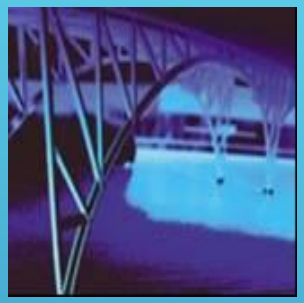
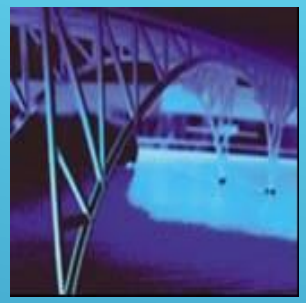
APPLIED FINANCE

Lecture 13



HINT ON ANNUITY VALUATION

The present value of an ordinary annuity can be viewed as occurring at the ***beginning*** of the first cash flow period, whereas the future value of an annuity due can be viewed as occurring at the ***end*** of the first cash flow period.



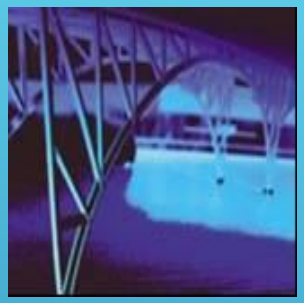
VALUATION USING TABLE IV

$PVA_n = R\ (PVIFA_{i\%,n})$

$PVA_3 = \$1{,}000\ (PVIFA_{7\%,3})$

$\$1{,}000\ (2.624) = \$2{,}624$

Period	6%	7%	8%
1	0.943	0.935	0.926
2	1.833	1.808	1.783
3	2.673	**2.624**	2.577
4	3.465	3.387	3.312
5	4.212	4.100	3.993



SOLVING THE PVA PROBLEM

	N	I/Y	PV	PMT	FV
Inputs	3	7		-1,000	0
Compute			2,624.32		

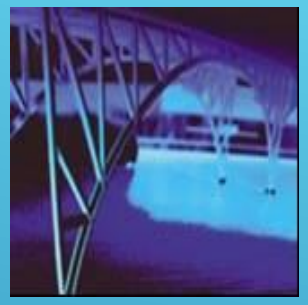
N: 3 Periods (enter as 3 year-end deposits)

I/Y: 7% interest rate per period (enter as 7 NOT .07)

PV: Compute (Resulting answer is positive)

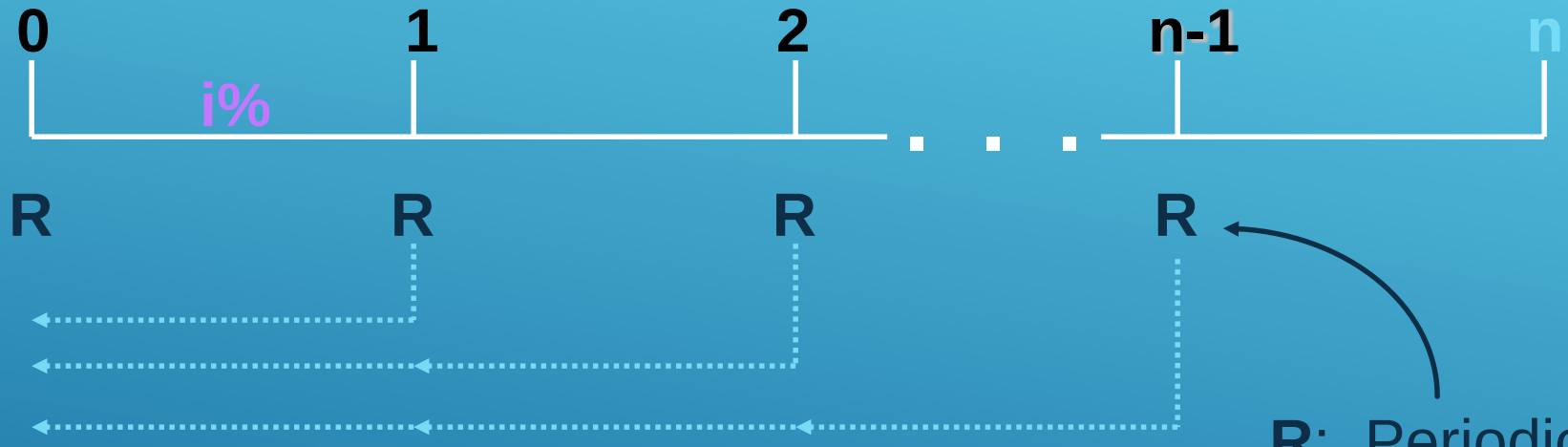
PMT: $1,000 (negative as you deposit annually)

