



# TIME VALUE OF MONEY

WHICH IS WHICH?



# YOU JUST WON \$100!!!

❖ Put it in the bank for 4 years at 10% interest.

❖ Looking for **Future Value**

❖  $Deposit * (1 + i)^n$

❖ There's a table for that:

Future Value of \$1			
Period	8%	9%	10%
1	1.0800	1.0900	1.1000
2	1.1664	1.1881	1.2100
3	1.2597	1.2950	1.3310
4	1.3605	1.4116	1.4641

$$100 * 1.464 = \$146.41$$

Year 0		\$100.00
Interest	$.10 * 100 =$	<u>10.00</u>
Year 1		110.00
Interest	$.10 * 110 =$	<u>11.00</u>
Year 2		121.00
Interest	$.10 * 121 =$	<u>12.10</u>
Year 3		133.10
Interest	$.10 * 133.10 =$	<u>13.31</u>
Year 4		146.41



# YOU'RE GOING TO NEED \$146.41

❖ How much to put in the bank today if 4 years at 10%.

$$❖ 146.41 = FV \text{ Factor} * ??$$

$$❖ 146.41 * \frac{1}{FV \text{ Factor}} = ??$$

❖ **Present Value** equals  $1/FV$  factor or  $\frac{1}{Deposit * (1+i)^n}$

❖ There's a table for that:

Future Value of \$1			
Period	8%	9%	10%
1	1.080	1.090	1.100
2	1.166	1.188	1.210
3	1.260	1.295	1.331
4	1.360	1.412	1.464



Present Value of \$1			
Period	8%	9%	10%
1	0.926	0.917	0.909
2	0.857	0.842	0.826
3	0.794	0.772	0.751
4	0.735	0.708	0.683

$$146.41 * .683 = \$100$$



# YOU JUST WON \$100 A YEAR!!!

❖ Put 4 payments of \$100 in the bank 10% interest.

❖ What's the **Future Value of this Annuity?**

Payment 1		\$100.00
Interest	$.10 * 100 =$	<u>10.00</u>
		110.00
Payment 2		<u>100.00</u>
		210.00

Interest	$.10 * 210 =$	<u>21.00</u>
		231.00
Payment 3		<u>100.00</u>
		331.00

		<u>331.00</u>
Interest	$.10 * 331$	<u>33.10</u>
		364.10
Payment 4		<u>100.00</u>
Total		464.10



# YOU JUST WON \$100 EVERY YEAR!!!

❖ Make 4 payments for \$100 at 10%.

❖ Looking for Future Value of Annuity

❖  $1 + \Sigma FV \text{ factor}$

❖ There's a table for that:

Future Value of \$1			
Period	8%	9%	10%
1	1.080	1.090	1.100
2	1.166	1.188	1.210
3	1.260	1.295	1.331
4	1.360	1.412	1.464

Future Value of Annuity			
Payment	8%	9%	10%
1	1.000	1.000	1.000
2	2.080	2.090	2.100
3	3.246	3.278	3.310
4	4.506	4.573	4.641

$$100 * 4.641 = \$464.10$$



# YOU'VE WON BUT...

❖ You can:

❖ Take \$300 today OR

❖ Take 4 payments of \$100 a year starting at the end of the year.

❖ Value of \$300 today is? \$300

❖ You need to find **PV of an Annuity** of \$100 a year

❖ There's a table for that:

Present Value of \$1			
Period	8%	9%	10%
1	0.926	0.917	0.909
2	0.857	0.842	0.826
3	0.794	0.772	0.751
4	0.735	0.708	0.683

Present Value of Annuity			
Payments	8%	9%	10%
1	0.926	0.917	0.909
2	1.783	1.759	1.736
3	2.577	2.531	2.487
4	3.312	3.240	3.170

$$100 * 3.170 = \$317$$



# WHICH TABLE/FORMULA?

Table	Known Value	Solving For	# of Payments
Future Amount of \$1	Total amount today	Future amount	One
Present Amount of \$1	Total amount in the future	Present amount	One
Future Amount of Ordinary Annuity	Amount of each payment	Future amount	Many
Present Amount of Ordinary Annuity	Amount of each payment	Present amount	Many



# GOT IT?

