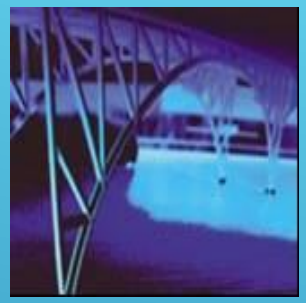
APPLIED FINANCE

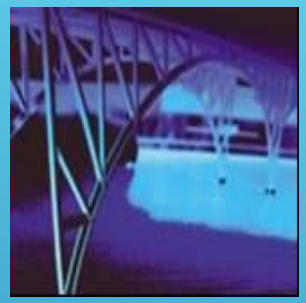
Lecture 12



SOLVING THE FV PROBLEM

	N	I/Y	PV	PMT	FV
Inputs	5	10	-10,000	0	
Compute					16,105.10

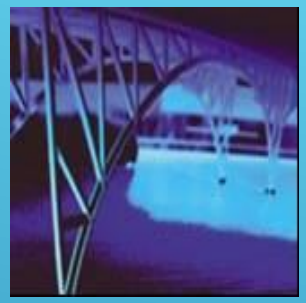
The result indicates that a $10,000 investment that earns 10% annually for 5 years will result in a future value of $16,105.10.



Quick! How long does it take to double $5,000 at a compound rate of 12% per year (approx.)?

We will use the "Rule-of-72".

DOUBLE YOUR MONEY!!!



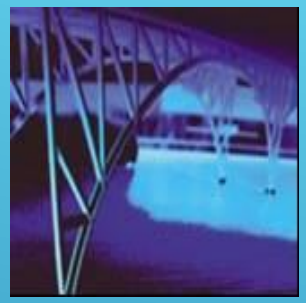
Quick! How long does it take to double $5,000 at a compound rate of 12% per year (approx.)?

Approx. Years to Double = 72 / i%

THE "RULE-OF-72"

72 / 12% = 6 Years

[Actual Time is 6.12 Years]

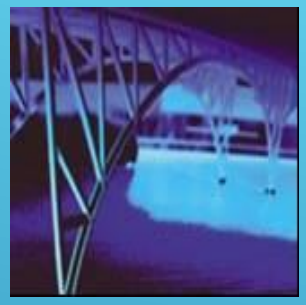


SOLVING THE PERIOD PROBLEM

Inputs		12	-1,000	0	+2,000
	N	I/Y	PV	PMT	FV
Compute	6.12 years				

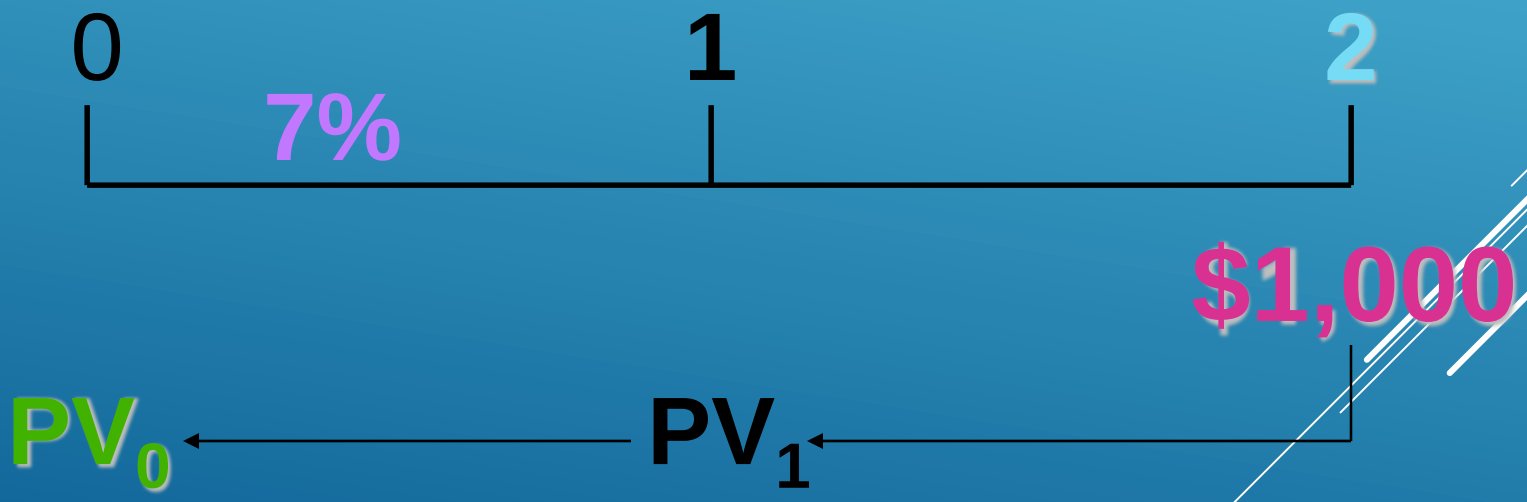
The result indicates that a $1,000 investment that earns 12% annually will double to $2,000 in 6.12 years.

