ISE 307 HOMEWORK # 6 SOLUTIONS **CHAPTER 7**

7.7

Consider the investment project with the following net cash flows: What would be the value of X if the project's IRR is 23%?

End of Year (n)	Net Cash Flow
0	-$12,000
1	$2,500
2	$5,500
3	X
4	X

$$\begin{aligned} PW(23\%) &= -\$12,000 + \$2,500(P/F,23\%,1) + \$5,500(P/F,23\%,2) \\ &\quad + X(P/A,23\%,2)(P/F,23\%,2) \\ &= 0 \\ \$6,332 &= 0.9743X \\ X &= \$6,498.93 \end{aligned}$$

7.27

A manufacturing firm is considering the following mutually exclusive alternatives:

Determine which project a better choice is at MARR = 15%, on the basis of the IRR criterion.

(n)	Project A	Project B
0	-$2,000	-$3,000
1	$1,400	$2,400
2	$1,650	$2,000

Determine the cash flow on incremental investment:

	Net Cash Flow		
n	Project A	Project B	B - A
0	–$2,000	–$3,000	–$1,000
1	$1,400	$2,400	$1,000
2	$1,640	$2,000	$360

$$i^*_{B-A} = 28.11\% > 15\%$$

Select project B.

7.28

Consider the following two mutually exclusive alternatives:

(a) Determine the IRR on the incremental investment in the amount of $2,000

(b) If the firm's MARR is 10%, which alternative is the better choice?

(n)	Project A1	Project A2
0	-$10,000	-$12,000
1	$5,000	$6,100
2	$5,000	$6,100
3	$5,000	$6,100

SOLUTION

(a) IRR on the incremental investment:

	Net Cash Flow		
n	Project A1	Project A2	A2 – A1
0	–$10,000	–$12,000	–$2,000
1	$5,000	$6,100	$1,100
2	$5,000	$6,100	$1,100
3	$5,000	$6,100	$1,100

$$i^*_{A2-A1} = 29.92\%$$

(b) Since it is an incremental simple investment, $IRR_{A2-A1} = 29.92\% > 10\%$. Therefore, select project A2.

7.29

Consider the following two mutually exclusive investment alternatives: (a) Determine the IRR on the incremental investment in the amount of $4,000. (Assume that MARR = 10 %.) (b) If the firm's MARR is 10%. Which alternative is the better choice?

(n)	Project A1	Project A2
0	-$16,000	-$20,000
1	$7,500	$5,000
2	$7,500	$15,000
3	$7,500	$8,000
IRR	19.19%	17.65%

SOLUTION

(a)

n	A1	A2	A2 – A1
0	–$16,000	–$20,000	–$4,000
1	$7,500	$5,000	–$2,500
2	$7,500	$15,000	$7,500
3	$7,500	$8,000	$500

$$IRR_{A2-A1} = 13.08\%$$

(b) Select Project A2.

7.34

Consider the following two investment alternatives:

(n)	Project A1	Project A2
0	-$10,000	-$20,000
1	$5,500	$0
2	$5,500	$0
3	$5,500	$40,000
IRR	30%	?
PW (15%)	?	$6,300

The firm's MARR is known to be 15%.

(a) Compute the IRR of Project B.

(b) Compute the PW of Project A.

(c) Suppose that Projects A and B are mutually exclusive. Using the IRR, which project would you select?

SOLUTION

(a) $\text{IRR}_B = 25.99\%$

(b) $\text{PW}(15\%)_A = -\$10,000 + \$5,500(P/A,15\%,3) = \$2,558$

(c) Incremental analysis:

	Net Cash Flow		
n	Project A	Project B	B – A
0	–$10,000	–$20,000	–$10,000
1	$5,500	0	–$5,500
2	$5,500	0	–$5,500
3	$5,500	$40,000	$34,500

Since $\text{IRR}_{B-A} = 24.24\% > 15\%$, select project B.