FV: Not relevant in this situation (no ending value)



OVERVIEW OF AN ANNUITY DUE -- PVAD

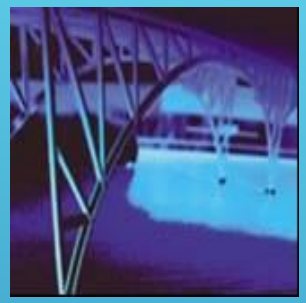
Cash flows occur at the beginning of the period



R: Periodic Cash Flow

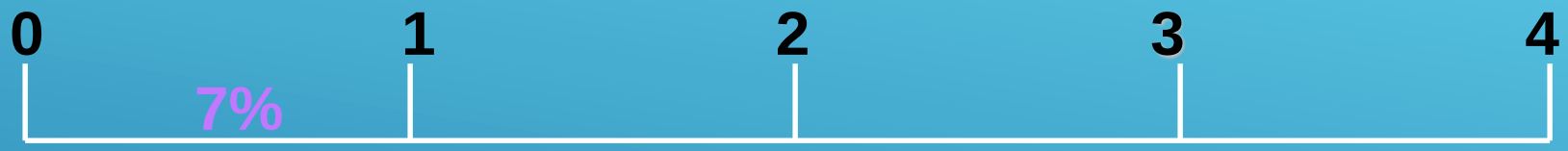
$PVAD_n$

$$PVAD_n = R/(1+i)^0 + R/(1+i)^1 + \ldots + R/(1+i)^{n-1}$$
$$= PVA_n (1+i)$$



EXAMPLE OF AN ANNUITY DUE -- PVAD

Cash flows occur at the beginning of the period



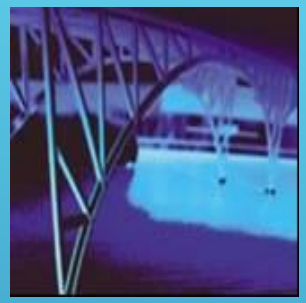
$1,000.00 $1,000 $1,000

$ 934.58

$ 873.44

$2,808.02 = $PVAD_n$

$$PVAD_n = \$1{,}000/(1.07)^0 + \$1{,}000/(1.07)^1 + \$1{,}000/(1.07)^2 = \$2{,}808.02$$



VALUATION USING TABLE IV

$PVAD_n = R\,(PVIFA_{i\%,n})(1+i)$

$PVAD_3 = \$1{,}000\,(PVIFA_{7\%,3})(1.07)$

$= \$1{,}000\,(2.624)(1.07) = \$2{,}808$

Period	6%	7%	8%
1	0.943	0.935	0.926
2	1.833	1.808	1.783
3	2.673	**2.624**	2.577
4	3.465	3.387	3.312
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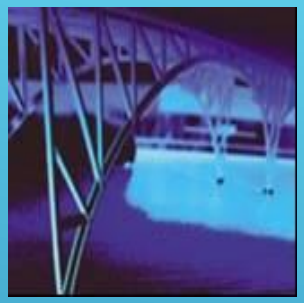
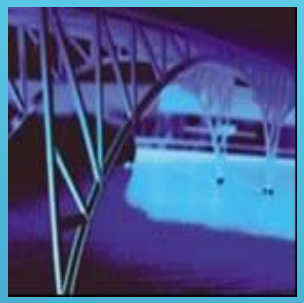


SOLVING THE PVAD PROBLEM

Inputs	3	7		-1,000	0
	N	**I/Y**	**PV**	**PMT**	**FV**
Compute			2,808.02		

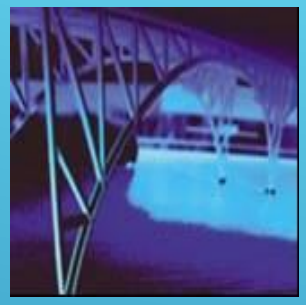
Complete the problem the same as an "*ordinary annuity*" problem, except you must change the calculator setting to "BGN" first. Don't forget to change back!

