Chapter 2
The Investment Process

Concept Questions

1. Purchasing on margin means borrowing some of the money used to buy securities. You do it because you desire a larger position than you can afford to pay for, recognizing that using margin is a form of financial leverage. As such, your gains and losses will be magnified. Of course, you hope you only experience the gains.

2. Shorting a security means borrowing it and selling it, with the understanding that at some future date you will buy the security and return it, thereby "covering" the short. You do it because you believe the security's value will decline, so you hope to sell high now, then buy low later.

3. Margin requirements amount to security deposits. They exist to protect your broker against losses.

4. Asset allocation means choosing among broad categories such as stocks and bonds. Security selection means picking individual assets within a particular category, such as shares of stock in particular companies.

5. Tactical asset allocation is making small, short-term adjustments to your longer-term strategic allocation. The idea is to overweight sectors with the greatest potential for gains. Since you are effectively trying to determine which sectors will perform the best, tactical asset allocation can be considered a form of market timing.

6. A broker simply conducts trades on your behalf, and in return he receives a commission. An advisor is typically a fee-based relationship, where you pay an annual percentage of assets, which covers the cost of all advice and trades. With an advisory relationship, the interests of the advisor and investor may be better aligned, as the incentive to "churn" is eliminated.

7. Probably none. The advice you receive is unconditionally *not* guaranteed. If the recommendation was grossly unsuitable or improper, then arbitration is probably your only possible means of recovery. Of course, you can close your account, or at least what's left of it.

8. If you buy (go long) 500 shares at $18, you have a total of $9,000 invested. This is the most you can lose because the worst that could happen is that the company could go bankrupt, leaving you with worthless shares. There is no limit to what you can make because there is no maximum value for your shares – they can increase in value without limit.

9. If the asset is illiquid, it may be difficult to quickly sell it during market declines, or to purchase it during market rallies. Hence, special care should always be given to investment positions in illiquid assets, especially in times of market turmoil

10. Traditional IRAs are tax-deferred, with withdrawals being taxed. Contributions to Roth IRAs are taxed up-front, but all deposits grow tax free. Thus, an investor who is currently in a low tax bracket (such as a college student) may prefer a Roth as the benefit of the tax-free growth outweighs the tax benefit of the traditional tax-deferred IRA.

Solutions to Questions and Problems

NOTE: All end of chapter problems were solved using a spreadsheet. Many problems require multiple steps. Due to space and readability constraints, when these intermediate steps are included in this solutions manual, rounding may appear to have occurred. However, the final answer for each problem is found without rounding during any step in the problem.

Core questions

1. Maximum investment = \$31,000 / .60 = \$51,667
Number of shares = \$51,667 / \$17 per share = 3,039.22 (or 3,039) shares

2. Margin loan = (\$53 × 275) – \$8,000 = \$6,575
Margin requirement = \$8,000 / (\$53 × 275) = .5489, or 54.89%

3. Terminal price = \$62
Without margin = (\$62 – 53) / \$53 = 16.98%
With margin = {(\$62 × 275) – (\$53 × 275) } / \$8,000 = 30.94%

Terminal price = \$46
Without margin = (\$46 – 53) / \$53 = –13.21%
With margin = {(\$46 × 275) – (\$53 × 275)} / \$8,000 = –24.06%

4. Initial deposit = .70 × (\$53 × 275) = \$10,202.50

Terminal price = \$62
Without margin = (\$62 – 53) / \$53 = 16.98%
With margin = {(\$62 × 275) – (\$53 × 275)} / \$10,202.50 = 24.26%

Terminal price = \$46
Without margin = (\$46 – 53) / \$53 = –13.21%
With margin = {(\$46 × 275) – (\$53 × 275)} / \$10,202.50 = –18.87%

A lower initial margin requirement will make the returns more volatile. In other words, a stock price increase will increase the return, and a stock price decrease will cause a greater loss.

