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CORRECT ANSWERS ARE LOCATED IN THE 2ND HALF OF THIS DOC.

TRUE/FALSE - Write 'T' if the statement is true and 'F' if the statement is false.

1) The rate of return, discount rate, hurdle rate, and opportunity cost of capital all have the same meaning.
   - ◎ true
   - ◎ false

2) A dollar today is worth more than a dollar tomorrow if the interest rate is positive.
   - ◎ true
   - ◎ false

3) One can find the present value of a future cash flow by dividing it by an appropriate discount factor.
   - ◎ true
   - ◎ false

4) One can find a project's net present value by subtracting the present value of its required investment from the present value of its future cash flows.
   - ◎ true
   - ◎ false

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5) The opportunity cost of capital is higher for safe investments than for risky ones.
   - ◎ true
   - ◎ false

6) A safe dollar is always worth less than a risky dollar because the rate of return on a safe investment is generally low and the rate of return on a risky investment is generally high.
   - ◎ true
   - ◎ false

7) "Accept investments that have positive net present values" is called the net present value rule.
   - ◎ true
   - ◎ false

8) Generally, one should accept investments that offer rates of return in excess of their opportunity costs of capital.
   - ◎ true
   - ◎ false

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9) The rate of return on any perpetuity is equal to its cash flow multiplied by its price.
   - ◎ true
   - ◎ false

10) An annuity is an asset that pays a fixed amount each period for a specified number of periods.
   - ◎ true
   - ◎ false

11) The value of a five-year annuity is equal to the sum of two perpetuities. One makes its first payment in year 1, and the other makes its first payment in year 6.
   - ◎ true
   - ◎ false

12) An equal-payment home mortgage is an example of an annuity.
   - ◎ true
   - ◎ false

13) In the amortization of a mortgage loan with equal payments, the fraction of each payment devoted to interest steadily increases over time and the fraction devoted to reducing the loan balance decreases steadily.
   - ◎ true
   - ◎ false

14) The present value of a growing perpetuity, with cash flow C_1 occurring one year from now, is given by: $[C_1/(r - g)]$, where $r > g$.
   - ◎ true
   - ◎ false

MULTIPLE CHOICE - Choose the one alternative that best completes the statement or answers the question.

15) The present value of $120 expected two years from today at a discount rate of 6 percent is:
   - A) $134.83.
   - B) $127.00.
   - C) $120.00.
   - D) $106.80.

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16) The present value of $138,600 expected one year from today at an interest rate (discount rate) of 10 percent per year is:
A) $138,600.
B) $116,000.
C) $126,000.
D) $124,900.

17) The present value of $113,000 expected at the end of one year, at a discount rate of 25 percent per year, is:
A) $90,400.
B) $141,250.
C) $113,000.
D) $84,750.

18) If the present value of a cash flow generated by an initial investment of $220,000 is $290,000, what is the NPV of the project?
A) $290,000
B) $70,000
C) $220,000
D) −$70,000

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19) What is the present value of the following cash flows at a discount rate of 9 percent?

Year 1	Year 2	Year 3
$ 106,000	$ 156,000	$ 206,000

A) $387,619.58
B) $468,000.00
C) $423,950.68
D) $430,844.04

20) What is the net present value of the following sequence of annual cash flows at a discount rate of 16 percent APR?

t = 1	t = 2
−$ 106,000	$ 306,000

A) $136,028.54
B) $122,088.27
C) $158,124.83
D) $138,737.70

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21) What is the net present value (NPV) of the following sequence of cash flows at a discount rate of 9 percent?

t = 0	t = 1	t = 2	t = 3
-$ 265,000	$ 115,000	$ 165,000	$ 215,000

A) $145,401.23
B) $215,000.00
C) $181,799.40
D) $205,324.12

22) You would like to have enough money saved to receive a $70,000 per year perpetuity after retirement. How much would you need to have saved in your retirement fund to achieve this goal? Assume that the perpetuity payments start on the day of your retirement. The annual interest rate is 8 percent.

