MARR **12%**

N	(F/P, i, N)	(P/F, i, N)	(F/A, i, N)	(A/F, i, N)	(P/A, i, N)	(A/P, i, N)
1	1.1200	0.8929	1.0000	1.0000	0.8929	1.1200
2	1.2544	0.7972	2.1200	0.4717	1.6901	0.5917
3	1.4049	0.7118	3.3744	0.2963	2.4018	0.4163
4	1.5735	0.6355	4.7793	0.2092	3.0373	0.3292
5	1.7623	0.5674	6.3528	0.1574	3.6048	0.2774
6	1.9738	0.5066	8.1152	0.1232	4.1114	0.2432
7	2.2107	0.4523	10.0890	0.0991	4.5638	0.2191
8	2.4760	0.4039	12.2997	0.0813	4.9676	0.2013
9	2.7731	0.3606	14.7757	0.0677	5.3282	0.1877
10	3.1058	0.3220	17.5487	0.0570	5.6502	0.1770

N	**1**	**2**	**3**	**4**	**5**	**6**
(F/P, i, N)	1.1200	1.2544	1.4049	1.5735	1.7623	1.9738
(P/F, i, N)	0.8929	0.7972	0.7118	0.6355	0.5674	0.5066
(F/A, i, N)	1.0000	2.1200	3.3744	4.7793	6.3528	8.1152
(A/F, i, N)	1.0000	0.4717	0.2963	0.2092	0.1574	0.1232
(P/A, i, N)	0.8929	1.6901	2.4018	3.0373	3.6048	4.1114
(A/P, i, N)	1.1200	0.5917	0.4163	0.3292	0.2774	0.2432

7	8	9	10
2.2107	2.4760	2.7731	3.1058
0.4523	0.4039	0.3606	0.3220
10.0890	12.2997	14.7757	17.5487
0.0991	0.0813	0.0677	0.0570
4.5638	4.9676	5.3282	5.6502
0.2191	0.2013	0.1877	0.1770

Recovery Year	3-Year Property	5-Year Property	7-Year Property	10-Year Property	15-Year Property	20-Year Property
1	33.33%	20.00%	14.29%	10.00%	5.00%	3.75%
2	44.45%	32.00%	24.49%	18.00%	9.50%	7.22%
3	14.81%	19.20%	17.49%	14.40%	8.55%	6.68%
4	7.41%	11.52%	12.49%	11.52%	7.70%	6.18%
5		11.52%	8.93%	9.22%	6.93%	5.71%
6		5.76%	8.92%	7.37%	6.23%	5.29%
7			8.93%	6.55%	5.90%	4.89%
8			4.46%	6.55%	5.90%	4.52%
9				6.56%	5.91%	4.46%
10				6.55%	5.90%	4.46%
11				3.28%	5.91%	4.46%
12					5.90%	4.46%
13					5.91%	4.46%
14					5.90%	4.46%
15					5.91%	4.46%
16					2.95%	4.46%
17						4.46%
18						4.46%
19						4.46%
20						4.46%
21						2.23%

a.

Assume that the expected inflation rate is 5%. If the market interest rate is 10%, what should the interest-free inflation rate be? **[3 points]**

Assume that the expected inflation rate is 5%. If th

Given:

$\overline{f}$, general inflation rate **5.00%**

i, market interest rate **10.00%**

Find i' using the following relationship:

$$i = i' + \overline{f} + i'\overline{f}$$

i' = 10.00% - 5.00% / [1 + 5.00%]

i' = 4.76%

b.

The Shakalaka investment company plans to make a series of five constant dollar (or real-dollar) payments are made over a five-year period to offset its one bad debt in an account .
The payments begin with a $35,000 payment at the end of the first year. The payments then increase at the rate of 7% per year. The average general inflation rate is 9%, and the market interest rate is 12% during this five-year period.
Calculate the inflation free interest rate. **[3 points]**
What is the equivalent present worth of the series? **[4 points]**

The Shakalaka investment company plans to make

Given:

F at EOY 1	$35,000	(Constant Dollars)
Rate of increase	7.00%	
Market interest rate, i	12.00%	
General inflation rate (f bar)	9.00%	

Given constant dollars, therefore need to use the inflation-free interest rate, i '

$$i = i' + \overline{f} + i'\overline{f}$$

therefore

$$i' = \frac{i - \overline{f}}{1 + \overline{f}}$$

i' = 2.75%

$$\boxed{(P/F, i', N) = (1 + i')^{-N}}$$

Period, n	Net Cash Flow Const $ F	(P/F, i ', n	F(P/F, i ', n)
1	$35,000	0.9732	$34,063
2	$37,450	0.9471	$35,471
3	$40,072	0.9218	$36,937
4	$42,877	0.8971	$38,464
5	$45,878	0.8731	$40,054
	PW		**$184,988**

on rate is 5%. If the marketinterest rate is 10%, what should the interest-free inflation rate be? [3 points]

any plans to make a series of five constant dollar (or real-dollar) payments are made over a five-year period to offset its one bad debt in an account . The payments begin with a $35,000 payment at the

begin with a $35,000 payment at the end of the first year. The payments then increase at the rate of 7% per year. The average general inflation rate is 9%, and the market interest rate is 12% during

e market interest rate is 12% during this five-year period.