5. Maximum purchase = \$22,000 / .55 = \$40,000

6. Amount borrowed = (500 × \$38) - (500 × \$38)(.60) = \$7,600
Margin call price = (\$7,600 / 500) / (1 –.3) = \$21.71

7. Amount borrowed = (1,200 × \$34)(1 – .55) = \$18,360
Margin call price = (\$18,360 / 1,200) / (1 –.35) = \$23.54
Stock price decline = (\$23.54 – \$34) / \$34 = –30.77%

8. Proceeds from short sale = 1,000 × \$48 = \$48,000
Initial deposit = \$48,000 (.60) = \$28,800
Account value = \$48,000 + \$28,800 = \$76,800
Margin call price = \$76,800 / [1,000 + (.30 × 1,000)] = \$59.08

9. Proceeds from short sale = 1,000($36) = $36,000
Initial deposit = $36,000(.55) = $19,800
Account value = $36,000 + 19,800 = $55,800
Margin call price = $55,800 / [1,000 + (.35 × 1,000)] = $41.33
Account equity = $55,800 – (1,000 × $41.33) = $14,470

10. Pretax return = ($78 – 73 + 1.20) / $73 = 8.49%
Aftertax capital gains = ($78 – 73)(1 – .30) = $3.50
Aftertax dividend yield = $1.20(1 – .15) = $1.02
Aftertax return = ($3.50 + 1.02) / $73 = 6.19%

Intermediate questions

11.

Assets		Liabilities and account equity	
3039 shares	$51,663.00	Margin loan	$20,665.20
		Account equity	30,997.80
Total	$51,663.00	Total	$51,663.00

Stock price = $24

Assets		Liabilities and account equity	
3039 shares	$72,936.00	Margin loan	$20,665.20
		Account equity	52,270.80
Total	$72,936.00	Total	$72,936.00

Margin = $52,270.80 / $72,936 = 71.67%

Stock price = $14

Assets		Liabilities and account equity	
3039 shares	$42,546.00	Margin loan	$20,665.20
		Account equity	21,880.80
Total	$42,546.00	Total	$42,546.00

Margin = $21,880.80 / $42,546 = 51.43%

12. 500 shares × $60 per share = $30,000
Initial margin = $20,000 / $30,000 = 66.67%

Assets		Liabilities and account equity	
500 shares	$30,000	Margin loan	$10,000
		Account equity	20,000
Total	$30,000	Total	$30,000

13. Total purchase = 500 shares × \$48 = \$24,000
Margin loan = \$24,000 – 8,000 = \$16,000
Margin call price = \$16,000 / [500 – (.30 × 500)] = \$45.71

To meet a margin call, you can deposit additional cash into your trading account, liquidate shares until your margin requirement is met, or deposit additional marketable securities against your account as collateral.

14. Interest on loan = \$16,000(1.065) – 16,000 = \$1,040

a. Proceeds from sale = 500(\$56) = \$28,000
Dollar return = \$28,000 – 8,000 – 16,000 – 1,040 = \$2,960
Rate of return = \$2,960/ \$8,000 = 37.00%
Without margin, rate of return = (\$56 – 48) / \$48 = 16.67%

b. Proceeds from sale = 500(\$48) = \$24,000
Dollar return = \$24,000 – 8,000 – 16,000 – 1,040 = –\$1,040
Rate of return = –\$1,040 / \$8,000 = –13.00%
Without margin, rate of return = \$0%

c. Proceeds from sale = 500(\$32) = \$16,000
Dollar return = \$16,000 – 8,000 – 16,000 – 1,040 = –\$9,040
Rate of return = –\$9,040 / \$8,000 = –113.00%
Without margin, rate of return = (\$32 – 48) / \$48 = –33.33%

15. Initial equity = (1,000 × \$40)(.50) = \$20,000
Amount borrowed = (1,000 × \$40)(1 – .50) = \$20,000
Interest = \$20,000 × .0680 = \$1,360
Proceeds from sale = 1,000 × \$45 = \$45,000
Dollar return = \$45,000 – 20,000 – 20,000 – 1,360 = \$3,640
Rate of return = \$3,640 / \$20,000 = 18.20%