A) $1,400,000
B) $945,000
C) $875,000
D) $700,000

23) If the eight-year present value annuity factor is 4.96764 and the seven-year present value annuity factor is 4.56376, what is the present value of the $1 received at the end of eight years?

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A) $0.47197
B) $1.27170
C) $0.40388
D) $.9025

24) What is the present value of a $1,180 per year annuity for five years at an interest rate of 12 percent?

A) $7,498.09
B) $4,253.64
C) $660.12
D) $3,188.21

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25) After retirement, you expect to live for 25 years. You would like to have $79,000 in income each year. How much should you have saved in your retirement account to receive this income if the annual interest rate is 9 percent per year? (Assume that the payments start one year after your retirement.)
A) $775,983.79
B) $87,845.81
C) $1,975,000.00
D) $1,278,198.27

26) Mila Cabellero has taken a 20-year, $256,000 mortgage on her house at an interest rate of 6 percent per year. What is the remaining balance (or value) of the mortgage after the payment of the fifth annual installment?
A) $132,044.74
B) $216,770.08
C) $144,430.16
D) $254,682.63

27) Ms. Richert expects to retire in 30 years, and she wishes to accumulate $1,004,000 in her retirement fund by that time. If the interest rate is 13 percent per year, how much should Ms. Richert put into her retirement fund at the end of each year in order to achieve this goal?
A) $3,424.29
B) $6,848.59
C) $4,016.00
D) $10,325.08

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28) You would like to have enough money saved to receive a growing annuity for 20 years, growing at a rate of 5 percent per year, with the first payment of $52,800 occurring exactly one year after retirement. How much would you need to save in your retirement fund to achieve this goal? The interest rate is 10 percent.
A) $1,056,000.00
B) $449,500.35
C) $639,518.04
D) $873,765.39

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29) You would like to have enough money saved to receive a growing annuity for 25 years, growing at a rate of 4 percent per year, with the first payment of $60,600 occurring exactly one year after retirement. How much would you need to save in your retirement fund to achieve this goal? The interest rate is 12 percent.
A) $1,515,000
B) $638,714
C) $456,687
D) $1,053,742

30) The present value of $100 expected two years from today at a discount rate of 6 percent is:
A) $112.36.
B) $106.00.
C) $100.00.
D) $89.00.

31) Present value is defined as:
A) future cash flows discounted to the present by an appropriate discount rate.
B) inverse of future cash flows.
C) present cash flows compounded into the future.
D) future cash flows multiplied by the factor $(1 + r)^{t}$.

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32) If the annual interest rate is 12 percent, what is the two-year discount factor?
A) 0.7972
B) 0.8929
C) 1.2544
D) 0.8065

33) If the present value of cash flow *X* is $240, and the present value of cash flow *Y* is $160, then the present value of the combined cash flows is:
A) $240.
B) $160.
C) $80.
D) $400.

34) The rate of return is also called the:
A) discount rate only.
B) discount rate and hurdle rate only.
C) discount rate, hurdle rate, and opportunity cost of capital.
D) discount rate and opportunity cost of capital only.

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35) The present value of $121,000 expected one year from today at an interest rate (discount rate) of 10 percent per year is:
A) $121,000.
B) $100,000.
C) $110,000.
D) $108,900.

36) The one-year discount factor, at a discount rate of 25 percent per year, is:
A) 1.25.
B) 1.0.
C) 0.8.
D) 0.75.

37) The one-year discount factor, at an interest rate of 100 percent per year, is:
A) 1.50.
B) 0.50.
C) 0.25.
D) 1.00.

38) The present value of $100,000 expected at the end of one year, at a discount rate of 25 percent per year, is:
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A) $80,000.
B) $125,000.
C) $100,000.
D) $75,000.

