Testbank

to accompany

Financial Planning 2nd edition

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WILEY

Chapter 2
Financial Planning Skills

Multiple-choice questions

1. A period of negative savings where income does not meet the required level of expenditures could also be regarded as a(n):

    a. asset.
    b. increase in equity.
    c. savings surplus.
    *d. savings deficit.

Correct answer: d
Feedback: A savings deficit is another term for a period of negative savings. Learning Objective 2.1 ~ prepare personal financial statements.

2. A personal balance sheet would not generally include:

    *a. dividends received during a period.
    b. a motor vehicle.
    c. a collection of rare banknotes.
    d. both a and b.

Correct answer: a
Feedback: Dividends received during a period should be included in the personal cash flow statement not the personal balance sheet. Learning Objective 2.1 ~ prepare personal financial statements.

3. Which of the following is generally true about the calculation of an individual's equity or net worth ratio?

    a. For a young person or couple, it is expected that their equity ratio would be relatively low as they are likely to have a relatively high level of debt.
    b. For a young person or couple, it is expected that their equity ratio would be relatively high as they are likely to have a relatively low level of debt.
    c. The ratio shows the percentage of net worth to total assets.
    *d. Both a and c.

Correct answer: d
Feedback: The equity/net worth ratio is the ratio of net worth to total assets, expressed as a percentage and for a young person or couple, it is expected that their equity ratio would be relatively low as they are likely to have a relatively high level of debt. Learning Objective 2.2 ~ understand the purpose of analysing financial statements using ratio analysis.

4. Which of the following items would not generally be included in the calculation of an individual's liquidity ratio?

   *a. the total outstanding balance of a 25-year mortgage loan taken out in the last year
   b. debt repayments over the next 12 months
   c. amount of an outstanding telephone account
   d. both a and c

Correct answer: a
Feedback: The liquidity ratio includes the amount of debt which is to be repaid within the next 12 months and hence would not include the total outstanding balance of a mortgage loan with a remaining term of more than 12 months. Learning Objective 2.2 ~ understand the purpose of analysing financial statements using ratio analysis.

5. In the calculation of the savings ratio, savings is defined as:

   a. the amount left over after deducting all expenditures from income.
   b. the balance of an individual's funds on deposit at a bank at the end of a period.
   *c. the amount left over after deducting expenditure from income after we add back items that may be regarded as an investment.
   d. both a and b.

Correct answer: c
Feedback: Savings as defined in the savings ratio is the amount left over after deducting expenditure from income after we add back items that may be regarded as an investment. Learning Objective 2.2 ~ understand the purpose of analysing financial statements using ratio analysis.

6. The debt-service ratio shows monthly debt commitments as a percentage of:

   a. before-tax monthly income.
   b. total liabilities.
   *c. after-tax monthly income.
   d. none of the above.

Correct answer: c
Feedback: The debt-service ratio expressed as a percentage is calculated as the monthly debt commitment divided by after-tax monthly income. Learning Objective 2.2 ~ understand the purpose of analysing financial statements using ratio analysis.

7. A rational response in relation to an investment involving time preference for money issues is to prefer to receive a given sum of money earlier rather than later because:

    a. there is a greater chance that the entity promising you the money may not fulfil the promise the longer the waiting period.
    b. the earlier the money is received the earlier the ability to reinvest and earn a rate of return on such funds.
    c. the earlier the money is received the earlier the ability to use the funds for current consumption.
    *d. all of the above.

Correct answer: d
Feedback: All of the factors mentioned are relevant in providing a rational response as to why an investor would prefer to receive a given sum of money earlier rather than later. Learning Objective 2.4 ~ explain the concept of time value of money and the benefits of compound interest.

8. The greater the initial investment the:

    *a. greater the future value at a given interest rate and given number of periods.
    b. lower the future value at a given interest rate and given number of periods.
    c. future value will be the same at a given interest rate and given number of periods.
    d. none of the above.