16. Total purchase = 800 × \$34 = \$27,200
Loan = \$27,200 – 15,000 = \$12,200
Interest = \$12,200 × .07 = \$854
Proceeds from sale = 800 × \$48 = \$38,400
Dividends = 800 × \$.64 = \$512
Dollar return = \$38,400 + 512 – 15,000 – 12,200 – 854 = \$10,858
Return = \$10,858 / \$15,000 = 72.39%

17. $\$50,000 \times (1.084)^{6/12} - 50,000 = \$2,057.66$

18. $\$75,000 \times (1.064)^{2/12} - 75,000 = \$779.46$

19. $(1 + .14)^{12/7} - 1 = 25.18\%$

20. $(1 + .14)^{12/5} - 1 = 36.95\%$
All else the same, the shorter the holding period, the larger the EAR for a given holding period return.

21. Holding period return = ($61 – 57 + .60) / $57 = 8.07%
EAR = $(1 + .0807)^{12/5} - 1$ = 20.47%

22. Initial purchase = 500 × $60 = $30,000
Amount borrowed = $30,000 – 20,000 = $10,000
Interest on loan = $10,000$(1 + .0625)^{1/2}$ – $10,000 = $307.76
Dividends received = 500($.25) = $125.00
Proceeds from stock sale = 500($65) = $32,500
Dollar return = $32,500 + 125 – 10,000 – 20,000 – 307.76 = $2,317.24
Rate of return = $2,317.24 / $20,000 = 11.59% per six months
Effective annual return = $(1 + .1159)^{12/6} - 1$ = 24.51%

23. Proceeds from sale = 800 × $47 = $37,600
Initial margin = $37,600 × 1.00 = $37,600

Assets		Liabilities and account equity	
Proceeds from sale	$37,600	Short position	$37,600
Initial margin deposit	37,600	Account equity	37,600
Total	$75,200	Total	$75,200

24. Proceeds from sale = 800 × $47 = $37,600
Initial margin = $37,600 × .60 = $22,560

Assets		Liabilities and account equity	
Proceeds from sale	$37,600	Short position	$37,600
Initial margin deposit	22,560	Account equity	22,560
Total	$60,160	Total	$60,160

25. Proceeds from short sale = 750($96) = $72,000
Initial margin deposit = $72,000(.60) = $43,200
Total assets = Total liabilities and equity = $72,000 + 43,200 = $115,200
Cost of covering short = 750($86.50) = $64,875
Account equity = $115,200 – 64,875 = $50,325
Cost of covering dividends = 750($0.75) = $563
Dollar profit = $50,325 – 43,200 – 563 = $6,563
Rate of return = $6,563 / $43,200 = 15.19%

26. Proceeds from sale = 600 × $72 = $43,200
Initial margin = $43,200 × .50 = $21,600

Initial Balance Sheet

Assets		Liabilities and account equity	
Proceeds from sale	$ 43,200	Short position	$ 43,200
Initial margin deposit	21,600	Account equity	21,600
Total	$ 64,800	Total	$ 64,800

Stock price = $63

Assets		Liabilities and account equity	
Proceeds from sale	$ 43,200	Short position	$ 37,800
Initial margin deposit	21,600	Account equity	27,000
Total	$ 64,800	Total	$ 64,800

Margin = \$27,000 / \$37,800 = 71.43%
Five-month return = (\$27,000 – 21,600) / \$21,600 = 25%
Effective annual return = $(1 + .25)^{12/5} - 1$ = 70.84%

Stock price = \$77

Assets		Liabilities and account equity	
Proceeds from sale	\$ 43,200	Short position	\$ 46,200
Initial margin deposit	21,600	Account equity	18,600
Total	\$ 64,800	Total	\$ 64,800

Margin = \$18,600 / \$46,200 = 40.26%
Five-month return = (\$18,600 – 21,600) / \$21,600 = –13.89%
Effective annual return = $(1 - .1389)^{12/5} - 1$ = –30.15%

