Chapter 11 – Sample Problems

Title: NPV (6 different future CFs) Sample

1. Determine the net present value for a project that costs $104,000 and would yield after-tax cash flows of $16,000 the first year, $18,000 the second year, $21,000 the third year, $23,000 the fourth year, $27,000 the fifth year, and $33,000 the sixth year. Your firm's cost of capital is 12.00%.

a. $138,000.00
b. $90,238.86
c.   -$13,761.14
d. $34,000.00
e. $153,621.60

Title: NPV (3 sets of numerous CFs) Sample

2. Determine the net present value for a project that costs $253,494.00 and is expected to yield after-tax cash flows of $29,000 per year for the first ten years, $37,000 per year for the next ten years, and $50,000 per year for the following ten years. Your firm's cost of capital is 12.00%.

a. $260,454.65
b. $6,960.65
c. $133,707.65
d. $906,506.00
e. $10,023.33

Title: IRR (6 different future CFs) Sample

3. Determine the internal rate of return for a project that costs $78,000 and would yield after-tax cash flows of $12,000 the first year, $14,000 the second year, $17,000 the third year, $19,000 the fourth year, $23,000 the fifth year, and $29,000 the sixth year..

a.   9.75%
b.   8.72%
c.   10.33%
d.   8.38%
e.   10.88%

Title: IRR (3 sets of numerous CFs) Sample

4. Determine the internal rate of return for a project that costs $180,532.00 and is expected to yield after-tax cash flows of $25,000 per year for the first five years, $33,000 per year for the next five years, and $46,000 per year for the following five years.

a.   11.88%
b.   12.36%
c.   13.81%
d.   14.64%
e.   15.41%

Title: MIRR (8 different future CFs) Sample

5. Your company has an opportunity to invest in a project that is expected to result in after-tax cash flows of $18,000 the first year, $20,000 the second year, $23,000 the third year, -$8,000 the fourth year, $30,000 the fifth year, $36,000 the sixth year, $39,000 the seventh year, and -$6,000 the eighth year. The project would cost the firm $142,000. If the firm's cost of capital is 12%, what is the modified internal rate of return for the project?

a.   7.03%
b.   5.64%
c.   6.30%
d.   5.42%
e.   6.68%

Title: MIRR (6 different future CFs) Sample
6. Your company has an opportunity to invest in a project that is expected to result in after-tax cash flows of $8,000 the first year, $10,000 the second year, $13,000 the third year, -$8,000 the fourth year, $20,000 the fifth year, and $26,000 the sixth year. The project would cost the firm $59,000. If the firm's cost of capital is 13%, what is the modified internal rate of return for the project?

a.   6.30%
b.   7.46%
c.   7.04%
d.   6.05%
e.   7.85%

Title: Payback period Sample
7. Determine the payback period (in years) for a project that costs $120,000 and would yield after-tax cash flows of $20,000 the first year, $22,000 the second year, $25,000 the third year, $27,000 the fourth year, $31,000 the fifth year, and $37,000 the sixth year.

a.   3.93
b.   4.08
c.   4.56
d.   4.84
e.   5.09

Answers:

1.	c	5.	e
2.	b	6.	b
3.	c	7.	d
4.	d		

Solutions:
1. TI83: npv(12,-104000,{16000,18000,21000,23000,27000,33000})
CF0 = -104000
CF1 = 16000
CF2 = 18000
CF3 = 21000
CF4 = 23000
CF5 = 27000
CF6 = 33000
I = 12
Answer:
NPV = -13,761.14

2. TI83: npv(12,-253494,{29000,37000,50000},{10,10,10})
CF0 = -253494
CF1 = 29000
F01 = 10
CF2 = 37000
F02 = 10
CF3 = 50000
F03 = 10
I = 12
Answer:
NPV = 6,960.65

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3. TI83: irr(-78000,{12000,14000,17000,19000,23000,29000})
CF0 = -78000
CF1 = 12000
CF2 = 14000
CF3 = 17000
CF4 = 19000
CF5 = 23000
CF6 = 29000
Answer:
IRR = 10.33%

4. TI83: irr(-180532,{25000,33000,46000},{5,5,5})
CF0 = -180532
CF1 = 25000
F01 = 5
CF2 = 33000
F02 = 5
CF3 = 46000
F03 = 5
Answer:
IRR = 14.64%

5. Step 1: PV(-)
CF0 = -142000
CF1 = 0
CF2 = 0
CF3 = 0
CF4 = -8000
CF5 = 0
CF6 = 0
CF7 = 0
CF8 = -6000
I = 12
Compute:
NPV = -149,507.44   TI83: npv(12,-142000,{0,0,0,-8000,0,0,0,-6000})

Step 2: FV(+)
Part a: PV(+)   Part b: FV(+)
                                 N = 8
CF0 = 0   I = 12
CF1 = 18000   PV = 101289.40
CF2 = 20000   Compute:
CF3 = 23000   FV = 250,788.82
CF4 = 0
CF5 = 30000
CF6 = 36000
CF7 = 39000
CF8 = 0
I = 12
Compute: NPV = 101,289.40   TI83: npv(12,0,{18000,20000,23000,0,30000,36000,39000,0})

Step 3: MIRR
N = 8
PV = -149507.44
FV = 250788.82
Compute:
I = 6.68%

6. Step 1: PV(-)
CF0 = -59000
CF1 = 0
CF2 = 0
CF3 = 0
CF4 = -8000
CF5 = 0
CF6 = 0
I = 13
Compute:
NPV = -63,906.55   TI83: npv(13,-59000,{0,0,0,-8000,0,0})

Step 2: FV(+)
Part a: PV(+)   Part b: FV(+)
CF0 = 0   N = 6
CF1 = 8000   I = 13
CF2 = 10000   PV = 47264.25
CF3 = 13000   Compute:
CF4 = 0   FV = 98,401.89
CF5 = 20000
CF6 = 26000
I = 13
Compute:
NPV = 47,264.25   TI83: npv(13,0,{8000,10000,13000,0,20000,26000})

Step 3: MIRR
N = 6
PV = -63906.55
FV = 98401.89
Compute:
I = 7.46%

7.

Year	CF	Cost left to recover
0	-120,000	120,000
1	20,000	100,000
2	22,000	78,000
3	25,000	53,000
4	27,000	26,000
5	31,000	-5,000
6	37,000	-42,000

The final portion of the initial cost is recovered in the fifth year. Divide the amount remaining to be recovered at the end of the fourth year by the amount received in the fifth year to get the portion of the fifth year necessary to complete recovery of the cost.   Payback period = 4 + (26000/31000) = 4.84 years