Step 1:	**Press**	**2nd**	**BGN**	**keys**
Step 2:	**Press**	**2nd**	**SET**	**keys**
Step 3:	**Press**	**2nd**	**QUIT**	**keys**



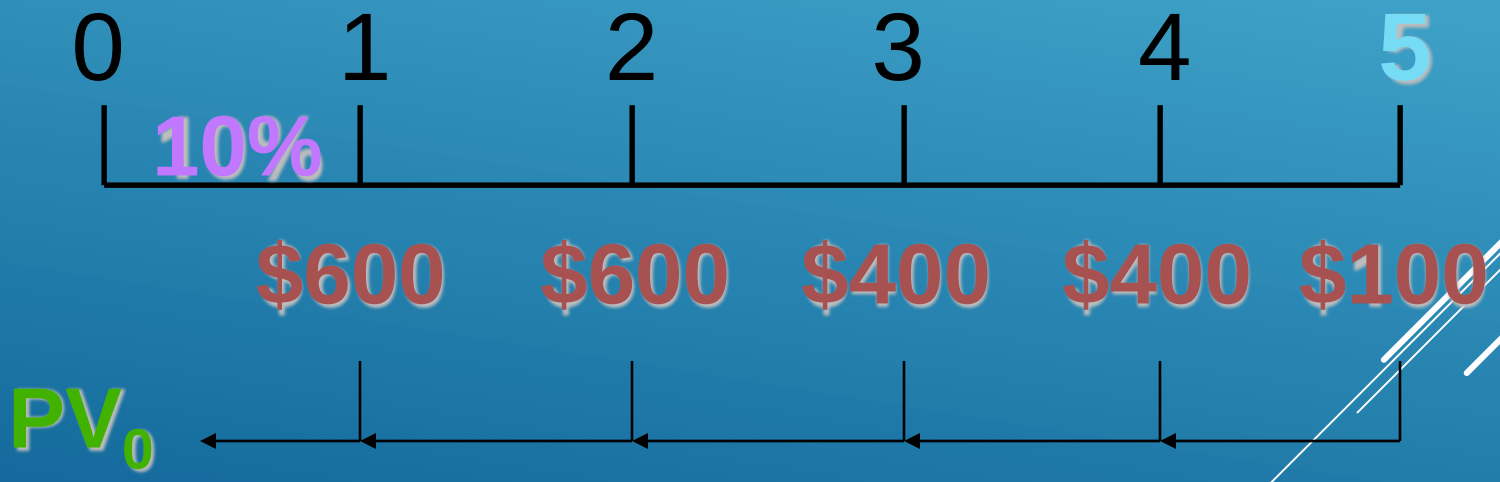
STEPS TO SOLVE TIME VALUE OF MONEY PROBLEMS

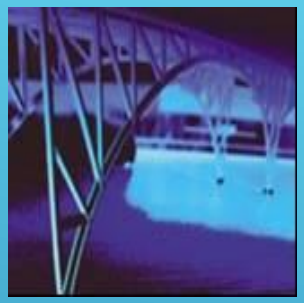
1. Read problem thoroughly
2. Create a time line
3. Put cash flows and arrows on time line
4. Determine if it is a PV or FV problem
5. Determine if solution involves a single CF, annuity stream(s), or mixed flow
6. Solve the problem
7. Check with financial calculator (optional)



MIXED FLOWS EXAMPLE

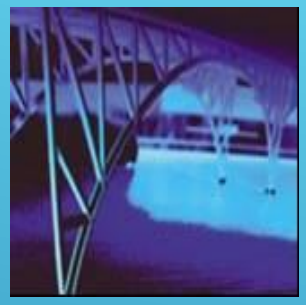
Julie Miller will receive the set of cash flows below. What is the Present Value at a discount rate of 10%.