Correct answer: a
Feedback: The greater the initial investment the greater the future value at a given interest rate and given number of periods. This follows from the future value equation; $FV = PV(1 + i)^n$. Learning Objective 2.4 ~ explain the concept of time value of money and the benefits of compound interest.

9. If you were to deposit $850 today into an investment account earning 6% p.a. compounded annually, approximately how much will you have in your account at the end of 5 years?

    a. $1,165
    *b. $1,137
    c. $1,206
    d. $620

Correct answer: b
Feedback: The future value calculation can be made using the formula;
$FV = PV(1 + i)^n$ as follows:
$FV = \$850(1 + 6\%)^5 = \$850(1.06)5 = \$1,137.49$
The future value of the investment at the end of 5 years is approximately $1,137. Learning Objective 2.4 ~ explain the concept of time value of money and the benefits of compound interest.

10. Mr Rolf Weasley has recently purchased $12,000 worth of shares in Perloins Ltd. Given the relative risk exposure of Perloins Ltd., Rolf expects an annual rate of return on the investment of 9% p.a. compounded at regular intervals of 4 months. Approximately how much would Rolf expect to realise from the sale of his investment in 5 years from now?

    a. $13,911
    b. $18,463
    *c. $18,696
    d. $43,710

Correct answer: c
Feedback: The future value calculation can be made using the formula;
$FV = PV(1 + i)^n$ as follows:
$FV = \$12,000(1 + 3\%)^{15}$
$= \$12,000(1.03)^{15} = \$18,695.61$
The future value of the investment at the end of 5 years is approximately $18,696. Learning Objective 2.4 ~ explain the concept of time value of money and the benefits of compound interest.

11. An ordinary annuity is characterised by:

    *a. a series of cash flows that are identical in amount and occur at the end of consecutive time periods.
    b. a series of cash flows that are identical in amount and occur at the start of consecutive time periods .
    c. a single cash flow that occurs at the end of a particular time period and is accumulated over multiple time periods.
    d. none of the above.

Correct answer: a
Feedback: An ordinary annuity is characterised by a series of cash flows that are identical in amount and occur at the end of consecutive time periods.
Learning Objective 2.4 ~ explain the concept of time value of money and the benefits of compound interest.

12. Mr & Mrs Kelso are seeking a loan to buy a caravan to use to travel around Australia. The on-road cost of the caravan is $35,000. The loan details they have been provided from Ezy Credit are that the interest rate charged will be 9% p.a. and require end-of-month repayments over a 4-year term. The initial fees that form part of the loan arrangement are an establishment fee of $750 as well as a brokerage fee to Ezy Credit calculated as 2% of the loan value. Given that Mr & Mrs Kelso wish to borrow all the funds required to obtain the caravan what will be the approximate end-of-month loan repayment?

    a. $612.80
    b. $894.60
    *c. $907.80
    d. $938.35

Correct answer: c
Feedback: We initially need to determine the loan amount which will be $35,000 plus the relevant fees. Hence we know that $35,750 will provide Mr & Mrs Kelso with 98% of the total loan value (given a brokerage fee of 2% to Ezy Credit) which can be shown as follows:
98% (loan) = $35,750
Loan = $35,750 / 98% = $36,480
Now that we know the total loan value required ($36,480) we can calculate the monthly loan repayment using the formula:
$PV = PMT\,[1 - (1 + i)^{-n}] / i$
$\$36{,}480 = PMT\,[1 - (1 + (9\%/12)^{-48}] / (9\%/12)$
$\$36{,}480 = PMT\,[1 - (1 + (0.0075)^{-48}] / (0.0075)$
$\$36{,}480 = PMT\,[1 - (1 + (0.0075)^{-48}] / (0.0075)$
$\$36{,}480 = PMT\,(0.3014] / (0.0075)$
$PMT = \$36{,}480 / 40.1848$
$= \$907.80$
Learning Objective 2.4 ~ explain the concept of time value of money and the benefits of compound interest.

