

Chapter 2: Time Value of Money

Practice Problems

FV of a lump sum

- i. A company's 2005 sales were \$100 million. If sales grow at 8% per year, how large will they be 10 years later, in 2015, in millions?

PV of a lump sum

- ii. Suppose a U.S. government bond will pay \$1,000 three years from now. If the going interest rate on 3-year government bonds is 4%, how much is the bond worth today?

Interest rate on a simple lump sum investment

- iii. The U.S. Treasury offers to sell you a bond for \$613.81. No payments will be made until the bond matures 10 years from now, at which time it will be redeemed for \$1,000. What interest rate would you earn if you bought this bond at the offer price?

Number of periods

- iv. Addico Corp's 2005 earnings per share were \$2, and its growth rate during the prior 5 years was 11.0% per year. If that growth rate were maintained, how long would it take for Addico's EPS to double?

PV of an ordinary annuity

- v. You have a chance to buy an annuity that pays \$1,000 at the end of each year for 5 years. You could earn 6% on your money in other investments with equal risk. What is the most you should pay for the annuity?

Payments on an annual annuity

- vi. Suppose you inherited \$200,000 and invested it at 6% per year. How much could you withdraw at the end of each of the next 15 years?

Payments on a monthly annuity

- vii. You are buying your first house for \$220,000, and are paying \$30,000 as a down payment. You have arranged to finance the remaining \$190,000 30-year mortgage with a 7% nominal interest rate and monthly payments. What are the equal monthly payments you must make?

PV of a perpetuity

- viii. What's the present value of a perpetuity that pays \$100 per year if the appropriate interest rate is 6%?

Rate of return on a perpetuity

- ix. What's the rate of return you would earn if you paid \$1,500 for a perpetuity that pays \$105 per year?

PV of an uneven cash flow stream

- x. At a rate of 8%, what is the present value of the following cash flow stream? \$0 at Time 0; \$100 at the end of Year 1; \$300 at the end of Year 2; \$0 at the end of Year 3; and \$500 at the end of Year 4?

i. FV of a lump sum

Answer: e EASY

N	10
I/YR	8%
PV	-\$100.00
PMT	\$0.00
FV	\$215.89

ii. PV of a lump sum

Answer: c EASY

N	3
I/YR	4%
PV	\$889.00
PMT	\$0
FV	-\$1,000.00

iii. Interest rate on a simple lump sum investment

Answer: e EASY

N	10
I/YR	5.00%
PV	-\$613.81
PMT	\$0
FV	\$1,000.00

iv. Number of periods

Answer: a EASY

N	6.64
I/YR	11.00%
PV	-\$2.00
PMT	\$0
FV	\$4.00

v. PV of an ordinary annuity

Answer: c EASY

N	5
I/YR	6.00%
PV	\$4,212.36
PMT	-\$1,000
FV	\$0.00

vi. Payments on an ordinary annuity

Answer: c EASY

N	15
I/YR	6.00%
PV	-\$200,000
PMT	\$20,592.55
FV	\$0.00

vii. Mortgage payments

Answer: c MEDIUM

N	360
I	0.5833%
PV	\$190,000
PMT	-\$1,264
FV	\$0.00

viii. PV of a perpetuity

Answer: e EASY

I/YR	6.00%
PMT	\$100
PV	\$1,666.67

Divide PMT by I.

ix. Rate of return on a perpetuity

Answer: b EASY

Cost (PV)	\$1,500
PMT	\$105
I/YR	7.00%

Divide PMT by Cost.

x. PV of an uneven cash flow stream

Answer: a EASY

I/YR =	8%				
	0	1	2	3	4
CFs:	\$0	\$100	\$300	\$0	\$500
PV of CFs:	\$0	\$92.59	\$257.20	\$0	\$367.51
PV =	\$717.31				
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Find the individual PVs and sum them.

Automate the process using Excel or a calculator, by inputting the data into the cash flow register and pressing the NPV key.