CHAPTER 1

THE TIME VALUE OF MONEY

1. (C) **The real risk-free rate, the expected inflation rate, the default risk premium, a liquidity premium and a premium to reflect the risk associated with the maturity of the security.**

   Explanation

   The required interest rate on a security is made up of the nominal rate which is in turn made up of the real risk-free rate plus the expected inflation rate. It should also contain a liquidity premium as well as a premium related to the maturity of the security.

   (Study Session 1, Module 1.1, LOS 1.b)

   Related Material

   SchweserNotes - Book 1

2. (A) **$225,000 $330,000**

   Explanation

   N = 30; I/Y = 8; PMT = -2,000; PV = 0; CPT FV = 226,566.42

   N = 30; I/Y = 10; PMT = -2,000; PV = 0; CPT FV = 328,988.05

   (Study Session 1, Module 1.2, LOS 1.e)

   Related Material

   SchweserNotes - Book 1

3. (A) **$108.29**

   Explanation

   Using your cash flow keys, CF_0 = 0; CF_1 = 10; CF_2 = -20; CF_3 = 10; CF_4 = 150; I/Y = 8.5; NPV = $108.29.

   (Study Session 1, Module 1.2, LOS 1.e)

   Related Material

   SchweserNotes - Book 1

4. (A) **nominal risk-free rates because they contain an inflation premium.**

   Explanation

   T-bills are government issued securities and are therefore considered to be default risk free. More precisely, they are nominal risk-free rates rather than real risk-free rates since they contain a premium for expected inflation.

   (Study Session 1, Module 1.1, LOS 1.b)

   Related Material

   SchweserNotes - Book 1

5. (B) **4.59%.**

Explanation

$(1 + 0.045 / 12)^{12} - 1 = 1.0459 - 1 = 0.0459.$

(Study Session 1, Module 1.1, LOS 1.c)

Related Material

SchweserNotes - Book 1

6. (B) **$549,487.**

Explanation

The investor has to ensure that the amount deposited now will grow into the amount needed to fund the perpetuity. With semiannual compounding, the effective annual rate

(EAR) earned on funds in the account is:

$$EAR = \left(1 + \frac{\text{annual rate}}{2}\right)^2 - 1 = \left(1 + \frac{0.04}{2}\right)^2 - 1 = 0.0404 = 4.04\%$$

The present value of the perpetuity = $25,000/0.0404 = $618,811.88.

Note that since the first scholarship award is paid out in four years, the present value of the perpetuity represents the amount that must be in the account at time t = 3. We can find the required deposit from:

FV = -618,811.88; N = 3; I = 4.04; CPT → PV = $549,487.24 or $\frac{618,811.88}{1.0404^3}$

= $549,487.24

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

7. (A) **$6,759.**

Explanation

This is an annuity due problem. There are several ways to solve this problem.

Method 1:

PV of first $1,000 = $1,000

PV of next 9 payments at 10% = 5,759.02

Sum of payments = $6,759.02

Method 2:

Put calculator in BGN mode.

N = 10; I = 10; PMT = -1,000; CPT → PV = 6,759.02

Note: make PMT negative to get a positive PV. Don't forget to take your calculator out of BGN mode.

Method 3:

You can also find the present value of the ordinary annuity $6,144.57 and multiply by 1 + k to add one year of interest to each cash flow. $6,144.57 × 1.1 = $6,759.02.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

8. (A) $274,422

Explanation

This is an annuity due so set your calculator to the BGN mode. N = 15; I/Y = 14.5; PMT = -40,000; FV = 0; CPT → PV = 274,422.50. Switch back to END mode.

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

9. (C) $110 $20 $10 $5

Explanation

This is an intuition question. The two cash flow streams that contain the $110 payment have the same total cash flow but the correct answer is the one where the $110 occurs earlier. The cash flow stream that has the $500 that occurs four years hence is overwhelmed by the large negative flows that precede it.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

10. (A) $1,127.

Explanation

The monthly interest rate is 12%/12 = 1%. The future value after 12 months will be $\$1,000 \times (1.01)^{12} = \$1,126.83$.