13. Approximately how much would you currently pay for an investment at a discount rate of 11% p.a. which produces an end of year cash inflow of $160 each year for 3 years?

    a. $369
    *b. $391
    c. $480
    d. $1,480

Correct answer: b
Feedback: The amount currently payable can be calculated using the present value formula;
$PV = (PMT[1 - (1 + i)^{-n}]) / i$ as follows:
$PV = (\$160[1 - (1 + 11\%)^{-3}] / 11\% = \$390.99$
The investor would be prepared to currently pay approximately $391 for the investment.
Learning Objective 2.4 ~ explain the concept of time value of money and the benefits of compound interest.

14. A loan is made to a borrower at a specified nominal interest rate. In order for the loan to be fully repaid over a specified term:

    a. periodic repayments would be the same whether they were made at the start or end of each period.
    b. periodic repayments would be greater if they were made at the start rather than at the end of each period.
    *c. periodic repayments would be greater if they were made at the end rather than at the start of each period.
    d. whether periodic repayments would be greater if they were made at the start or at the end of each period would depend on the specified interest rate.

Correct answer: c
Feedback: For the loan to be fully repaid over a specified number of repayments, the application of the time preference for money concept (where the preference is for earlier rather than later cash flows) would result in the conclusion that periodic repayments would need to be greater over a specified term if they were made at the end rather than at the start of each period. Learning Objective 2.5 ~ understand the difference between nominal and effective interest rates.

15. Credit card facilities in Australia are currently characterised by:

    a. providing borrowers with an open-ended credit facility.
    b. borrowers being required to make a monthly payment based on the outstanding credit card balance.
    c. providing lenders in recent years with a higher source of fee revenue from this source than from home loans.
    *d. all of the above.

Correct answer: d
Feedback: All of the issues raised are consistent with the current character of credit card facilities in Australia. Learning Objective 2.5 ~ understand the difference between nominal and effective interest rates.

16. An investment providing a nominal interest rate of 6% p.a. compounded monthly is equivalent to an effective interest rate of:

    a. less than 6%.
    b. equal to 6%.
    c. more or less than 6% depending on the investment term .
    *d. none of the above.

Correct answer: d
Feedback: An effective interest rate will always exceed the nominal interest rate whenever there is more than a single compounding period per annum. In this situation where there is monthly compounding (hence there are 12 compounding periods per annum) the interest rate will be more than 6% p.a.
Learning Objective 2.5 ~ understand the difference between nominal and effective interest rates.

17. NPV is:

    *a. the comparison of what is proposed to be outlaid or invested in today's dollars with what the investment is predicted to return in today's dollars.
    b. the sum of the future value of cash inflows less cash outflows.
    c. both a and b.
    d. positive at all discount rates greater than the IRR.

Correct answer: a
Feedback: NPV is the comparison of what is proposed to be outlaid or invested in today's dollars with what the investment is predicted to return in today's dollars. A positive outcome will result in the acceptance of the investment proposal and a negative outcome will result in the investment proposal's rejection. Learning Objective 2.5 ~ understand the difference between nominal and effective interest rates.

18. The NPV of an investment requiring an initial outlay of $10,000 at a discount rate of 6% which provides end-of-year cash flows of; year 1 - $3,000 (inflow), year 2 - $11,000 (inflow), year 3 - $1,500 (outflow) and year 4 - $7,000 (inflow) will be approximately:

    a. $6,163.
    *b. $6,905.
    c. $9,424.
    d. $19,500.

Correct answer: b
Feedback: We can calculate the NPV as follows:
NPV = -$10,000 + $3,000 / $(1 + 6\%)^1$ + $11,000 / $(1 + 6\%)^2$ - $1,500 / $(1 + 6\%)^3$ + $7,000 / $(1 + 6\%)^4$
= -$10,000 + ($3,000 / 1.06) + ($11,000 / 1.1236) - ($1,500 / 1.191) + ($7,000 / 1.2625)
= -$10,000 + $2,830 + $9,789 - $1,259 + $5,545
= $6,905

Learning Objective 2.6 ~ understand the concept of net present value.