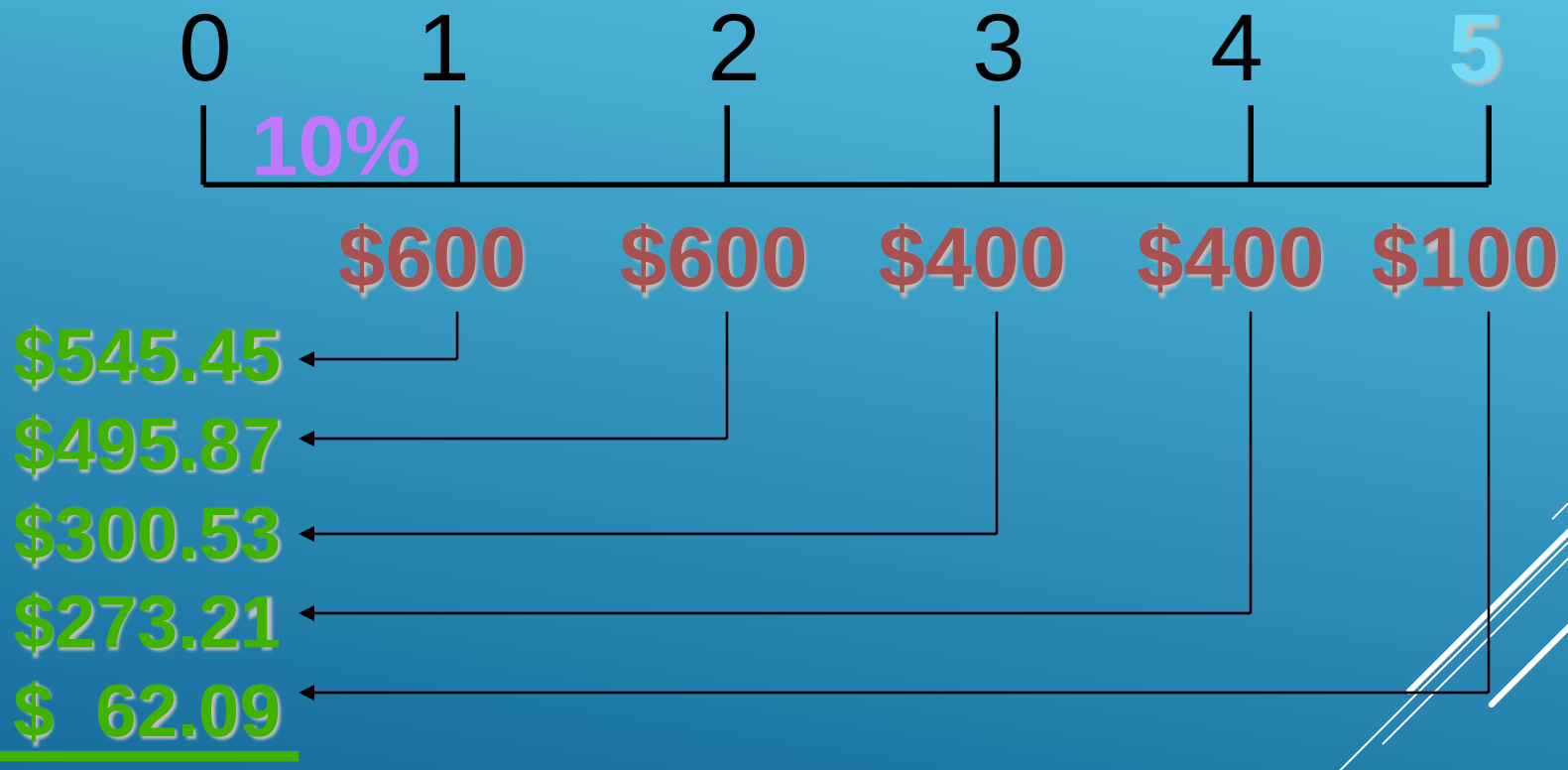


HOW TO SOLVE?