CFA Exam Review by Kaplan Schweser

1. a

   The Analee's pre-tax return objective is computed as follows:

Living expenses	\$75,000
Travel expenses	15,000
College fund	20,000
Total	\$110,000

Portfolio Value = \$3,000,000	
Income objective = \$110,000 / 3,000,000 =	3.67%
Plus inflation	3.00%
Gross Return Objective	6.67%

2. a

   Their risk tolerance is average. Their liquidity needs are high due to their living expenses, yet their portfolio is large enough. Since they are in their retirement years, they will be living off their portfolio and not adding to it other than the growth in the portfolio to stay even with inflation.

3. a

   Although Barbara's willingness to assume risk may be high (above average) given her past entrepreneurial pursuits and the Analee's time horizon is quite long, her ability to assume risk is average given her current income needs.

4. a

   The most appropriate portfolio is A, as it provides a good balance in terms of return objectives, risk tolerance, and constraints. The portfolio provides an adequate return (8.8%) versus their requirement (6.67%), and it provides sufficient income while minimizing the impact of inflation.

Portfolio B is inappropriate because it concentrates a higher proportion of assets into VC and REITs, which are lower liquidity and higher volatility assets. Portfolio C is inappropriate because it does not meet the return objective.

Chapter 2

Problems 1-26

Input boxes in tan
Output boxes in yellow
Given data in blue
Calculations in red
Answers in green

NOTE: Some functions used in these spreadsheets may require that the "Analysis ToolPak" or "Solver Add-in" be installed in Excel. To install these, click on "Tools|Add-Ins" and select "Analysis ToolPak and "Solver Add-In."

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Chapter 2
Question 1

Input Area:

Stock price	$	17
Dollars to invest	$	31,000
Initial margin		60%

Output Area:

Maximum investment	$	51,667
Maximum shares		**3039.215686**

Chapter 2

Question 2

Shares of stock		275
Stock price	$	53
Required deposit	$	8,000

Output Area:

Margin loan	$	**6,575**
Initial margin		**54.89%**

Chapter 2
Question 3

Shares of stock		275
Stock price	$	53
Margin	$	8,000
Terminal stock price	$	62
Terminal stock price	$	46

Output Area:

Margin requirement		54.89%
When stock price is	$	62
Return with margin		**30.94%**
Return without margin		**16.98%**
When stock price is	$	46
Return with margin		**-24.06%**
Return without margin		**-13.21%**

Chapter 2
Question 4

Shares of stock		275
Stock price	$	53
Terminal stock price	$	62
Terminal stock price	$	46
Initial margin		70%

Output Area:

Equity	$	10,202.50
When stock price is	$	62
Return with margin		**24.26%**
Return without margin		**16.98%**
When stock price is	$	46
Return with margin		**-18.87%**
Return without margin		**-13.21%**

Chapter 2
Question 5

Input Area:

Dollars to invest	$	22,000
Initial margin		55%

Output Area:

Maximum investment	$	**40,000.00**

Chapter 2
Question 6

Input Area:

Share price	$	38
Initial margin		60%
# of shares		500
Maintenance margin		30%

Output Area:

Total stock purchase	$	19,000
Account equity	$	11,400
Amount borrowed	$	7,600
P*	**$**	**21.71**

Chapter 2

Question 7

Input Area:

Share price	$	34
Initial margin		55%
# of shares		1,200
Maintenance margin		35%

Output Area:

Total stock purchase	$	40,800
Account equity	$	22,440
Amount borrowed	$	18,360
P*	$	23.54
Percentage stock decline		**-30.77%**

Chapter 2

Question 8

Input Area:

Short shares		1,000
Share price	$	48
Initial margin		60%
Maintenance margin		30%

Output Area:

Proceeds from short sale	$	48,000
Margin deposit	$	28,800
Total assets	$	76,800
P* (margin call above this price)	**$**	**59.08**