(Study Session 1, Module 1.1, LOS 1.d)

Related Material

SchweserNotes - Book 1

11. (A) $3,356.00

Explanation

This is a two-step problem. First, we need to calculate the present value of the amount she needs over her sabbatical. (This amount will be in the form of an annuity due since she requires the payment at the beginning of the month.) Then, we will use future value formulas to determine how much she needs to save each month (ordinary annuity).

Step 1: Calculate present value of amount required during the sabbatical

Using a financial calculator: **Set to BEGIN Mode**, then N = 12 x 1.5 = 18; I/Y = 10 / 12 = 0.8333; PMT = 2,500; FV = 0; CPT → PV = 41,974

Step 2: Calculate amount to save each month

Make sure the calculator is set to END mode, then N = 12; I/Y = 9 / 12 = 0.75; PV = 0; FV = 41,974; CPT → PMT = -3,356

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

12. (C) $1,588.45

Explanation

With no interest paid on the original $5,000 loan, at 6% in five years the loan balance will be:

New loan balance = $\$5,000(1.06)^5$ = $6,691.13 or PV = 5,000; I/Y = 6; N = 5; PMT = 0; CPT → FV = -$6,691.13.

$6,691.13 is the loan that has to be retired over the next five years. The financial calculator solution is:

PV = 6,691.13; I/Y = 6; N = 5; FV = 0; CPT → PMT. You obtain PMT = -1,588.45.

For Further Reference:

(Study Session 1, Module 1.2, LOS 1.e)

CFA® Program Curriculum, Volume 1, page 17

Related Material

SchweserNotes - Book 1

13. (C) $33,138

Explanation

First, find the present value of the college costs as of the end of year 9. (Remember that the PV of an ordinary annuity is as of time = 0. If the first payment is in year 10, then the present value of the annuity is indexed to the end of year 9). N = 4; I/Y = 8; PMT = 20,000; CPT → PV = $66,242.54. Second, find the present value of this single sum: N = 9; I/Y = 8; FV = 66,242.54; PMT = 0; CPT → PV = 33,137.76.

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

14. (B) $38,375

Explanation

The time line for the cash flows is as follows:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
$100,000										?	?	?	?	?	?	?	?	?	?

One period before the deferred annuity begins (i.e., at t = 9), the value will be: $\$100,000 \times (1 + 0.10)^9$ = $235,794.77.

Using a financial calculator and solving for a 10-year annuity:

N = 10; I/Y= 10; PV = -235,794.77; FV = 0; CPT PMT = 38,374.51

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

15. (B) $443.65 $166.67

Explanation

Calculate the payment first:

N = 48; I/Y = 8/12 = 0.667; PV = 25,000; FV = 0; CPT PMT = 610.32.

Interest = 0.006667 x 25,000 = $166.67; Principal = 610.32 - 166.67 = $443.65.

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

16. (A) $50,760

Explanation

The beginning of the eleventh year is the same point in time as the end of the tenth year. So we can perform the calculation as if the question were asking for a value at the end of the tenth year.

N = 10; I = 15; PMT = 2,500; CPT → FV = $50,759.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

17. (C) $700.

Explanation

87.50 ÷ 0.125 = $700.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

18. (A) 4.5%, and this represents a required rate of return.

Explanation

Since we are taking the view of the minimum amount required to induce investors to lend funds to the bank, this is best described as a required rate of return. Based upon the numerical information, the rate must be 4.5% (= 3.0 + 1.5).

(Study Session 1, Module 1.1, LOS 1.a)

Related Material

SchweserNotes - Book 1

19. (A) $919.74

Explanation

$200 / (1.05) + 300 / (1.05)^3 + 600 / (1.05)^5 = 919.74$.

This can also be solved using the net present value function: $CF_0 = 0$; CO1 = 200; CO2 = 0; CO3 = 300; CO4 = 0; CO5 = 600; I = 5; CPT NPV = 919.74

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

20. (A) $900,000

Explanation

N = 45; PMT = -2,000; PV = 0; I/Y = 8.5%; CPT → FV = $901,060.79.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

21. (A) The present value of the ordinary annuity is less than an annuity due.