19. An investor is seeking to make an investment decision over a 4-year term between alternative fixed interest securities of equivalent risk with each providing accumulated interest amounts on maturity. The ABC security offers a fixed interest rate of 8% for a 3-year maturity whereas the XYX security offers a fixed interest rate of 9% for a 4-year maturity. What initial calculation should be the basis for the decision-making between the securities?

    a. to calculate a forward rate for year 4 of the XYX security
    *b. to calculate a forward rate for year 4 of the ABC security
    c. to calculate a forward rate for year 3 of the ABC security
    d. none of the above

Correct answer: b
Feedback: To resolve the decision-making dilemma between securities ABC and XYX we can solve for the rate at which the 4^{th} year of security ABC is expected to represent the same financial outcome as for security XYX. This is known as the forward rate.
Learning Objective 2.7 ~ apply the time value of money concept to different investment choices.

20. The relationship of the effects of taxation and positive rates of inflation on investment returns for a fixed interest security will be:

    a. positive for both taxation and positive rates of inflation.
    b. inverse for taxation and positive for positive rates of inflation.
    *c. inverse for both taxation and positive rates of inflation.
    d. none of the above.

Correct answer: c
Feedback: Both taxation and positive rates of inflation are inversely related to investment returns for a fixed interest security as higher rates of each reduce the current value of such security. Learning Objective 2.7 ~ apply the time value of money concept to different investment choices.

Short Answer Questions

21. Outline the concept of a household's net worth and discuss some of the principal items that are likely to form part of this calculation.

Answer: A household's net worth can be calculated from the personal balance sheet by subtracting the total value of the household's personal liabilities from their total personal assets. A positive net worth will arise where total personal assets exceed liabilities and is the preferred outcome for the household. Some of the principal items that form part of a typical household's assets include; cash and investments (including superannuation), motor vehicles and house and contents whilst typical household liabilities include; outstanding credit card balance, personal loans and the home mortgage. Learning Objective 2.1 ~ prepare personal financial statements.

22. One of your financial planning clients, Ms Yvette Bordeaux has asked you to prepare specified personal financial statements on her behalf. Yvette is a 33 year-old employed landscape gardener and has a gross income of $55,000 for the 2014 financial year. In addition, Yvette's employer also contributes 9.25% of her gross income into a personal superannuation fund that you have set up to fund her retirement. Fortnightly salary deductions (based on gross income) for Yvette are as follows:

Details	**Percentage**
Taxation	**20**
Personal super contributions	**7**
Health cover	**3**
Union fees	**2**

Other expenditures incurred by Yvette for the 2014 financial year are as follows:

Details	**Amount ($)**
Household expenses	**10,000**
Mortgage loan repayments	**12,000**
Credit card repayments	**8,000**
Entertainment expenses	**5,000**

Yvette has also provided a list of her assets and liabilities based on the information that she currently has available as shown below:

Details	**Amount ($)**
Assets -	
House and personal effects	**400,000**
Superannuation	**160,000**
Car	**10,000**
Savings account	**2,000**
Liabilities -	

Mortgage loan	**250,000**
Credit card balance	**10,000**

(a) Prepare a personal cash flow budget for Yvette for the 2014 financial year based on the information provided.

(b) Prepare a current personal balance sheet for Yvette based on the information provided.

Answer:

(a) Personal cash flow statement for Yvette for the 2014 financial year:

Income:	Salary	$55,000
	Employer superannuation	5,088
		60,088
Expenditure:	Taxation	11,000
	Personal superannuation	3,850
	Health cover	1,650
	Union fees	1,100
	Household	10,000
	Mortgage payments	12,000
	Credit card payments	8,000
	Entertainment	5,000
		52,600
Net income		$7,488

(b) Personal balance sheet for Yvette at the end of the 2014 financial year:

Assets:	Savings account	$ 2,000
	Car	10,000
	Personal effects	15 000
	House and personal effects	400,000
	Superannuation	160,000
		572,000
Liabilities:	Credit card	10,000
	Mortgage loan	250,000
		260,000
Net worth		$312,000

Learning Objective 2.1 ~ prepare personal financial statements.