a. **5 Points**

i '	**12.0%**

Period, n	et Cash Flow in Constant Dollar	(P/F, i ', n)	B X C
0	-$125,000	-	-$125,000
1	$90,000	0.8929	$80,357
2	$60,000	0.7972	$47,832
3	$70,000	0.7118	$49,825
4	$80,000	0.6355	$50,841
5	$80,000	0.5674	$45,394
		PW	**$149,249**

b. **5 Points**

f bar	**4.00%**
i '	**5.00%**
i	9.20%

Period, n	Net Cash Flow in Actual Dollars	(P/F, i, n)	B X C
0	-$75,000	-	-$75,000
1	$35,000	0.9158	$32,051
2	$37,000	0.8386	$31,028
3	$38,250	0.7679	$29,374
4	$42,500	0.7032	$29,888
5	$45,000	0.6440	$28,980
		PW	**$76,322**

If the wrong method is used but the right answer is found award 2.5 points.

Chavez Villas is considering an expansion to their Acapulco resort.
The financial data is as follows:

Investment:	**$3,000,000**	
45% debt equity ratio. Loan borrowed at 6% interest.		
45%		6%
Project life:	**6**	**years**
Salvage value:	**$300,000**	
Year 6 dollars		
Depreciation method:	**5-year MACRS**	
Income tax rate:	**30%**	
Annual Revenue:	**$1,500,000**	
Year 1 dollars		
Annual Expense:	**$450,000**	
Year 1 dollars		
Does NOT include depreciation		
Does NOT include interest		
Market Interest rate (i):	**12%**	

If the general inflation rate (effects revenues, expenses, salvage value) during the next 6 years i increase by 3% annually:

General Inflation Rate:	**4.0%**

a. Develop the income statement for the project. **[12 points]**

b. Develop the cash flow statement for the project. **[3 points]**

c. Determine the PW of the project. Is the project economically viable? Why? **[4 + 1 points]**

a. Develop the income statement for the project. [3 points]

GIVEN:

I	$3,000,000	
N	6	
S	$300,000	
MACRS	5-year MACRS	
general inflation rate	4.0%	(f bar)
Market Interest rate (i):	12.0%	i

Step 1: Determine the allowed depreciation amounts **3 points**

n	BV_{n-1}	MACRS	D_n
1	$3,000,000	20.00%	$600,000
2	$2,400,000	32.00%	$960,000
3	$1,440,000	19.20%	$576,000

4	$864,000	11.52%	$345,600
5	$518,400	11.52%	$345,600
6	$172,800	5.76%	$172,800

Step 2: Determine the loan repayment schedule **3 points**

P, amt borrowe	$1,350,000	
i	6.00%	
N	6	
AE	$274,540	(Actual)

Year	Beginning Balance	Interest Payment	Principal Payment	Ending Balance
1	$1,350,000	$81,000	$193,540	$1,156,460
2	$1,156,460	$69,388	$205,152	$951,309
3	$951,309	$57,079	$217,461	$733,847
4	$733,847	$44,031	$230,509	$503,339
5	$503,339	$30,200	$244,339	$259,000
6	$259,000	$15,540	$259,000	$0

Step 3: Calculate the Gains (Losses) associated with Asset Disposal

Salvage Value	Year 6	
S	$300,000	
Book Value		
BV_6		$0
Taxable Gains (Losses)		
		$300,000
Taxes (Capital Gains, rate = 30%)		
Rate (S - BV_5)		$90,000

Step 4: Create the Income Statement

Income Statement	**0**	**1**	**2**	**3**
Revenues		$1,500,000	$1,622,400	$1,687,296
Expenses:				
General		$450,000	$486,720	$506,189
Interest		$81,000	$69,388	$57,079
Depreciation		$600,000	$960,000	$576,000
Taxable Income		$369,000	$106,292	$548,029
Income Taxes (30%)		$110,700	$31,888	$164,409
Net Income		$258,300	$74,405	$383,620

b. Develop the cash flow statement for the project. [3 points]

Step 5: Develop a Cash Flow Statement

Cash Flow State	**0**	**1**	**2**	**3**
Operating Activities:				
Net Income		$258,300	$74,405	$383,620
Depreciation		$600,000	$960,000	$576,000
Investment Activities:				
Investment	-$3,000,000			
Salvage				
Gains Tax				
Financing Activities:				
Loan	$1,350,000	-$193,540	-$205,152	-$217,461
Net Cash Flow	-$1,650,000	$664,760	$829,253	$742,159

c. Determine the PW of the project. [4 + 1 points]