Explanation

With a positive interest rate, the present value of an ordinary annuity is less than the present value of an annuity due. The first cash flow in an annuity due is at the beginning of the period, while in an ordinary annuity, the first cash flow occurs at the end of the period. Therefore, each cash flow of the ordinary annuity is discounted one period more.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

22. (A) $7,829.00

Explanation

$25,458 / 1.14^9 = 7,828.54$

Alternatively, N = 9; I/Y = 14; FV = -25,458; PMT = 0; CPT → PV = $7,828.54.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

23. (C) $11,000

Explanation

Using a financial calculator: N = 30; I/Y = 9; FV = -1,500,000; PV = 0; CPT → PMT = 11,004.52.

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

24. (C) $751

Explanation

Compute the present value of the perpetuity at (t = 3). Recall, the present value of a perpetuity or annuity is valued one period before the first payment. So, the present value at t = 3 is 100 / 0.10 = 1,000. Now it is necessary to discount this lump sum to t = 0. Therefore, present value at t = 0 is $1,000 / (1.10)^3 = 751$.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

25. (B) $9,251.82

Explanation

It's best to break this problem into parts to accommodate the change in the interest rate. Money in the fund at the end of ten years based on deposits made with initial interest of 5%:

(1) The total value in the fund at the end of the fifth year is $3,152.50:
PMT = -1,000; N = 3; I/Y = 5; CPT → FV = $3,152.50. (calculator in END mode)

(2) The $3,152.50 is now the present value and will then grow at 4% until the end of the tenth year. We get:
PV = -3,152.50; N = 5; I/Y = 4; PMT = -1,000; CPT → FV = $9,251.82
(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

26. (C) $334

Explanation

I = 12 / 12 = 1; N = 5 x 12 = 60; PV = 15,000; CPT → PMT = 333.67.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

27. (C) $15,000.00

Explanation

With PMT = 5,000; N = 7; I/Y = 11.5; value (at t = 4) = 23,185.175. Therefore, PV (at t = 0) = 23,185.175 / $(1.115)^4$ = $15,000.68.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

28. (C) $11,557

Explanation

Using a financial calculator: N = 10 x 4 = 40; I/Y = 12 / 4 = 3; PMT = -500; FV = 0; CPT → PV = 11,557.

(Study Session 1, Module 1.1, LOS 1.d)

Related Material

SchweserNotes - Book 1

29. (C) $1,650; $1,702

Explanation

Step 1: Calculate the annual payment.

Using a financial calculator (remember to clear your registers): PV = 15,000; FV = 0; I/Y = 11; N = 7; PMT = $3,183

Step 2: Calculate the portion of the first payment that is interest.

$Interest_1$ = Principal x Interest rate = (15,000 x 0.11) = 1,650

Step 3: Calculate the portion of the second payment that is principal.

$Principal_1$ = Payment - $Interest_1$ = 3,183 - 1,650 = 1,533 (interest calculation is from Step 2)

$Interest_2$ = Principal remaining x Interest rate = [(15,000 - 1.533) x 0.11] = 1,481

$Principal_2$ = Payment - $Interest_1$ = 3,183 - 1,481 = 1,702

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

30. (C) The stated annual interest rate is used to find the effective annual rate

Explanation

The effective annual rate, not the stated rate, adjusts for the frequency of compounding. The nominal, stated, and stated annual rates are all the same thing.

(Study Session 1, Module 1.1, LOS 1.c)

Related Material

SchweserNotes - Book 1

31. (A) $27

Explanation

$10(1.02)^{50}$ = $26.91

Alternatively, N = 50; I/Y = 2; PV = -10; PMT = 0; CPT → FV = $26.91.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

32. (A) $1,185.00

Explanation

N = 4 x 12 = 48; I/Y = 12/12 = 1; PV = -45,000; FV = 0; CPT → PMT = 1,185.02

(Study Session 1, Module 1.1, LOS 1.d)

Related Material

SchweserNotes - Book 1

33. (C) $5,949.77

Explanation

The value of the account at maturity will be: $5,000 x $(1 + 0.05 / 4)^{(3.5 \times 4)}$ = $5.949.77; or with a financial calculator: N = 3 years x 4 quarters/year + 2 = 14 periods; I = 5% / 4 quarters/year = 1.25; PV = $5,000; PMT = 0; CPT → FV = $5,949.77.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

34. (C) 19.25%.