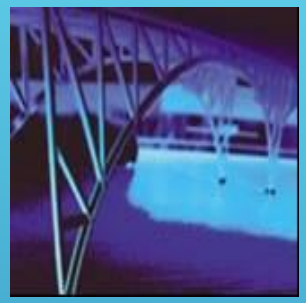
Note: 72/12% = approx. 6 years



PRESENT VALUE SINGLE DEPOSIT (GRAPHIC)

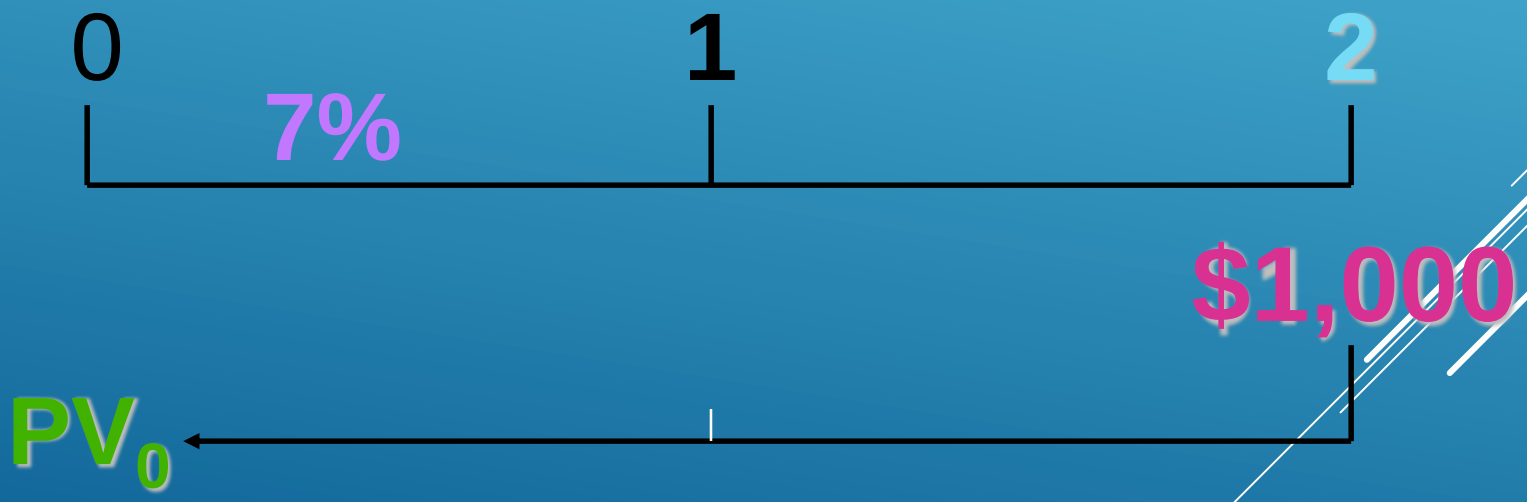
Assume that you need $1,000 in 2 years. Let's examine the process to determine how much you need to deposit today at a discount rate of 7% compounded annually.