Market Interest rate (i): 12%

$(P/F,i,$

n	P	F	(P/F, i , n)	F(P/F, i , n)
0	-$1,650,000	-	-	-
1	-	$664,760	0.8929	$593,536
2	-	$829,253	0.7972	$661,075
3	-	$742,159	0.7118	$528,254
4	-	$702,196	0.6355	$446,258
5	-	$732,440	0.5674	$415,606
6	-	$921,972	0.5066	$467,100

PW manual **$1,461,830**

YES this project is economically viable. It has a PW > 0.

xt 6 years is expected to

BV_n
$2,400,000
$1,440,000
$864,000

$518,400
$172,800
$0

3 points

3 points

4	5	6
$1,754,788	$1,824,979	$1,897,979
$526,436	$547,494	$569,394
$44,031	$30,200	$15,540
$345,600	$345,600	$172,800
$838,721	$901,685	$1,140,245
$251,616	$270,506	$342,073
$587,104	$631,180	$798,171

4	5	6
$587,104	$631,180	$798,171
$345,600	$345,600	$172,800
		$300,000
		-$90,000
-$230,509	-$244,339	-$259,000
$702,196	$732,440	$921,972

$$N)=(1+i)^{-N}$$

Two alternatives are being considered by a food processor for the warehousing and distribution of its canned produc in a sales region. These canned products come in standard cartons of 24 cans per carton. A summary of the financial of these 2 alternatives are listed as follows:

Alternative 1: Build its Own Distribution System
Investment cost $70,000 (installed)
Estimated useful life of 5 years
Salvage value of $52,000 after the first year, decreasing at a rate of 4% each year.
Operating and maintenance costs are expected to be $12,000 in the first year increasing at a rate of 15%

Alternative 2: Buy a Distribution System from a Distribution Company
Estimated useful life of 5 years
Salvage value of $38,000 after the first year (year 1), decreasing at a rate of 5% each year.
Current market value of $55,000
Operating and maintenance costs for the next 5 years are expected to be $11,000 in the first year increas 15% each year.

With a MARR of 12%, calculate the following:

a. Calculate the economic service life for each alternative. [4 + 4 points]

MARR 12%

Alternative 1

Investment	$70,000	
Salvage	$52,000	EOY 1
S decrease	4%	(per year)
O&M	$12,000	EOY 1
OC increase	15%	(per year)

I $70,000

Year	Investment	Annual OC	Annual S	(A/P, i, N)	(A/F, i, N)	CR(i)	(P/F, i, N)	OC(i)	EUAC(i)
0	$70,000	$0	$0	-	-	-	-	-	-
1	$0	$12,000	$52,000	1.1200	1.0000	$26,400	0.8929	$12,000	$38,400
2	$0	$13,800	$49,920	0.5917	0.4717	$17,872	0.7972	$12,849	$30,721
3	$0	$15,870	$47,923	0.4163	0.2963	$14,942	0.7118	$13,744	$28,687
4	$0	$18,251	$46,006	0.3292	0.2092	$13,420	0.6355	$14,687	**$28,107**
5	$0	$20,988	$44,166	0.2774	0.1574	$12,467	0.5674	$15,679	$28,146

Economic Life of the Challenger = N_C* = 4
$EUAC_C$ = $28,107

Defender

Mkt Value	$55,000	
Salvage	$38,000	EOY 1
S decrease	5%	(per year)
O&M	$11,000	EOY 1
OC increase	15%	(per year)

I $55,000 (opportunity cost of not selling defender)

Year	Investment	Annual OC	Annual S	(A/P, i, N)	(A/F, i, N)	CR(i)	(P/F, i, N)	OC(i)	EUAC(i)
0	$55,000	$0	$0	-	-	-	-	-	-
1	$0	$11,000	$38,000	1.1200	1.0000	$23,600	0.8929	$11,000	$34,600
2	$0	$12,650	$36,100	0.5917	0.4717	$15,515	0.7972	$11,778	$27,293
3	$0	$14,548	$34,295	0.4163	0.2963	$12,736	0.7118	$12,599	$25,335
4	$0	$16,730	$32,580	0.3292	0.2092	$11,291	0.6355	$13,463	**$24,754**
5	$0	$19,239	$30,951	0.2774	0.1574	$10,386	0.5674	$14,372	$24,758

Economic Life of the Defender = N_D* = 4
$EUAC_D$ = $24,754

b. What are your conclusions? [2 points]

Summary:

N_1* = 4
$EUAC_1$ = $28,107
N_2* = 4
$EUAC_2$ = $24,754

$EUAC_1$ > $EUAC_2$

The defender will have an equivalent annual cost of **$24,754** per year for the next **4** years. whereas,
The challenger will have an equivalent annual cost of **$28,107** per year for the next **4** years, (assuming it is goi to be kept for a total of **4** years).

Therefore, as the EUAC of the defender (if kept for **4** additional years) is lower than that of the challenger (if kept foı **4** years), the defender should be kept for **4** years.

Keep the defender for 4 years.

anned products
f the financial information

a rate of 15% each year.

st year increasing at a rate of

ing

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