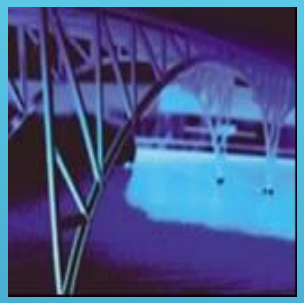
1. Solve a "*piece-at-a-time*" by discounting each *piece* back to t=0.
2. Solve a "*group-at-a-time*" by first breaking problem into groups of annuity streams and any single cash flow groups. Then discount each *group* back to t=0.



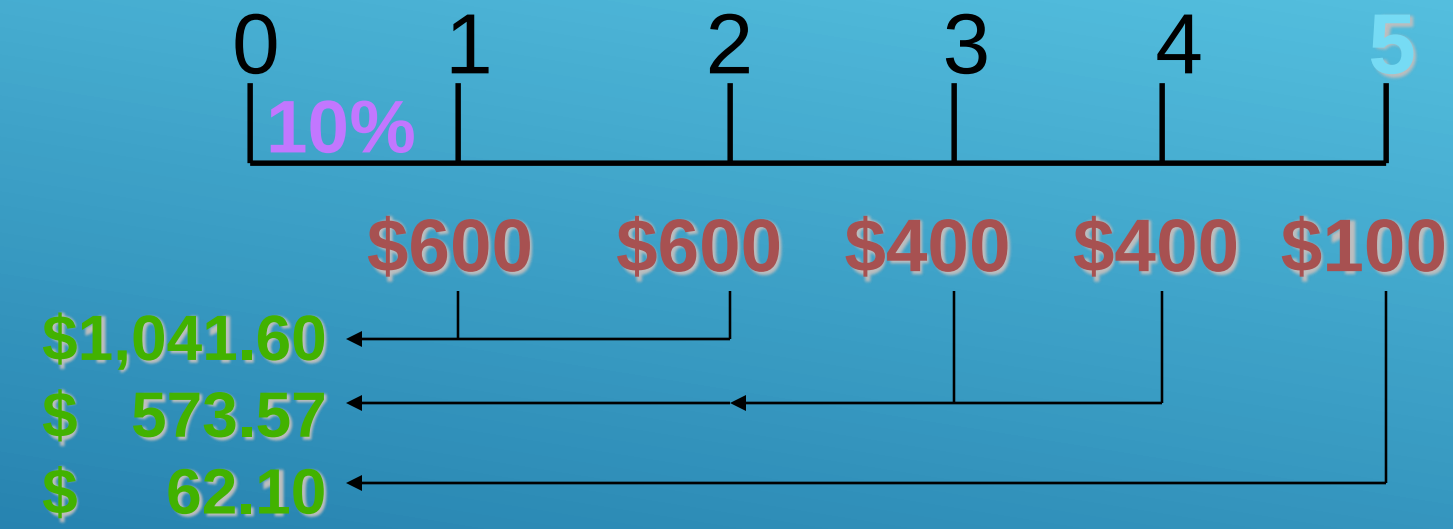
"PIECE-AT-A-TIME"



$1677.15 = PV_0 of the Mixed Flow

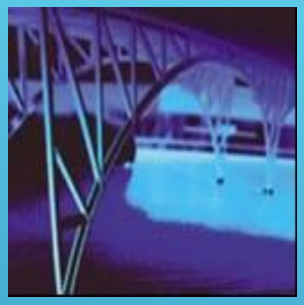


"GROUP-AT-A-TIME" (#1)