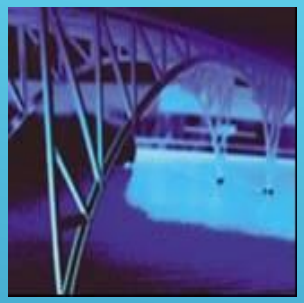




PRESENT VALUE
SINGLE DEPOSIT (FORMULA)

$PV_0 = FV_2 / (1+i)^2 = \$1{,}000 / (1.07)^2 \quad = FV_2 / (1+i)^2 = \$873.44$





General Present Value Formula

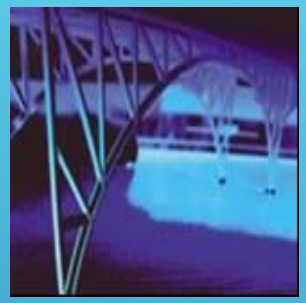
$PV_0 = FV_1 / (1+i)^1$

$PV_0 = FV_2 / (1+i)^2$ **etc.**

General Present Value Formula:

$PV_0 = FV_n / (1+i)^n$

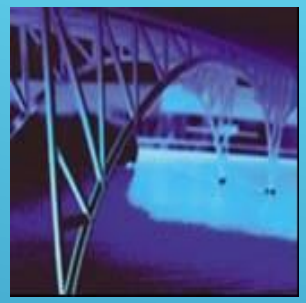
or $PV_0 = FV_n (PVIF_{i,n})$ -- *See Table II*



VALUATION USING TABLE II

$PVIF_{i,n}$ is found on Table II at the end of the book.

Period	6%	7%	8%
1	.943	.935	.926
2	.890	**.873**	.857
3	.840	.816	.794
4	.792	.763	.735
5	.747	.713	.681



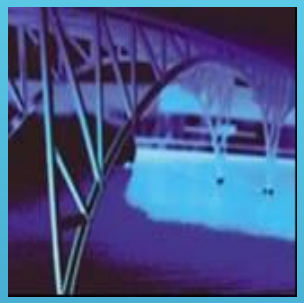
USING PRESENT VALUE TABLES

PV_2 = $1,000 ($PVIF_{7\%,2}$)

= $1,000 (.873)

= $873 [Due to Rounding]

Period	6%	7%	8%
1	.943	.935	.926
2	.890	.873	.857
3	.840	.816	.794
4	.792	.763	.735
5	.747	.713	.681



SOLVING THE PV PROBLEM

	N	I/Y	PV	PMT	FV
Inputs	2	7		0	+1,000
Compute			-873.44		

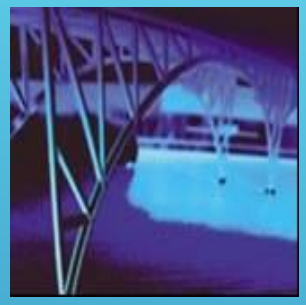
N: 2 Periods (enter as 2)

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

PV: Compute (Resulting answer is negative "deposit")

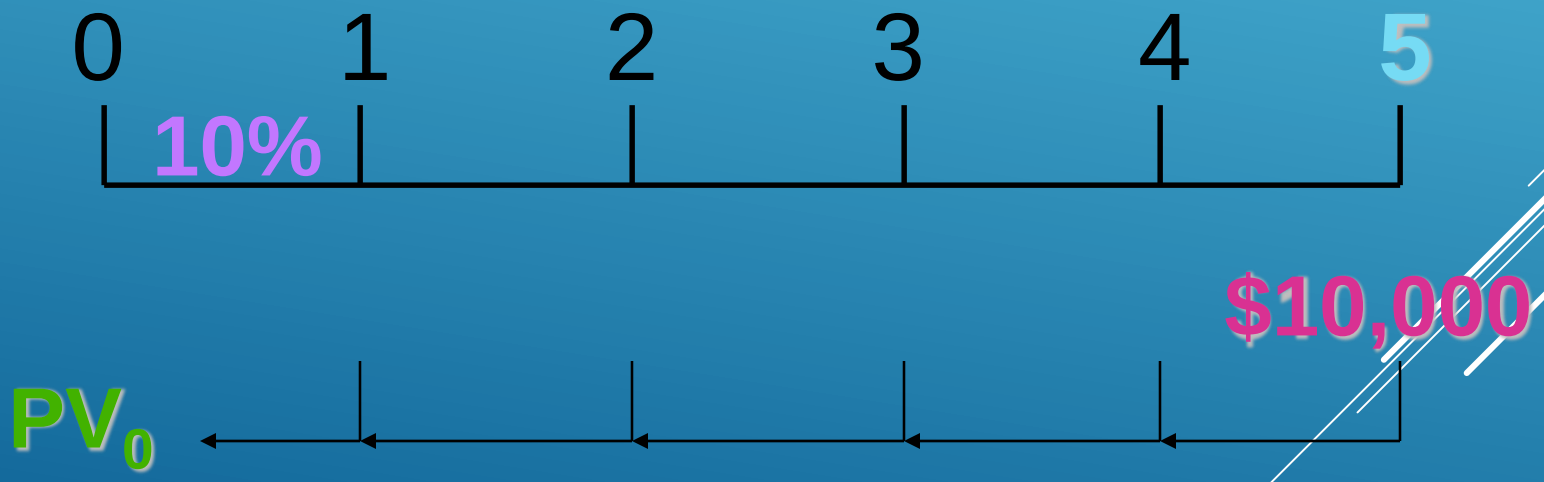
PMT: Not relevant in this situation (enter as 0)