Explanation

Because this investment is compounded quarterly, we need to divide the APR by four compounding periods: 18 / 4 = 4.5%. EAR = $(1.045)^4$ - 1 = 0.1925, or 19.25%.

(Study Session 1, Module 1.1, LOS 1.c)

Related Material

SchweserNotes - Book 1

35. (C) $924,423.70

Explanation

First put your calculator in the BGN.

N = 15; I/Y = 8; PMT = 100,000; CPT → PV = 924,423.70.

Alternatively, do not set your calculator to BGN, simply multiply the ordinary annuity (end of the period payments) answer by 1 + I/Y. You get the annuity due answer and you don't run the risk of forgetting to reset your calculator back to the end of the period setting.

OR N = 14; I/Y = 8; PMT = 100,000; CPT → PV = 824,423.70 + 100,000 = 924,423.70.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

36. (A) 1,300%; 10,947,544%.

Explanation

Stated Weekly Rate = 5/4 - 1 = 25%

Stated Annual Rate = 1,300%

Annual Effective Interest Rate = $(1 + 0.25)^{52}$ - 1 = 109,476.44 – 1 = 10,947,544%

(Study Session 1, Module 1.1, LOS 1.c)

Related Material

SchweserNotes - Book 1

37. (B) **All else equal, the longer the term of a loan, the lower will be the total interest you pay.**

Explanation

Since the proportion of each payment going toward the principal decreases as the original loan maturity increases, the total dollars interest paid over the life of the loan also increases.

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

38. (C) **$1,000**

Explanation

When I/Y = 0 you just sum up the numbers since there is no interest earned.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

39. (A) **$4,606.00**

Explanation

PV(1): N = 1; I/Y = 10; FV = -4,000; PMT = 0; CPT → PV = 3,636

PV(2): N = 2; I/Y = 10; FV = -2,000; PMT = 0; CPT → PV = 1,653

PV(3): 0

PV(4): N = 4; I/Y = 10; FV = 1,000; PMT = 0; CPT → PV = -683

Total PV = 3,636 + 1,653 + 0 - 683 = 4,606

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

40. (B) **8.24%.**

Explanation

$(1 + \text{periodic rate})^m - 1 = (1.02)^4 - 1 = 8.24\%$.

(Study Session 1, Module 1.1, LOS 1.c)

Related Material

SchweserNotes - Book 1

41. (A) **$16,100**

Explanation

The loan is repayable over 8 six-month periods. The rate of interest over six months is 12% / 2 = 6%. Given the present value of the loan is $100,000, we need to calculate the six monthly annuity that arises.

Using the calculator:

N = 8; I/Y = 6; PV = -100,000; CPT → PMT = 16,103.59.

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

42. (B) $159,374.00

Explanation

N = 10; I/Y = 10; PMT = -10,000; PV = 0; CPT → FV = $159,374.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

43. (B) approximately the nominal risk-free rate reduced by the expected inflation rate.

Explanation

The approximate relationship between nominal rates, real rates and expected inflation rates can be written as:

Nominal risk-free rate = real risk-free rate + expected inflation rate.

Therefore we can rewrite this equation in terms of the real risk-free rate as:

Real risk-free rate = Nominal risk-free rate - expected inflation rate

The exact relation is: (1 + real) (1 + expected inflation) = (1 + nominal)

(Study Session 1, Module 1.1, LOS 1.b)

Related Material

SchweserNotes - Book 1

44. (C) $222.00

Explanation

N = 10 x 12 = 120; I/Y = 8/12 = 0.666667; PV = -100; PMT = 0; CPT → FV = 221.96.

(Study Session 1, Module 1.1, LOS 1.d)

Related Material

SchweserNotes - Book 1

45. (B) $5,346.00.

Explanation

Future value of $1,000 for 3 periods at 10% = 1,331

Future value of $1,500 for 2 periods at 10% = 1,815

Future value of $2,000 for 1 period at 10% = 2,200

Total = $5,346

N = 3; PV = -$1,000; I/Y = 10%; CPT → FV = $1,331

N = 2; PV = -$1,500; I/Y = 10%; CPT → FV = $1,815

N = 1; PV = -$2,000; I/Y = 10%; CPT → FV = $2,200

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

46. (A) $2,080

Explanation

This is a two-step problem. First, we need to calculate the present value of the amount she needs over her sabbatical. (This amount will be in the form of an annuity due since she requires the payment at the beginning of the month.) Then, we will use future value formulas to determine how much she needs to save each month.