Chapter 2
Question 9

Input Area:

Short shares		1,000
Share price	$	36
Initial margin		55%
Maintenance margin		35%

Output Area:

Proceeds from short sale	$	36,000
Margin deposit	$	19,800
Total assets	$	55,800
P* (margin call above this price)	**$**	**41.33**
Account equity at P*	**$**	**14,470.00**

Chapter 2
Question 10

Input Area:

Initial stock price	$	73.00
Dividend	$	1.20
Terminal stock price	$	78.00
Marginal tax rate		15%
Capital gains tax		30%

Output Area:

Pretax return		**8.49%**
Aftertax capital gain	$	3.500
Aftertax dividend	$	1.020
Aftertax return		**6.19%**

Chapter 2
Question 11

Input Area:

Stock price	$	17
Terminal stock price	$	24
Terminal stock price	$	14
Shares		3,039

Output Area:

	Assets			Liabilities and
Initial Purchase				
Shares of stock	$	51,663.00	Margin loan	
			Account equity	
Total	$	51,663.00	Total	
Stock price =		$24		
Shares of stock	$	72,936.00	Margin loan	
			Account equity	
Total	$	72,936.00	Total	
Margin		**71.67%**		
Stock price =		$14		
Shares of stock	$	42,546.00	Margin loan	
			Account equity	
Total	$	42,546.00	Total	
Margin		**51.43%**		

account equity	
$	20,665.20
$	30,997.80
$	51,663.00
$	20,665.20
$	52,270.80
$	72,936.00
$	20,665.20
$	21,880.80
$	42,546.00

Chapter 2
Question 12

Input Area:

Stock price	$	60
Margin account	$	20,000
Shares		500

Output Area:

	Assets			Liabilities and a
Shares of stock	$	30,000.00		Margin loan
				Account equity
Total	$	30,000.00		Total
Margin		**66.67%**		

account equity	
$	10,000.00
$	20,000.00
$	30,000.00

Chapter 2
Question 13

Input Area:

Share price	$	48
Initial investment	$	8,000
# of shares		500
Maintenance margin		30%

Output Area:

Total stock purchase	$	24,000
Margin loan	$	16,000
P*	**$**	**45.71**

To meet margin call, you can deposit additional cash into your trading account, liquidate shares until your margin requirement is met, or deposit additional marketable securities against your account as collateral.

Chapter 2

Question 14

Input Area:

Initial stock price	$	48
Initial investment	$	8,000
# of shares		500
Maintenance margin		30%
Call money rate		5%
Premium charged		1.5%
Margin loan	$	16,000
Total stock purchase	$	24,000
Price:	$	56
	$	48
	$	32

Output Area:

Interest on loan	$	1,040.00
Terminal price	$	56
Proceeds from sales	$	28,000
Dollar return	$	2,960
Rate of return		**37.00%**
Without margin, rate of return		**16.67%**
Terminal price	$	48
Proceeds from sales	$	24,000
Dollar return	$	(1,040)
Rate of return		**-13.00%**
Without margin, rate of return		**0.00%**
Terminal price	$	32
Proceeds from sales	$	16,000
Dollar return	$	(9,040)
Rate of return		**-113.00%**
Without margin, rate of return		**-33.33%**

Chapter 2
Question 15

Input Area:

Initial stock price	$	40
# of shares		1,000
Call money rate		5.6%
Premium charged		1.2%
Terminal stock price	$	45
Initial margin		50%

Output Area:

Total purchase	$	40,000
Initial equity	$	20,000
Proceeds from sale	$	45,000
Loan value	$	20,000
Interest rate		6.80%
Interest paid	$	1,360
Dollar return	$	3,640
Rate of return		**18.20%**

Chapter 2
Question 16

Input Area:

Initial stock price	$	34
# of shares		800
Call money rate		4.5%
Premium charged		2.5%
Terminal stock price	$	48
Initial investment	$	15,000
Dividends per share	$	0.64

Output Area:

Total purchase	$	27,200.00
Initial equity	$	15,000.00
Proceeds from sale	$	38,400.00
Loan	$	12,200.00
Interest paid	$	854.00
Dividends received	$	512.00
Dollar return	$	10,858.00
Rate of return		**72.39%**

Chapter 2

Question 17

Input Area:

Margin loan	$	50,000
Margin rate		8.40%
Loan term (months)		6

Output Area:

Interest	$	**2,057.66**

Chapter 2
Question 18

Input Area:

Margin loan	$ 75,000
Margin rate	6.40%
Loan term (months)	2

Output Area:

Interest	$ 779.46

Chapter 2
Question 19

Input Area:

Holding period (months)	7
Holding period return	14%

Output Area:

EAR	**25.18%**

Chapter 2
Question 20

Input Area:

Holding period (months)	5
Holding period return	14%

Output Area:

EAR	**36.95%**

All else the same, the shorter the holding period, the larger EAR for a given holding period return.

Chapter 2

Question 21

Input Area:

Holding period (months)		5
Initial share price	$	57.00
Current share price	$	61.00
Dividend	$	0.60

Output Area:

Holding period return	8.07%
EAR	**20.47%**

Chapter 2

Question 22

Input Area:

Call money rate		5%
Spread		1.25%
Sell price	$	65
Margin account	$	30,000
Margin loan	$	10,000
Shares		500
# of months		6
Dividend per share	$	0.25

Output Area:

Interest on loan	$	307.76
Dividends received	$	125.00
Proceeds from stock sale	$	32,500.00
Dollar return	**$**	**2,317.24**
Holding period return		11.59%
Rate of return (1 year)		**24.51%**

Chapter 2

Question 23

Input Area:

Initial margin		100%
Short shares		800
Share price	$	47.00

Output Area:

Assets			*Liabilities and account equity*		
Proceeds from sale	$	37,600	Short position	$	37,600
Initial margin deposit	$	37,600	Account equity	$	37,600
Total	$	75,200	Total	$	75,200

Chapter 2
Question 24

Input Area:

Initial margin		60%
Short shares		800
Share price	$	47.00

Output Area:

Assets			*Liabilities and account equity*		
Proceeds from sale	$	37,600	Short position	$	37,600
Initial margin deposit	$	22,560	Account equity	$	22,560
Total	$	60,160	Total	$	60,160

Chapter 2

Question 25

Input Area:

Initial margin		60%
Short shares		750
Share price	$	96.00
Terminal price	$	86.50
Dividends paid	$	0.75

Output Area:

Assets			*Liabilities and account equity*		
Proceeds from sale	$	72,000	Short position	$	64,875
Initial margin deposit	$	43,200	Account equity	$	50,325
Total	$	115,200	Total	$	115,200
Dividends covered	$	563			
Cost of covering short	$	64,875			
Dollar return	$	6,563			
Effective annual return		**15.19%**			

Chapter 2
Question 26

Input Area:

Initial margin		50%
Short shares		600
Share price	$	72.00
Terminal price	$	63.00
Terminal price	$	77.00
Investment length (months)		5

Output Area:

Initial balance sheet

Assets			*Liabilities and account equity*		
Proceeds from sale	$	43,200	Short position	$	43,200
Initial margin deposit	$	21,600	Account equity	$	21,600
Total	$	64,800	Total	$	64,800

Stock price = $ 63.00

Assets			*Liabilities and account equity*		
Proceeds from sale	$	43,200	Short position	$	37,800
Initial margin deposit	$	21,600	Account equity	$	27,000
Total	$	64,800	Total	$	64,800

Margin	**71.43%**
Effective annual return	**70.84%**

Stock price = $ 77.00

Assets			*Liabilities and account equity*		
Proceeds from sale	$	43,200	Short position	$	46,200
Initial margin deposit	$	21,600	Account equity	$	18,600
Total	$	64,800	Total	$	64,800

Margin	**40.26%**
Effective annual return	**-30.15%**