23. Briefly explain the relationship between the 'time preference for money' concept and opportunity costs.

Answer: Underlying the 'time preference for money' concept is the notion that a given amount received today is worth more than the same given amount received at any future time. This reflects the situation that the receipt of funds earlier rather than later provides an opportunity to re-invest those funds and commence receiving a return at an earlier date than otherwise available.
In the situation where funds are received at a relatively later date, the investor needs to be financially 'compensated' in the form of an interest rate or otherwise described as a required rate of return, discount rate or time preference rate. This interest rate will depend on the risk attached to the investment with a higher rate required for taking relatively higher risk. Once this interest rate is known, the 'value' of the compensation required can be calculated in the form of a future value that will move in the same direction as any change in interest rates. Hence the interest rate provided on an investment prevents an opportunity cost arising to the investor. Learning Objective 2.4 ~ explain the concept of time value of money and the benefits of compound interest.

24. Ms. Alicia Weir has been able to accumulate $10,000 in savings from her end-of-month salary and is seeking to invest this amount plus the regular monthly salary savings of $400 into a suitable investment. Given her risk profile, the People's Preference Credit Union has been selected as the best financial intermediary to place her funds. The credit union has offered her a high-interest savings account with an interest rate of 8% compounded monthly for the next 4 years for the investment of Alicia's accumulated and ongoing savings.
a) What effective interest rate will Alicia be earning on her funds?
b) What is the expected balance of the high-interest savings account at the end of the 4-year term?

Answer:
a) The effective interest rate on the investment can be calculated using the formula:
$i = (1 + j / m)^m - 1$
$= (1 + 8\% / 12)^{12} - 1$
$= (1 + 0.6667\%)^{12} - 1$
$= 1.083 - 1$
$= 8.3\%$
b) The expected balance of the high-interest savings account at the end of the 4-year term can be calculated as the future value of the initial sum of $10,000 plus the future value of the regular end-of-month payment of $400 as follows:
The future value of the initial sum will be -
$FV = PV(1 + i)^n$ which can be applied as follows:
$= \$10,000\ (1 + 8\% / 12)^{48} = \$10,000\ (1.3757)$
$= \$13,757$
The future value of the regular end-of-month payments will be -
$FV = (PMT\ [1 + i]^n - 1) / i$ as follows:
$= (\$400\ (1 + 8\%/12)^{48} - 1] / 8\%/12$
$= \$400\ (1.3757 - 1] / 0.00667$
$= \$150.28 / 0.00667$

= $22,530
Hence the expected balance at the end of the 4-year term will be $36,287 ($13,757 + $22,530). Learning Objective 2.4 ~ explain the concept of time value of money and the benefits of compound interest.

25. Briefly outline a situation where a reverse mortgage may be a suitable option for a person.

Answer: A reverse mortgage provides a potential solution to a situation where a person requires additional regular income and they have an asset that is suitable to provide to a lender as security. This is often the case with retired people living in their family home who do not have the benefit of regular personal exertion income and their investment income is insufficient to meet their lifestyle expenses. By taking out a reverse mortgage the lender will provide the borrower with either a lump sum or a regular income which can be used by the borrower to meet any gap in their lifestyle expenses without having an obligation to make regular payments on the debt as is typically the case with a regular loan arrangement. The outstanding loan balance on a reverse mortgage is typically repaid upon the subsequent sale of the home which may be after the time of death of the borrower. As this may occur a number of years after the loan is taken out the lender is typically quite conservative in the lending ratio made available for this type of loan.
Learning Objective 2.4 ~ explain the concept of time value of money and the benefits of compound interest.

26. You were looking for a loan and had secured the following three quotes from local banks.

1) bank A: 10.45% p.a., compounded monthly
2) bank B: 10.6% p.a., compounded quarterly
3) bank C: 11% p.a., compounded annually

Which bank offers the best loan deal?