Step 1: Calculate present value of amount required during the sabbatical

Using a financial calculator: Set to BEGIN Mode, then N = 4; I/Y = 9.5 / 12 = 0.79167; PMT = 6,000; FV = 0; CPT → PV = -23,719.

Step 2: Calculate amount to save each month

Using a financial calculator: Make sure it is set to END mode, then N = 11; I/Y = 8.5 / 12.0 = 0.70833; PV = 0; FV = 23,719; CPT → PMT= -2,081, or approximately $2,080.

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

47. (B) 12.55%.

Explanation

If the stated rate is 12%, then the effective quarterly (period) rate is 12% / 4 = 3%

The effective annual rate is, therefore, $(1 + \text{period rate})^{\#\ \text{periods in a year}} - 1$

EAR = $[1 + (0.12 / 4)]^4 - 1 = 12.55\%$

(Study Session 1, Module 1.1, LOS 1.c)

Related Material

SchweserNotes - Book 1

48. (B) $432

Explanation

N = 3; I/Y = 5; FV = 500; PMT = 0; CPT → PV = 431.92.

or: $500/1.05^3 = 431.92$.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

49. (A) discount rate

Explanation

He needs to figure out how much the trip will cost in one year, and use the 5% as a discount rate to convert the future cost to a present value. Thus, in this context the rate is best viewed as a discount rate.

(Study Session 1, Module 1.1, LOS 1.a)

Related Material

SchweserNotes - Book 1

50. (C) $62,285

Explanation

Using END mode, the PV of this annuity due is $10,000 plus the present value of a 9-year ordinary annuity: N = 9; I/Y = 12.5; PMT = -10,000; FV = 0; CPT PV = $52,285; $52,285 + $10,000 = $62,285.

Or set your calculator to BGN mode then N =10; I/Y =12.5; PMT = -10,000; FV = 0; CPT PV = $62,285.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

51. (A) EAR increases

Explanation

The EAR increases with the frequency of compounding.

(Study Session 1, Module 1.1, LOS 1.c)

Related Material

SchweserNotes - Book 1

52. (A) 7.411%.

Explanation

Solve for an annuity due with a future value of $1,000,000, a number of periods equal to (35 x 12) = 420, payments = -500, and present value = 0. Solve for i.

i = 0.61761 x 12 = 7.411 % stated annually. Don't forget to set your calculator for payments at the beginning of the periods. If you don't, you'll get 7.437%.

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

53. (B) increases at a decreasing rate

Explanation

There is an upper limit to the EAR as the frequency of compounding increases. In the limit, with continuous compounding the EAR = e^{APR}-1. Hence, the EAR increases at a decreasing rate.

(Study Session 1, Module 1.1, LOS 1.c)

Related Material

SchweserNotes - Book 1

54. (C) $56,400

Explanation

To compound monthly, remember to divide the interest rate by 12 (6%/12 = 0.50%) and the number of periods will be 2 years times 12 months (2 x 12 = 24 periods). The value after 24 periods is $50,000 x 1.005^{24} = $56,357.99.

The problem can also be solved using the time value of money functions: N = 24; I/Y = 0.5; PMT = 0; PV = 50,000; CPT FV = $56,357.99.

(Study Session 1, Module 1.1, LOS 1.d)

Related Material

SchweserNotes - Book 1

55. (B) Bank B, 5.90%.

Explanation

Effective interest rates:

Bank A = 5.85 (already annual compounding)

Bank B, nominal = 5.75; C/Y = 12; effective = 5.90

Bank C, nominal = 5.70, C/Y = 365; effective = 5.87

Hence Bank B has the highest effective interest rate.

(Study Session 1, Module 1.1, LOS 1.c)

Related Material

SchweserNotes - Book 1

56. (A) a periodic interest rate of 0.667%.

Explanation

Periodic rate = 8.0 / 12 = 0.667. Stated rate is 8.0% and effective rate is 8.30%.

(Study Session 1, Module 1.1, LOS 1.c)

Related Material

SchweserNotes - Book 1

57. (B) 9.2%.

