**Module 5 Critical Thinking Assignment**

**The Time Value of Money (100 Points)**

Complete the following problems. You will likely use a spreadsheet for this assignment but you may choose to type up your answers in a Word document. In either case, *be sure to show your work*.

* Problem 5-1: Compound Interest
* Problem 5-2: Present Value
* Problem 5-3: Future Value
* Problem 5-4: Present-Value Comparison
* Problem 5-5: Compound Annuity
* Problem 5-6: Compound Interest with Nonannual Periods

**Problem 5-1: Compound Interest**

To what amount will the following SAR investments accumulate?

**Solution**

|  |  |
| --- | --- |
| A) |   |
| Investment | 4,500  |
| Years | 5  |
| Percent | 7% |
| FV = |   |
| B) |  |
| Investment | 9,200  |
| Years  | 3  |
| Percent | 9% |
| FV = |   |
| C) |  |
| Investment | 17,050  |
| Years  | 8  |
| Percent | 11% |
| FV = |   |
| D) |  |
| Investment | 925  |
| Years | 15  |
| Percent | 7% |
| FV = |   |

**Problem 5-2: Present Value**

What is the present value of the following future amounts?

|  |  |
| --- | --- |
| A) |   |
| FV  | 3,550 |
| Years | 5  |
| Percent | 13% |
| PV = |   |
| B) |  |
| FV | 250  |
| Years | 3  |
| Percent | 8% |
| PV = |   |
| C) |  |
| FV | 2,700  |
| Years | 5  |
| Percent | 9% |
| PV = |   |
| D) |  |
| FV | 3,025 |
| Years | 7  |
| Percent | 15% |
| PV = |   |

**Problem 5-3: Future Value**

Sales of a new business book were 15,500 copies this year and were expected to increase by 14 percent per year. What are expected sales during each of the next 3 years?

|  |  |
| --- | --- |
| **DATA** |  |
| Copies | 15,500  |
| Percent | 13.5% |
| Years | 9  |

**Solution**

|  |  |  |  |
| --- | --- | --- | --- |
| FV for 1st yr = |  |   |  |
| FV for 2nd yr = |  |   |  |
| FV for 3rd yr = |  |   |  |

**Problem 5-4: Present-Value Comparison**

Assuming you can earn 5 percent on your money, which of the following offers should you choose? SAR 950 today; SAR 11,000 in 13 years; or SAR 24,000 in 21 years?

**Solution**

|  |  |  |  |
| --- | --- | --- | --- |
| Percent | 5% |   |   |
|  | Years | Amount | PV |
| A | Today | 950  |   |
| B | 13  | 12,500  |   |
| C | 21  | 24,000  |   |
|  |  |  |  |
| Which offer should you choose and why? |  |  |  |
|  |

**Problem 5-5: Compound Annuity**

What is the accumulated sum of each of the following streams of payments?

a. SAR 1,100 a year for 5 years compounded annually at 7 percent

b. SAR 1,350 a year for 4 years compounded annually at 10 percent

c. SAR 225 a year for 3 years compounded annually at 9 percent

d. SAR 400 a year for 7 years compounded annually at 3 percent

**Solution**

|  |  |
| --- | --- |
| A) |   |
| Pymt | 1,100  |
| Years | 5  |
| Percent | 7% |
| FV = |   |
| B) |  |
| Pymt | 1,350  |
| Years | 3.25  |
| Percent | 10% |
| FV = |   |
| C) |  |
| Pymt | 225  |
| Years | 3  |
| Percent  | 9% |
| FV = |   |
| D) |  |
| Pymt | 400  |
| Years | 7  |
| Percent | 3% |
| FV = |   |

**Problem 5-6: Compound Interest with Nonannual Periods**

a. Calculate the future sum of SAR 5,500, given that the money will be held in the bank for 4 years at an annual interest rate of 3 percent.

b. Recalculate part a. assuming the interest rate is (1) an APR of 4 percent compounded semiannually and (2) an APR of 8 percent compounded bimonthly.

c. Recalculate parts a. and b. for an APR of 9 percent

d. Recalculate part a. using a time horizon of 14 years (the APR is still 3 percent).

e. With respect to the effect of changes in the stated interest rate and holding periods on future sums in parts c. and d., what conclusions do you draw when you compare these figures with the answers found in parts a. and b.?

**Solution**

|  |  |  |  |
| --- | --- | --- | --- |
| A) |   |   |   |
| PV |  | 5,500  |
| Years |  | 4  |
| Percent |  | 3% |
| FV = |  |   |
| B) |  |  |
| Semiannual | 4  |   |
| Bimonthly | 8  |   |
| C) |  |  |
| Rate |  | 9% |
| Annual |  |   |
| Semiannual |  |   |
| Bimonthly |  |   |
| D) |  |  |
| Years |  | 14  |
| Annual |  |   |
| E) |  |  |
|  |