Answer: We need to determine which bank is offering the best (lowest) interest rate. To do this we need to understand the difference between nominal and effective interest rates. Bank C is already an effective rate (given that there is only 1 compounding period p.a.) but we need to convert the nominal rates shown for banks A and B to effective rates in order to provide a basis for comparison. To do this we use the following formula:

$i = (1 + j / m)^m - 1$

where:

j is the nominal rate p.a. and

m is the compounding frequency p.a.

bank A = $(1 + 0.1045 / 12)^{12} - 1 = 10.96\%$

bank B = $(1 + 0.106 / 4)^4 - 1 = 11.03\%$

For a borrower, bank A offers the lowest rate as 10.96% < both 11% (bank C) and 11.03% (bank B). Learning Objective 2.5 ~ understand the difference between nominal and effective interest rates.

27. As an experienced financial adviser you are often asked to provide assistance to people who are contemplating taking out a new credit card or transferring their existing credit card facilities from one lender to another. Often the lender provides 'financial incentives' to the applicant to encourage them to undertake such borrowing arrangements including; credit limit increases, honeymoon rates and cash back offers. Outline what these 'financial incentives' provide to the potential applicant and the considerations that they should assess prior to undertaking any of these credit arrangements.

Answer: The main issue to note in this situation is for the potential applicant to have a full understanding of the financial implications of any of these 'financial incentives' prior to entering into any such arrangements so that they are making an informed decision. That is, it may often be the case that such 'financial incentives' are worthwhile and should be strongly considered however only where all the relevant issues have been taken into consideration prior to the decision being made.
Credit limit increases provide additional borrowing capacity by allowing the borrower to have a greater credit balance on their credit facility which is likely to sound attractive to a potential credit applicant. However, if they have previously experienced difficulties in repaying existing credit facilities this is likely to be made worse if their outstanding balance is greater. Interest is charged on the total outstanding balance which further compounds the repayment requirements.
Honeymoon rates are an introductory 'lower' interest rate provided to a borrower for a specified period. This may encourage people to transfer existing arrangements to this lender given the rate is likely to be lower than competitors. However, of course the rate will increase back to a higher rate at the end of the introductory period based on the outstanding balance at this time. There is a potential danger that during the introductory period a person may spend more than what they otherwise can afford and hence subsequently experience difficulties in repaying the debt once the facility reverts back to the higher 'standard' interest rate.
Cash back offers provide the borrower with initial credit on their account which sounds very attractive. However all the terms and conditions of the arrangement need to be examined as many have higher interest rates and fees than competitors which may more than offset such financial incentive. Other conditions such as requiring the credit card to be maintained for a specified period and / or minimum transaction requirements may also be attached to such offers which may not be consistent with the borrower's requirements.
Learning Objective 2.5 ~ understand the difference between nominal and effective interest rates.

28. Anne Herriman is seeking to purchase a motor vehicle for approximately $10,000 and requires finance in order to complete the purchase. She has recently visited the following financiers who have each approved finance for an amount of $10,000 on the following terms and conditions:

Ezy Credit: 3 year loan with end of month repayments of $350 and a loan establishment fee of $100 payable upon loan acceptance, Spinner Financing: 2 year loan with end of month repayments of $500, and Low Doc Loans: 3 year loan with end of quarter repayments of $1,050 and a loan establishment fee of $150 payable upon loan acceptance.
As Anne has become confused as to which finance alternative is best given the different terms and conditions of each financier she has sought your assistance and advice.

a) On what financial basis should Anne seek to differentiate and select between the different financiers?

b) With the assistance of a financial calculator and your previous discussion in part (a) of this question, advise Anne as to the preferred finance alternative.

Answer:

(a) As the repayment patterns for each of the finance alternatives are different, it is not sufficient to either simply add up the total payments for each alternative or to see which has the lowest regular payment. In this case the alternatives can only be validly compared based on their effective interest rates. Assuming only the information provided is relevant, Anne should select the finance offer with the lowest effective interest rate.

