APPENDIX VII

Solutions to selected questions and problems

This Appendix provides suggested solutions to those end-of-chapter numerical questions and problems not marked with an asterisk\*. Answers to questions and problems marked \* are given in the *Lecturer’s Guide*. Answers to discussion questions, essays and reports questions can be found by reading the text.

Chapter 1

No numerical questions; answers to all questions may be found by reading the text.

Chapter 2

1 Proast plc

a *Project A Project B*

*Point in*

*time Cash Discount Discounted Cash Discount Discounted*

*(yearly flow factor cash flow flow factor cash flow*

*intervals)*

0 −120 1.0 −120.00 −120 1.0 −120.00

1 60 0.8696 52.176 15 0.8696 13.044

2 45 0.7561 34.025 45 0.7561 34.025

3 42 0.6575 27.615 55 0.6575 36.163

4 18 0.5718 10.292 60 0.5718 34.308

NPV 4,108 NPV −2.460

£4,108 −£2,460

*Advice*: Accept project A and reject project B, because A generates a return greater than that required by the firm on projects of this risk class, but B does not.

b The figure of £4,108 for the NPV of project A can be interpreted as the surplus (in   
 present value terms) above and beyond the required 15 per cent return. Therefore,   
 Proast would be prepared to put up to £120,000 + £4,108 into this project at time zero,   
 because it could thereby obtain the required rate of return of 15 per cent. If Proast put in   
 any more than this, it would generate less than the opportunity cost of the finance   
 providers.

Likewise, the maximum cash outflow at time zero (0) for project B which permits the generation of a 15 per cent return is £120,000 − £2,460 = £117,540.

1

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2 Highflyer plc

a First, recognise that annuities are present (to save a lot of time).   
 *Project A*: Try 15%−420,000 + 150,000 × 2.855 = +£8,250.

Try 16%−420,000 + 150,000 × 2.7982 = −£270.

IRR = 15 +

8,250

8,250 + 270

× (16 −15) = 15.97%

*Project B*: Try 31% and 32%.

*Point in time Cash flow Discounted cash Discounted cash*

*(yearly flow @ 31% flow @ 32%*

*intervals)*

0 −100,000 −100,000 −100,000

1 75,000 57,252 56,818

2 75,000 43,704 43,044

+956 −138

IRR = 31+

956

956 + 138

× (32 − 31) = 31.87%

b NPV: Project A

−420,000 + 150,000 × 3.0373 = +£35,595   
Project B

−100,000 + 75,000 × 1.6901 = +£26,758 c Comparison:

*IRR NPV*

Project A 15.97% +£35,595

Project B 31.87% +£26,758

If the projects were not mutually exclusive, Highflyer would be advised to accept both.   
If the firm has to choose between them, on the basis of the IRR calculation it would   
select B, but, if NPV is used, project A is the preferred choice. In mutually exclusive   
situations with projects generating more than the required rate of return, NPV is the   
superior decision-making tool. It measures in absolute amounts of money rather than in   
percentages and does not have the theoretical doubts about the reinvestment rate of   
return on intra-project cash inflows.

4

*Point in time (yearly intervals) 0 1 2 3*

Cash flow −300 +260 −200 +600

Discount factor 1.0 0.885 0.7831 0.6931

Discounted cash flow −300 +230.1 −156.62 +415.86

NPV = +£189.34

2

Glen Arnold, Corporate Financial Management, 5th Edition, Solutions Manual

This project presents unconventional cash flows (more than one change in sign). Therefore there is more than one IRR, making a nonsense result.

5 a

*Point in time (yearly intervals) t* 1 *t* 2 *t* 3 *t* 4 Total

Cash flow (£) +200 +300 +250 +400

Terminal (t4) value (£) +304.2 +396.8 +287.5 +400 1,388.5

b

4 1,388.5

900

c Try 10%.

−1= 0.1145 or 11.45%

−900 +

200

+

1.10

300

2

(1.10)

250 400

+ + =−9.2

3 4

(1.10) (1.10)

Try 9%.

−900 +

200

+

1.09

300

2

(1.09)

250 400

+ + =+12.4

3 4

(1.09) (1.09)

IRR = 9 +

12.4

12.4 + 9.2

(10 − 9) = 9.57%

6 a Modified internal rate of return

*Point in time (yearly intervals) t* 1 *t* 2 *t* 3 *t* 4 Total

Cash flow (£) 5,400 3,100 2,800 600

Terminal value 8,000.3 4,028.8 3,192 600 15,821.1

4 15,821.1

9,300

−1= 0.142 or 14.2%

This project is accepted under the MIRR decision rule.

b Internal rate of return

Try 14%.

−9,300 +

Try 15%.

−9,300 +

5,400

+

1.14

5,400

+

1.15

3,100

2

(1.14)

3,100

2

(1.15)

2,800 600

+ + =+67.4

3 4

(1.14) (1.14)

2,800 600

+ + = −76.2

3 4

(1.15) (1.15)

14 +

67.4

67.4 + 76.2

(15 −14) =14.47%

This project is accepted under the IRR decision rule.