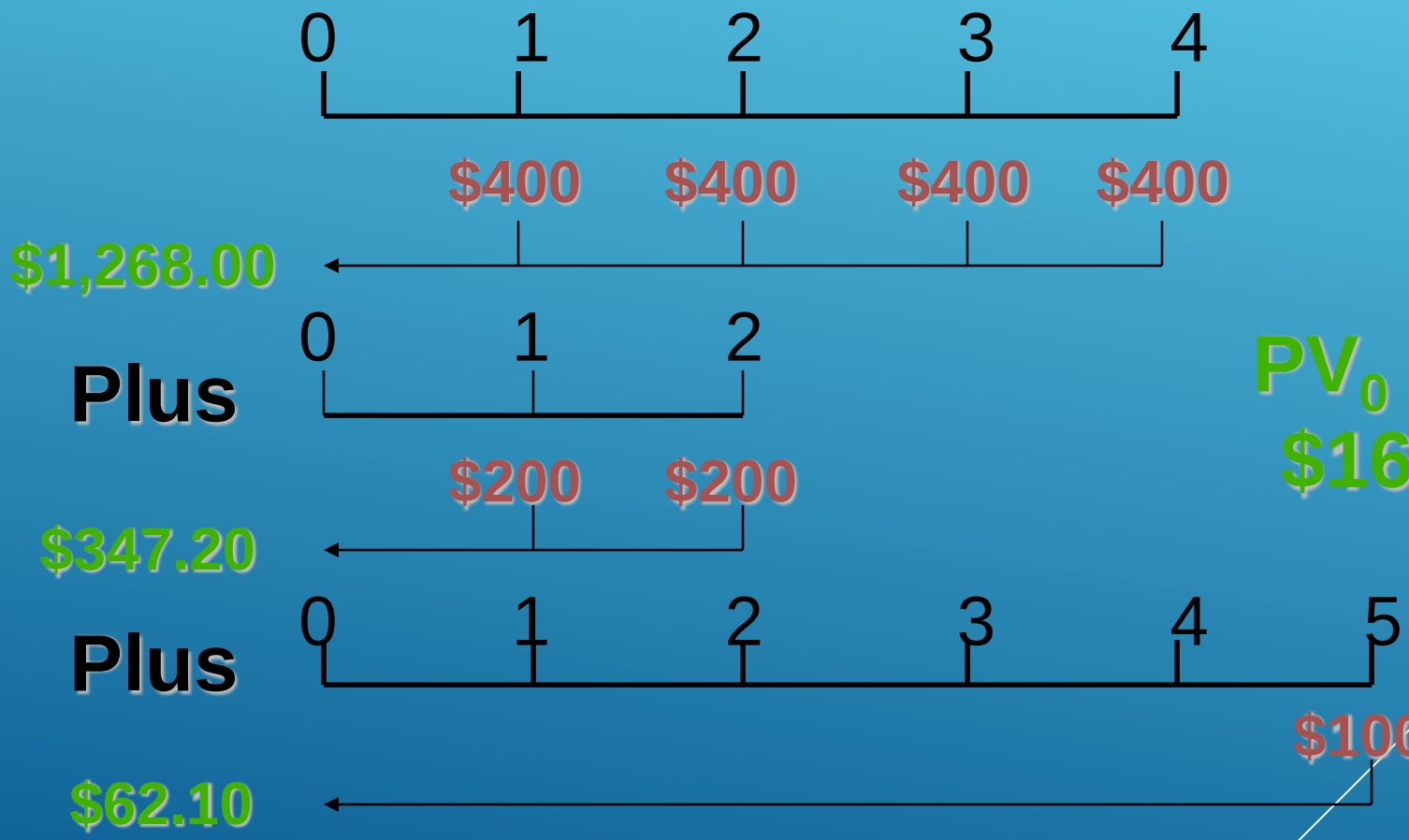


$1,677.27 = PV_0 of Mixed Flow [Using Tables]

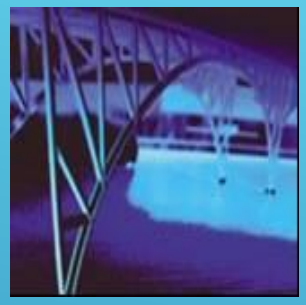
$$\$600(PVIFA_{10\%,2}) = \$600(1.736) = \$1{,}041.60$$
$$\$400(PVIFA_{10\%,2})(PVIF_{10\%,2}) = \$400(1.736)(0.826) = \$573.57$$
$$\$100\ (PVIF_{10\%,5}) = \$100\ (0.621) = \$62.10$$