(b) Calculating the effective interest rate for each finance alternative provides the following:

Ezy Credit:

Net loan provided = $9,900 ($10,000 - $100 fee)

9,900 ***PV*** *350 +/-* ***PMT*** *36* ***n*** ***COMP*** ***i*** *giving 1.3664% per month*

$i = (1 + j/m)^m - 1$

$= (1 + 1.3664\%)^{12} - 1$

$= 17.689\%$

Spinner Financing:

10,000 ***PV*** *500 +/-* ***PMT*** *24* ***n*** ***COMP*** ***i*** *giving 1.5131% per month*

$i = (1 + j/m)^m - 1$

$= (1 + 1.513\%)^{12} - 1$

$= 19.747\%$

Low Doc Loans:

Net loan provided = $9,850 ($10,000 - $150 fee)

9,850 ***PV*** *1,050 +/-* ***PMT*** *12* ***n*** ***COMP*** ***i*** *giving 4.0076% per quarter*

$i = (1 + j/m)^m - 1$

$= (1 + 4.001\%)^4 - 1$

$= 16.99\%$

The preferred finance alternative is the loan that provides the lowest effective interest rate to Anne. In this case Low Doc Loans has the lowest effective interest rate of 16.99% (as compared to 17.689% for Ezy Credit and 19.747% for Spinner Financing) this option should be selected by Anne. Learning Objective 2.5 ~ understand the difference between nominal and effective interest rates.

29. Ms Claire Samba is assessing a proposed 4-year investment requiring an initial outlay of $200,000. From her analysis she has predicted future end-of-year operating cash flows arising from the investment as follows: year 1 - $12,000 (cash inflow); year 2 - $30,000 (cash inflow); year 3 - $60,000 (cash inflow) and year 4 - $25,000 (cash outflow).
At the end of year 4 Claire also expects to realise $280,000 from the sale of the investment. As Claire's trusted adviser you have assessed the risk of the investment being 9% p.a. compounded monthly.
Would you recommend Claire proceed with the investment based on the information provided?

Answer: From the given information the first issue that needs to be considered is the appropriate discount rate to be used in the investment evaluation process as the rate is given monthly however the cash flows occur on an annual basis. Hence we need to calculate an effective interest rate to reconcile the interest rate to the cash flows.
The effective interest rate can be calculated using the formula: $i = (1 + j / m)^m - 1$
$= (1 + 9\% / 12)^{12} - 1$
$= (1 + 0.0075)^{12} - 1$
$= 1.0075 - 1$
$= 9.38\%$
Now that we have the relevant discount rate we can calculate the NPV as the present value of the future cash flows less the initial cash outflow as follows:
Initial (present) value of the cash outflow = $200,000
Present value of the future cash flows =
$(12{,}000/[1.0938]^1) + (30{,}000/[1.0938])^2) + (60{,}000/[1.0938]^3) + (255{,}000/[1.0938]^4)$
Note the year 4 net cash inflow of $255,000 has been calculated as; -25,000 + 280,000.
Present value of the future cash flows as above = 10,971 + 25,075 + 45,850 + 178,151
= $260,047
NPV = $260,047 - $200,000
= $60,047
Based on the information provided you would recommend that Claire proceed with the investment given it has a positive NPV ($60,047).
Learning Objective 2.6 ~ understand the concept of net present value.

30. Mr Rick Martinio is seeking to invest $50,000 today over a 5-year period to obtain the maximum possible fixed interest return. All interest accrued from each fixed interest investment will be payable upon maturity of the investment. The Wacpac Bank has offered Rick an interest rate of 5% p.a. compounded on a 6-monthly basis over a 3-year period. This bank charges an exit fee of $300 on the maturity of any fixed interest investment. At the end of year 3 Rick expects to be able to reinvest the accumulated proceeds into a 2-year fixed interest investment with Wacpac at an annual interest rate of 7% p.a. Rick has also been provided a quote from the National Provincial Bank which provides for a 4-year fixed interest investment at a rate of 6% p.a. and charges a one-off fee of $600 for any fixed interest investments undertaken by an entity within a 5-year period. Both banks offer fixed interest investments having terms of 1 to 4 years. What interest rate would Rick need to earn in year 5 with the National Provincial Bank in order to be competitive with the fixed interest investment offerings of the Wacpac Bank? Hint: Use a financial calculator to assist if seeking to calculate an Internal Rate of Return (IRR).

