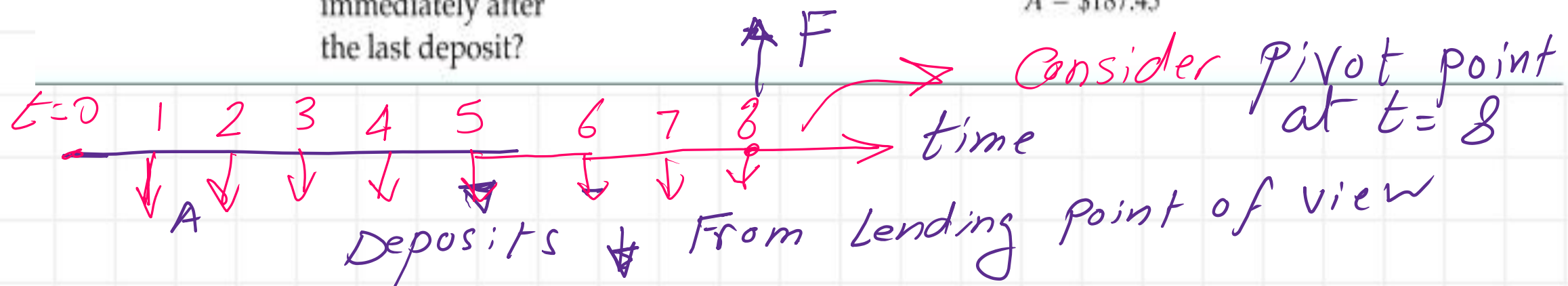


TABLE 4-2 Discrete Cash-Flow Examples Illustrating Equivalence

Example Problems (All Using an Interest Rate of $i = 10\%$ per Year—See Table C-13 of Appendix C)

To Find:	Given:	(a) In Borrowing– Lending Terminology:	(b) In Equivalence Terminology:	Cash-Flow Diagram ^a	Solution
For uniform series: F	A	If eight annual deposits of \$187.45 each are placed in an account, how much money has accumulated immediately after the last deposit?	What amount at the end of the eighth year is equivalent to eight EOY payments of \$187.45 each?		$F = A(F/A, 10\%, 8)$ $= \$187.45(11.4359)$ $= \$2,143.60$



Given $A, n, i \rightarrow$ Find F

By Estimation

Given $A = \$187.45$
 $i = 10\%$ interest annually
 $n = 8$ years

$A = \$187.45$ & $i = 10\%$ & $n = 8 \rightarrow F?$ $\rightarrow$ is unknown

Taking moment at pivot point at $(n = 8)$:

$$+ F(1+i)^0 - A(1+i)^7 - A(1+i)^6 - A(1+i)^5 - A(1+i)^4 - A(1+i)^3 - A(1+i)^2 - A(1+i) - A(1+i)^0 = 0 \rightarrow \text{Simplify} \Rightarrow F = A \left[(1.10)^7 + (1.10)^6 + (1.10)^5 + (1.10)^4 + (1.10)^3 + (1.10)^2 + (1.10) + 1 \right]$$

$$F = 187.45 [1.9487 + 1.7715 + 1.6105 + 1.4641 + 1.331 + 1.21 + 1]$$

$$F = 187.45 (11.4358) = \$2143.60$$

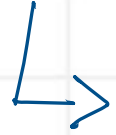
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$$\frac{P}{A} = \frac{[(1+i)^n - 1]}{i(1+i)^n}$$



$$\frac{A}{P} = \frac{i(1+i)^n}{[(1+i)^n - 1]}$$

From Equation



We have $P(1+i)^n = F$

$$\frac{F}{A} = \frac{[(1+i)^n - 1]}{i}$$



$$\frac{A}{F} = \left[\frac{i}{(1+i)^n - 1} \right]$$

TABLE 2-3 F/A and A/F Factors: Notation and Equations

Notation	Factor Name	Find/Given	Factor Formula	Standard Notation Equation	Excel Functions
$(F/A, i, n)$	Uniform series compound amount	F/A	$\frac{(1+i)^n - 1}{i}$	$F = A(F/A, i, n)$	$= FV(i\%, n, A)$
$(A/F, i, n)$	Sinking fund	A/F	$\frac{i}{(1+i)^n - 1}$	$A = F(A/F, i, n)$	$= PMT(i\%, n, F)$

given $\Rightarrow i = 10\%$ $\& n = 8$ $A = 187.45$

From table

10%		Compound Interest Factors								10%
		Single Payment		Uniform Payment Series				Arithmetic Gradient		
		Compound Amount Factor Find F Given P	Present Worth Factor Find P Given F	Sinking Fund Factor Find A Given F	Capital Recovery Factor Find A Given P	Compound Amount Factor Find F Given A	Present Worth Factor Find P Given A	Gradient Uniform Series Find A Given G	Gradient Present Worth Find P Given G	
n		F/P	P/F	A/F	A/P	F/A	P/A	A/G	P/G	n
1		1.100	.9091	1.0000	1.1000	1.000	0.909	0	0	1
2		1.210	.8264	.4762	.5762	2.100	1.736	0.476	0.826	2
3		1.331	.7513	.3021	.4021	3.310	2.487	0.937	2.329	3
4		1.464	.6830	.2155	.3155	4.641	3.170	1.381	4.378	4
5		1.611	.6209	.1638	.2638	6.105	3.791	1.810	6.862	5
6		1.772	.5645	.1296	.2296	7.716	4.355	2.224	9.684	6
7		1.949	.5132	.1054	.2054	9.487	4.868	2.622	12.763	7
8		2.144	.4665	.0874	.1874	11.436	5.335	3.004	16.029	8
9		2.358	.4241	.0736	.1736	13.579	5.759	3.372	19.421	9
10		2.594	.3855	.0627	.1627	15.937	6.145	3.725	22.891	10

$$F = A \left(\frac{F}{A}, 10\%, n = 8 \right) = 187.45 (11.436) = \$2143.67$$

$$\frac{F}{A} = \frac{[(1+i)^n - 1]}{i} = \frac{(1.10)^8 - 1}{0.10} = 11.4358$$

From formula

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Using Excel function - FV

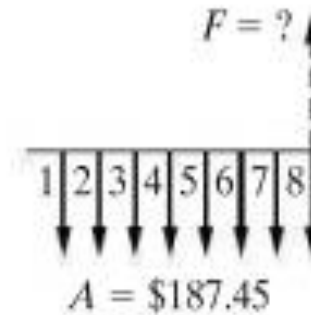
For uniform series:

F

A

If eight annual deposits of \$187.45 each are placed in an account, how much money has accumulated immediately after the last deposit?

What amount at the end of the eighth year is equivalent to eight EOY payments of \$187.45 each?



$$F = A(F/A, 10\%, 8)$$

$$= \$187.45(11.4359)$$

$$= \$2,143.60$$

= FV(rate, periods, payment)

$FV(10\%, 8, -182.45) \rightarrow$ A values are outflows

rate	10%
n	8
A	187.45
Future value	\$2,143.66

← C19
← C20
← C21

=FV(C19,C20,-C21)

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