Explanation

If the stated rate is 9% then the effective six month (period) rate is 9% / 2 = 4.5% The effective annual rate is, therefore, $(1 + \text{period rate})^{\#\text{ Periods in a year}} - 1$

EAR = $(1 + 4.5\%)^2 - 1 = 9.2\%$

(Study Session 1, Module 1.1, LOS 1.c)

Related Material

SchweserNotes - Book 1

58. (A) $760.

Explanation

PV = -500; N = 7 x 12 = 84; I/Y = 6/12 = 0.5; compute FV = 760.18

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

59. (C) $376.

Explanation

PV = 0.8 x 15,000 = -12,000; N = 36; I = 8/12 = 0.667; CPT → PMT = 376. (Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

60. (B) 6.9%.

Explanation

4.5/65 = 0.0692, or 6.92%.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

61. (B) $22,043.00

Explanation

PV(1 - 5): N = 5; I/Y = 8; PMT = -5,000; FV = 0; CPT → PV = 19,963

PV(6 - 7): 0

PV(8): N = 8; I/Y = 8; FV = -2,000; PMT = 0; CPT → PV = 1,080

PV(9): N = 9; I/Y = 8; FV = -2,000; PMT = 0; CPT → PV = 1,000

Total PV = 19,963 + 0 + 1,080 + 1,000 = 22,043.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

62. (C) opportunity cost

Explanation

Since Wei will be foregoing interest on the withdrawn funds, the 6% interest can be best characterized as an opportunity cost — the return he could earn by postponing his auto purchase until the future.

(Study Session 1, Module 1.1, LOS 1.a)

Related Material

SchweserNotes - Book 1

63. (B) $9,939

Explanation

The $8,000 investment will compound interest over 8 quarters.

The rate per quarter is 11 % / 4 = 2.75%

Therefore, =

FV $PV(1+r)^n$

= 8,000

x

1.0275^8 = 9,939

Calculator inputs: I/Y = 2.75; N = 8; PV = 8,000; PMT = 0; CPT FV = -9,939.04
(Study Session 1, Module 1.1, LOS 1.d)

Related Material

SchweserNotes - Book 1

64. (A) $1,829.08

Explanation

Each quarter of a year is comprised of 3 months thus N = 18 / 3 = 6; I/Y = 6 / 4 = 1.5; PMT = 0; FV = 2,000; CPT → PV = $1,829.08.

(Study Session 1, Module 1.1, LOS 1.d)

Related Material

SchweserNotes - Book 1

65. (C) $887

Explanation

Note that bond problems are just mixed annuity problems. You can solve bond problems directly with your financial calculator using all five of the main TVM keys at once. For bond-types of problems the bond's price (PV) will be negative, while the coupon payment (PMT) and par value (FV) will be positive. N = 10; I/Y = 12; FV = 1,000; PMT = 100; CPT → PV = -886.99.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

66. (B) Investment A offers a $53.18 greater return.

Explanation

Investment A: I = 7.25 / 4; N = 2 x 4 = 8; PV = $50,000; PMT = 0; CPT → FV = $57,726.98

Investment B: I = 7.40; N = 2; PV = $50,000; PMT = 0; CPT → FV = $57,673.80

Difference = investment A offers a $53.18 greater dollar return.

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

67. (B) $1244.90

Explanation

With PV = 20,000, N = 4, I/Y = 8, computed Pmt = 6,038.42. Interest (Yr1) = 20,000(0.08) = 1600. Interest (Yr2) = (20,000 - (6038.42 - 1600)) (0.08) = 1244.93

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

68. (B) **$1,468.**

Explanation

The present value of the loan is $200,000 repayable over 30 x 12 = 360 months. The rate of interest per month is 8% / 12 = 0.67%.

Using the calculator: PV = 200,000; FV = 0; N = 360; I/Y = 8 / 12 = 0.6667; CPT → PMT = $1,467.53.

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

69. (B) **$87,105.21.**

Explanation

N = 6, PMT = –$20,000, I/Y = 10%, FV = 0, Compute PV → 87,105.21.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

70. (A) **a lump sum discounted for 2 years, where the lump sum is the present value of an ordinary annuity of 8 periods at 12%.**

Explanation

The PV of an ordinary annuity (calculation END mode) gives the value of the payments one period before the first payment, which is a time = 2 value here. To get a time = 0 value, this value must be discounted for two periods (years).