Answer: To resolve this issue we need to calculate the forward rate for year 5 for the National Provincial Bank which provides the same outcome as the known return from the Wacpac Bank. Hence we initially need to calculate the compounded rate of return from the Wacpac Bank over the 5-year period – so this can be used for comparison purposes. We are familiar with the formula:

$FV = PV(1 + i)^n$ which can be applied to the initial 3-year fixed interest investment as follows:

$FV = \$50{,}000\ (1 + 2.5\%)^6 = \$50{,}000\ (1.1597) = \$57{,}985$

A fee of $300 will be deducted on maturity of the 3-year period by the Wacpac Bank reducing the net amount available for reinvestment to $57,685.

Assuming this amount can be reinvested at the end of year 3 at 7% p.a. for the remaining 2 years this will accumulate to:

$FV = \$57{,}685\ (1 + 7\%)^2 = \$57{,}685\ (1.1449) = \$66{,}044$

Again, a fee of $300 will be deducted on maturity of the 2-year period by the Wacpac Bank reducing the net amount available to Rick at the end of 5 years to $65,744.

Now that we know the accumulated sum of the investment with the Wacpac Bank over the 5-year term ($65,744) we can determine the compounded rate of interest over this period from the formula:

$FV = PV(1 + i)^n$ which can be applied as follows:

$\$65{,}744 = \$50{,}000\ (1 + i)^5 = (1 + i)^5 = \$65{,}744 / \$50{,}000$

$= (1 + i)^5 = 1.3149$

We can either use financial tables (to find the interest rate consistent with the factor 1.3149) or a financial calculator to assist with relevant calculations. Using the financial calculator would provide the following:

50,000 +/- ***PV*** 65,744 ***FV*** *5* ***n*** ***COMP i*** *giving* 5.6276%

Now that we know the net investment return from the Wacpac Bank (5.6276%) and the 4-year return from an investment with the National Provincial Bank (6%) we can now calculate the equivalent year 5 rate for the investment with the National Provincial Bank using the forward rate formula as follows:

$f_5 = ([1 + r_5])^5 / [1 + r_4]^4) - 1$

$= ([1 + 5.6276\%])^5 / [1 + 6\%]^4) - 1$

$= (1.3149 / 1.2625) - 1 = 1.0415$

$= 4.15\%$

Thus the year 5 forward rate will be 4.15%
Hence the year 5 interest rate for a 1-year fixed interest investment deposit with the National Provincial Bank needs to be at least 4.15% in order to be competitive with the fixed interest investment offerings of the Wacpac Bank over a 5-year period. This can be proved given that we know that the $50,000 investment with the Wacpac Bank will accumulate to $65,744 at the end of 5 years. For the National Provincial Bank the equivalent calculation will then be:
FV = $50,000 $(1 + 6\%)^4 (1 + 4.15\%)^1$
= $50,000 (1.2625) (1.0415)
= $65,744
Learning Objective 2.7 ~ apply the time value of money concept to different investment choices.

31. Outline circumstances where the NPV form of investment analysis is preferred to using the IRR method.

Answer: Where there is more than one sign change in the periodic cash flows (inflows and outflows) for an investment proposal the NPV form of investment analysis is preferred to using the IRR. This is because given the nature of the IRR calculation more than one IRR value can be calculated where multiple cash flow sign changes occur. As only a single NPV will be calculated regardless of the presence of multiple cash flow sign changes, this method will be preferred in these circumstances.
Learning Objective 2.7 ~ apply the time value of money concept to different investment choices.