**TVM of money problems**

**SIMPLE INTEREST**

Mr. Smith deposited $40,000 in a bank and earned SIMPLE interest at 7% annually for two years. Calculate the interest and total money earned.

* Interest = 5,600
* Money earned = 45,600

Jane wants to buy a CD that agrees to pay SIMPLE interest at 10% for 5 years. She puts in $10,000.

* INTEREST: $5,000
* MONEY EARNED: $15,000

**COMPOUND INTEREST**

Mr. Smith deposited $40,000 in a bank and earned COMPOUND interest at 7% annually for two years. Calculate the interest and total money earned.

* Interest = 5,796
* Money earned = 45,796

Jane wants to buy a CD that agrees to pay COMPOUND interest at 10% for 5 years. She puts in $10,000.

* INTEREST: $6,105.10
* MONEY EARNED: 16,105

**FUTURE VALUE**

Suppose you invested $1,000 for 3 years in an account paying 10% interest.

* What is the future value of the 1,000? 1,331.00

Suppose Linda wants to loan $1,000 to PCI and it agrees to compound interest at an annual rate of 6%. At the end of 5 years, how much does PCI owe Linda?

* OWED at the end of 5 years? $1,338.23

**PRESENT VALUE**

How much is $16,105 to be received in 5 years from now @ 10% interest worth today?

* Worth? 9,999.92
* What if they owed you $8,000? GOOD – Gain 2k
* What if they owed you $12,000? BAD – loss 2k

Interpretation – USING PV TABLE: At 10% interest, a dollar received 5 years from now is worth only about 62% of its value in today’s dollar

Suppose $1,000 was expected to be received in 3 years and the interest rate was determined to be 10%.

* What is the present value of the money? $751.31

**FUTURE VALUE OF AN ORDINARY ANNUITY**

Suppose someone donates 10,000 per year at the end of the year for the next 3 years. What would it be worth at the end of 3 years if it earned 10% at each period?

* Worth = 33,100

If a clinic were to deposit $100 at the end of the year for three years in an account that paid 5% interest per year, how much would Meridian accumulate at the end of 3 years?

* FV OF ANNUITY: $315.25

Mr. Kirk wants to pay annual payments into a savings account to accumulate the purchase price of his condo. He estimates that the condo will cost $250,000 in 5 years. He plans on putting it into a CD for 5 years with an interest rate of 9%.

* How much will we he need to put into the CD (annually at the end of the year) to earn him the money? 41,773.19

**PRESENT VALUE OF AN ORDINARY ANNUITY**

Suppose a donor wants to give us $10,000 per year at the end of the next three years. What is it worth today if it can earn 10% interest per period?

* Worth? 24,869

**PRESENT VALUE OF AN ANNUITY DUE**

Suppose a lessee has agreed to pay us $10,000 today and at the beginning of each of the next four years, for a total of five payments over five years @ 10% interest. Find the present value.

* Value? 41,699

**FUTURE VALUE OF AN ANNUITY DUE**

Suppose an individual would like to calculate their future balance after 5 years with today being the first deposit. The amount deposited per year is $1,000 (at the beginning of the year) with a 3% interest rate. What will the balance be after 5 years?

* Balance? 5,468.40

**Loan AMORTIZATION**

Suppose Santa Fe Healthcare System borrows $1 million from the Bank of New Mexico, to be repaid in three equal installments at the end of each of the next 3 years. The bank is to receive 6% interest on the loan balance that is outstanding at the beginning of each year.

* How much interest did they pay out? 68,329.44

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | Beginning amount | Payment | Interest rate | Interest owed | Payment on principle | Remaining balance |
| 1 | 1,000,000 | 374,109.81 | 6% | 6,000 | 314109.81 | 685,890.19 |
| 2 | 685,890.19 | 374,109.81 | 6% | 41,153.41 | 33295640 | 352,933.80 |
| 3 | 352,933.80 | 374,109.81 | 6% | 21,176.03 | 352933.80 | 0 |

1. Jane wants to buy a CD that agrees to pay SIMPLE interest at 10% for 5 years. She deposits $10,000.

* How much total interest did she earn? 5,000
* If she withdraws her money at the end of 5 years what is the total amount she will withdraw? 15,000

1. Grace wishes loan her sister 5,000. Her sister agrees to pay her back in 5 years with simple interest. She informs her sister that at the end of 5 years she expects to receive $5,500.
   1. How much interest is she charging her sister for the loan? 2%
2. If a nurse deposits $1,000 today in a bank account and the interest is compound annually at 12%, what will be the value of this investment?
3. Five years from now? 1,762.34
4. Twenty years from now? 9,646.29
5. Jane wants to buy a CD that agrees to pay COMPOUND interest at 10% for 5 years. She puts in $10,000.
   1. How much total interest did she earn? 6,105.10
   2. If she were to withdraw her money at the end of 2 years, how much would she withdraw? (assume no penalty for early withdrawal): 16,106.10
6. After completing her residency, an obstetrician plans to invest $12,000 per year at the end of year into a low-risk retirement account. She expects to earn 6% for 30 years.
   1. What will her retirement account be worth at the end of those 35 years? 948,698.40
   2. How much interest will she have earned? 912,698.40
7. Lincoln memory hospital has just been informed that a private donor is willing to contribute $5 million per year at the beginning of each year for fifteen years.
   1. What is the present dollar value of this contribution at 9%? 43,930,750
8. If a hospital received $5,000 in payments per year at the beginning of each year for the next 12 years from an uninsured patient who underwent an expensive operation what would be the present value of these collection payments
   1. At a 12% rate of return? 34,688.25
9. Suppose the PCI, Inc. wishes to put aside enough funds today to have $400,000 in 3 years. Assume that PCI can earn 9% interest.
   1. How much money do they need to set aside today? 308,873.30
10. You are interested in purchasing a home worth $525,000 in 3 years.
    1. How much money should you aside today in order to have the money assume 10% interest? 394,440.27
11. You borrowed $150,000 from the bank at an effective annual interest rate of 10%. The loan is to be repaid through 5-equal annual repayments.
    1. How much will the yearly payments be? 39,569.62
    2. How much interest will they pay for the life of the loan? 47,8484.11
    3. What is the total purchase price (principal + interest) of the loan? 197,848
    4. Suppose you get an annuity each year and are able to pay 1.5 times on the set payment each year. At what year will the loan be paid off? Year 4
12. If a hospital received $5,000 in payments per year at the end of each year for the next 12 years from an uninsured patient who underwent an expensive operation,
    1. What would be the current value of these collection payments at a 6% rate of return? 41,919.20