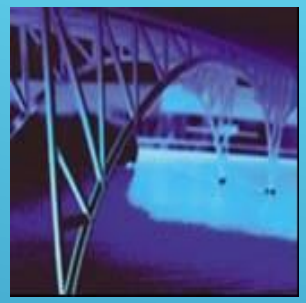
FV: $1,000 (enter as positive as you "receive $")



STORY PROBLEM EXAMPLE

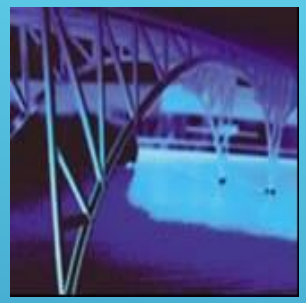
Julie Miller wants to know how large of a deposit to make so that the money will grow to $10,000 in 5 years at a discount rate of 10%.





STORY PROBLEM SOLUTION

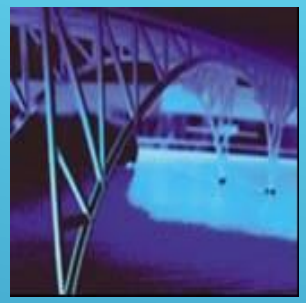
- Calculation based on general formula:
  $PV_0 = FV_n / (1+i)^n$ $PV_0 =$
  $\$10,000 / (1+ 0.10)^5$ $= \$6,209.21$
- Calculation based on Table I: PV_0
  $= \$10,000\ (PVIF_{10\%, 5})$ $= \$10,000$
  (.621) $= \$6,210.00$ *[Due to Rounding]*



SOLVING THE PV PROBLEM

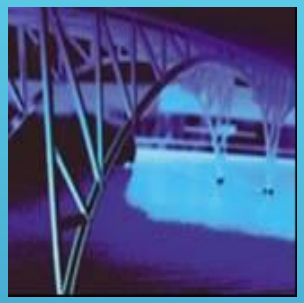
	N	I/Y	PV	PMT	FV
Inputs	5	10		0	+10,000
Compute			-6,209.21		

The result indicates that a $10,000 future value that will earn 10% annually for 5 years requires a $6,209.21 deposit today (present value).



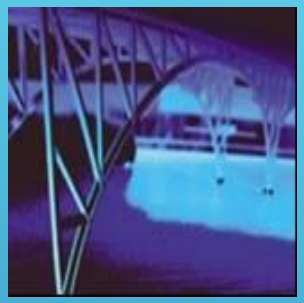
TYPES OF ANNUITIES

- ***An Annuity*** **represents a series of equal payments (or receipts) occurring over a specified number of equidistant periods.**
- Ordinary Annuity: Payments or receipts occur at the end of each period.
- Annuity Due: Payments or receipts occur at the beginning of each period.



EXAMPLES OF ANNUITIES

- Student Loan Payments
- Car Loan Payments
- Insurance Premiums
- Mortgage Payments
- Retirement Savings



(Ordinary Annuity)

End of Period 1

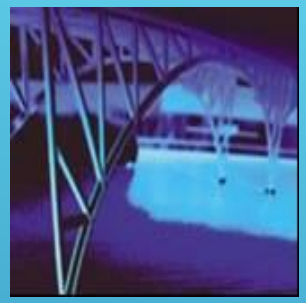
End of Period 2

End of Period 3

PARTS OF AN ANNUITY

Today

Equal Cash Flows Each 1 Period Apart



PARTS OF AN ANNUITY

(Annuity Due)