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

71. (C) **Option B's PV is $27 greater than option A's.**

Explanation

Option A: N = 10, PMT = -$1,225, I = 12%, FV = 0, Compute PV = $6,921.52.

Option B: N = 9, PMT = -$1,097.96, I = 12%, FV = 0, Compute PV → $5,850.51 + 1,097.96 = 6,948.17 or put calculator in Begin mode N = 10, PMT = $1,097.96, I = 12%, FV = 0, Compute PV → $6,948.17. Difference between the 2 options = $6,921.52 - $6,948.17 = -$26.65.

Option B's PV is approximately $27 higher than option A's PV.

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

72. (B) **9.3%.**

Explanation

Quarterly rate = 0.09 / 4 = 0.0225.

Effective annual rate = $(1 + 0.0225)^4$ - 1 = 0.09308, or 9.308%.

(Study Session 1, Module 1.1, LOS 1.c)

Related Material

SchweserNotes - Book 1

73. (A) $496.76.

Explanation

N = 8; I/Y = 12%; PMT = -$100; FV = 0; CPT → PV = $496.76.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

74. (B) $668

Explanation

N = 4; I/Y = 7.5; PV = -500; PMT = 0; CPT → FV = 667.73.

or: $500(1.075)^4 = 667.73$

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

75. (B) $189,229

Explanation

With monthly payments, we need a monthly rate:

6% / 12 = 0.5%. Next, solve for the monthly payment. The calculator keystrokes are:

PV = 200,000; FV = 0; N = 360; I/Y = 0.5; CPT → PMT = -$1,199.10. The balance at any time on an amortizing loan is the present value of the remaining payments. There are 312 payments remaining after the 48th payment is made. The loan balance at this point is: PMT = -1,199.10; FV = 0; N = 312; I/Y = 0.5; CPT → PV = $189,228.90.

Note that only N has to be changed to calculate this new present value; the other inputs are unchanged.

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

76. (A) $44.12

Explanation

To calculate the price, we need to discount the future dividend stream at the investor's required return.

The stream of dividends is a perpetuity (a fixed dividend each year forever).

Given the PV of a perpetuity = cash flow / discount rate

Then price = $3.75 / 0.085 = $44.12

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

77. (A) $810.98.

Explanation

N	i	FV	PV
0	12	100	100.00
1	12	200	178.57
2	12	300	318.88
3	12	400	213.53
			810.98

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

78. (B) 9.00%.

Explanation

Because this is an annuity due (payments at the start of each period) the calculator must first be set to BGN mode.

N = 48; PMT = 500; FV = -29,000; PV = 0; CPT I/Y = 0.7532

This percentage is a monthly rate because the time periods were entered as 48 months. It must be converted to a stated annual percentage rate (APR) by multiplying by the number of compounding periods per year: 0.7532 x 12 = 9.04%.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

79. (C) $14,900.

Explanation

The investment will compound over 5 x 12 = 60 months.

The rate per month is 8% / 12 = 0.67%.

Therefore, FV = $10,000 x (1 + 0.08 / 12)^{60} = $14,898.46.

This is closest to $14,900.

Using the calculator:

N = 60; PV = -$10,000; WY = 0.66667 (8% / 12 months); PMT = 0; CPT → FV = $14,898.46

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1

80. (C) $483.58

Explanation

N = 48; I/Y = 7.5 / 12 = 0.625; PV = 20,000; FV = 0; CPT → PMT = 483.58.

(Study Session 1, Module 1.3, LOS 1.f)

Related Material

SchweserNotes - Book 1

81. (B) $39,204.

Explanation

Switch to BGN mode. PMT = -1,000; N = 10, I/Y = 9, PV = 0; CPT → FV = 16,560.29. Remember the answer will be one year after the last payment in annuity due FV problems. Now PV_{10} = 16,560.29; N = 10; I/Y = 9; PMT = 0; CPT → FV = 39,204.23. Switch back to END mode.

(Study Session 1, Module 1.2, LOS 1.e)

Related Material

SchweserNotes - Book 1