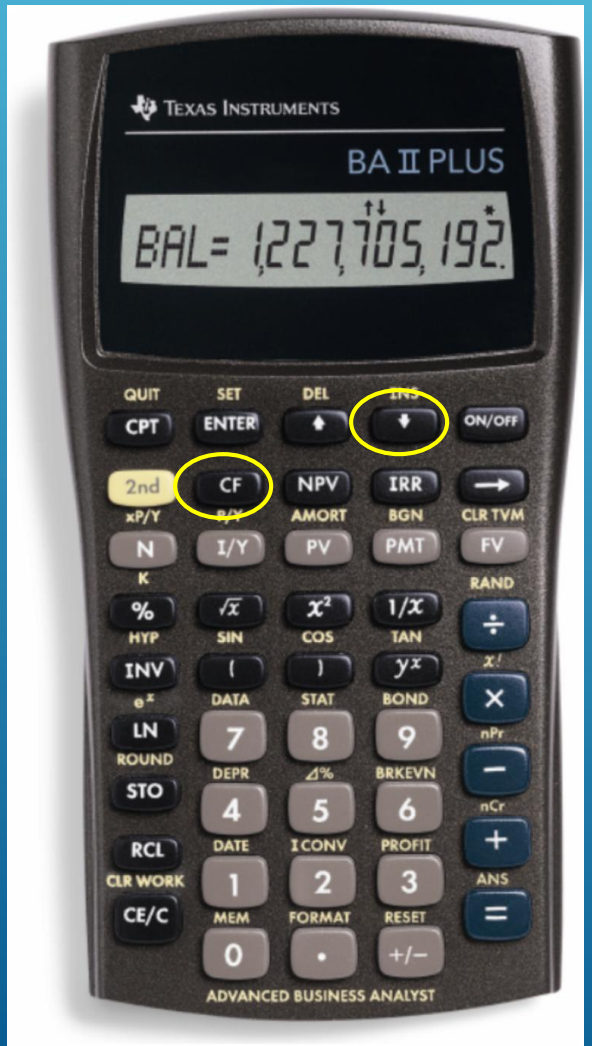
"GROUP-AT-A-TIME" (#2)



PV_0 equals $1677.30.

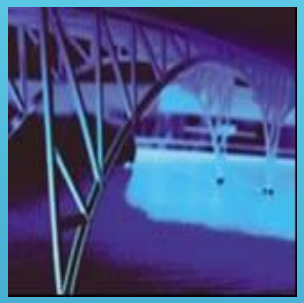


SOLVING THE MIXED FLOWS PROBLEM USING CF REGISTRY



- Use the highlighted key for starting the process of solving a mixed cash flow problem

- **Press the CF key and down arrow key through a few of the keys as you look at the definitions on the *next slide***



SOLVING THE MIXED FLOWS PROBLEM USING CF REGISTRY

Defining the calculator variables:

For *CF0*: This is ALWAYS the cash flow occurring at time t=0 (usually 0 for these problems)

For *Cnn*:*This is the cash flow SIZE of the nth group of cash flows. Note that a "group" may only contain a single cash flow (e.g., $351.76).

For *Fnn*:* This is the cash flow FREQUENCY of the nth group of cash flows. Note that this is always a positive whole number (e.g., 1, 2, 20, etc.).

*** nn represents the nth cash flow or frequency. Thus, the first cash flow is C01, while the tenth cash flow is C10.**

SOLVING THE MIXED FLOWS PROBLEM USING CF REGISTRY

Steps in the Process

Step 1: Press CF key

Step 2: Press 2nd CLR Work keys

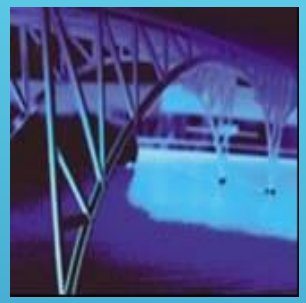
Step 3: For *CF0* Press 0 Enter ↓ keys

Step 4: For *C01* Press 600 Enter ↓ keys

Step 5: For *F01* Press2 Enter ↓ keys

Step 6: For *C02* Press 400 Enter ↓ keys

Step 7: For *F02* Press2 Enter ↓ keys



SOLVING THE MIXED FLOWS PROBLEM USING CF REGISTRY

Steps in the Process

Step 8: For *C03* Press 100 Enter ↓ keys

Step 9: For *F03* Press 1 Enter ↓ keys

Step 10: Press ↓ ↓ keys

Step 11: Press NPV key

Step 12: For I=, Enter 10 Enter ↓ keys

Step 13: Press CPT key

Result: Present Value = $1,677.15