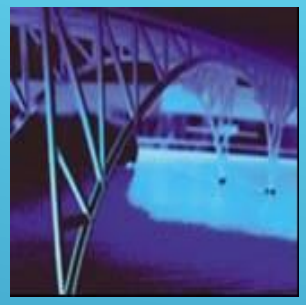
Beginning of Period 1

Beginning of Period 2

Beginning of Period 3

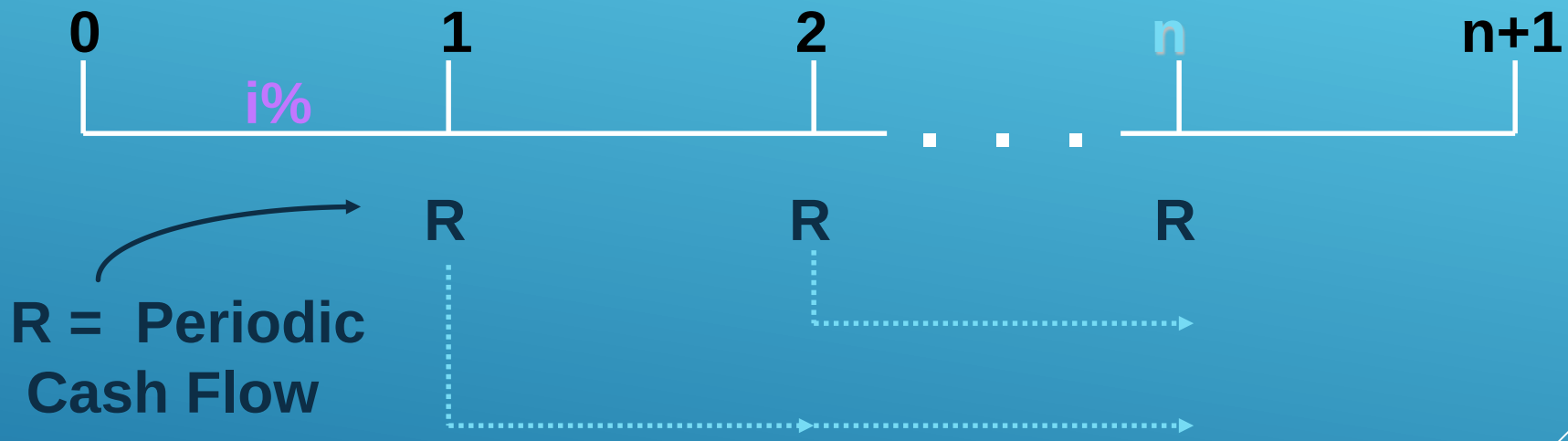
Today

Equal Cash Flows Each 1 Period Apart



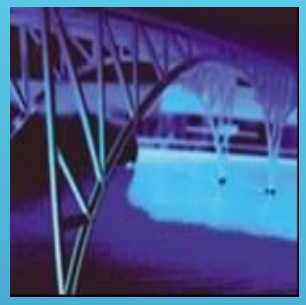
OVERVIEW OF AN ORDINARY ANNUITY -- FVA

Cash flows occur at the end of the period



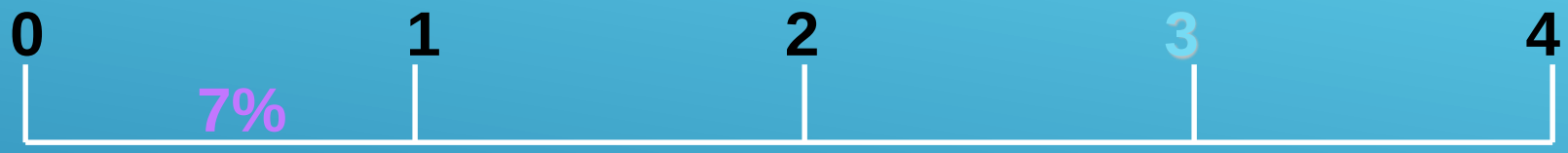
$$FVA_n = R(1+i)^{n-1} + R(1+i)^{n-2} + \ldots + R(1+i)^{1} + R(1+i)^{0}$$

FVA_n



EXAMPLE OF AN ORDINARY ANNUITY -- FVA

Cash flows occur at the end of the period



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

$1,070

$1,145

$3,215 = FVA_3

$FVA_3 = \$1,000(1.07)^2 + \$1,000(1.07)^1 + \$1,000(1.07)^0$

$= \$1,145 + \$1,070 + \$1,000$

$= \$3,215$