{r}{n}\right)^{nt}$

$= 50\ 000\left(1 + \frac{0.05}{4}\right)^{(4)(2)}$

$= \text{RM}55\ 224.31$

Therefore, Puan Laila will choose Bestari bank because she will get higher return.

(c) Total instalment payments
$= \text{RM}232 \times 24$
$= \text{RM}5\ 568$

$P + Prt = 5\ 568$
$P + P(0.08)(2) = 5\ 568$
$1.16P = 5\ 568$

$P = \frac{\text{RM}5\ 568}{1.16}$

$= \text{RM}4\ 800$

Cash price = Original balance + down payment
$= \text{RM}4\ 800 + \text{RM}600$
$= \text{RM}5\ 400$

3 (a) $I = Prt$

(i) $1\ 000 = 10\ 000(r)(2)$
$20\ 000r = 1\ 000$

$r = \frac{1\ 000}{20\ 000}$

$= 0.05$

$= \frac{5}{100}$

$= 5\%$

(ii) $1\ 800 = 8\ 000\left(\frac{4.5}{100}\right)t$

$1\ 800 = 360t$

$t = \frac{1\ 800}{360} = 5 \text{ years}$

(b) $r = 3.5\%$, $t = \frac{6}{12} = \frac{1}{2}$

$I = Prt$

$= 20\ 000 \times 3.5\% \times \frac{1}{2}$

$= 20\ 000 \times 0.035 \times \frac{1}{2}$

$= \text{RM}350$

(c) Bank P: Monthly repayment

$= \frac{\text{RM}10\ 000 + (\text{RM}10\ 000 \times 0.06 \times 2)}{24}$

$= \text{RM}466.67$

Bank Q: Monthly repayment

$= \frac{\text{RM}10\ 000 + (\text{RM}10\ 000 \times 0.0399 \times 2)}{24}$

$= \text{RM}449.92$

Bank R: Monthly repayment

$= \frac{\text{RM}10\ 000 + (\text{RM}10\ 000 \times 0.058 \times 2)}{24}$

$= \text{RM}465$

In my opinion, Mithran will choose bank Q because it offered the lowest monthly repayment.