39) If the one-year discount factor is 0.8333, what is the discount rate (interest rate) per year?
A) 10 percent
B) 20 percent
C) 30 percent
D) 40 percent

40) If the present value of $480 to be paid at the end of one year is $400, what is the one-year discount factor?
A) 0.8333
B) 1.20
C) 0.20
D) 1.00

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41) If the present value of $250 expected one year from today is $200, what is the one-year discount rate?
A) 10 percent
B) 20 percent
C) 25 percent
D) 30 percent

42) If the one-year discount factor is 0.90, what is the present value of $120 expected one year from today?
A) $100
B) $96
C) $108
D) $133

43) If the present value of $600, expected one year from today, is $400, what is the one-year discount rate?
A) 15 percent
B) 20 percent
C) 25 percent
D) 50 percent

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44) The present value formula for a cash flow expected one period from now is:
A) PV = $C_1 \times (1 + r)$.
B) PV = $C_1/(1 + r)$.
C) PV = C_1/r.
D) PV = $(1 + r)/C_1$.

45) The net present value formula for one period is:
A) NPV = $C_0 + [C_1/(1 + r)]$.
B) NPV = PV required investment.
C) NPV = C_0/C_1.
D) NPV = C_1/C_0.

46) An initial investment of $400,000 is expected to produce an end-of-year cash flow of $480,000. What is the NPV of the project at a discount rate of 20 percent?
A) $176,000
B) $80,000
C) $0
D) $64,000

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47) If the present value of a cash flow generated by an initial investment of $200,000 is $250,000, what is the NPV of the project?

A) $250,000
B) $50,000
C) $200,000
D) −$50,000

48) What is the present value of the following cash flows at a discount rate of 9 percent?

Year 1	Year 2	Year 3
$ 100,000	$ 150,000	$ 200,000

A) $372,431.81
B) $450,000.00
C) $405,950.68
D) $412,844.04

49) At an interest rate of 10 percent, which of the following sequences of cash flows should you prefer?

	Year 1	Year 2	Year 3
A	$ 500	$ 300	$ 100
B	100	300	500
C	300	300	300
D	Any of the above as they all add up to $900		

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A) Option A
B) Option B
C) Option C
D) Option D

50) What is the net present value of the following cash flow sequence at a discount rate of 11 percent?

t = 0	t = 1	t = 2
−$120,000	$300,000	−$100,000

A) $69,108.03
B) $231,432.51
C) $80,000.00
D) $88,000.00

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51) What is the net present value of the following sequence of annual cash flows at a discount rate of 16 percent APR?

t = 1	t = 2
−$100,000	$300,000

A) $136,741.97
B) $122,948.87
C) $158,620.69
D) $139,418.23

52) What is the net present value (NPV) of the following sequence of cash flows at a discount rate of 9 percent?

t = 0	t = 1	t = 2	t = 3
−$250,000	$100,000	$150,000	$200,000

A) $122,431.81
B) $200,000.00
C) $155,950.68
D) $177,483.77

53) Which of the following statements regarding the NPV rule and the rate of return rule is false?
A) Accept a project if its NPV > 0.
B) Reject a project if the NPV < 0.
C) Accept a project if its rate of return > 0.
D) Accept a project if its rate of return > opportunity cost of capital.

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54) An initial investment of $500 produces a cash flow of $550 one year from today. Calculate the rate of return on the project.
A) 10 percent
B) 15 percent
C) 20 percent
D) 25 percent

55) According to the net present value rule, an investment in a project should be made if the:
A) net present value is greater than the cost of investment.
B) net present value is greater than the present value of cash flows.
C) net present value is positive.
D) net present value is negative.

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56) Which of the following statements regarding the net present value rule and the rate of return rule is false?
A) Accept a project if NPV > cost of investment.
B) Accept a project if NPV is positive.
C) Accept a project if return on investment exceeds the rate of return on an equivalent-risk investment in the financial market.
D) Reject a project if NPV is negative.

57) The opportunity cost of capital for a risky project is:
A) the expected rate of return on a government security having the same maturity as the project.
B) the expected rate of return on a well-diversified portfolio of common stocks.
C) the expected rate of return on a security of similar risk as the project.
D) the expected rate of return on a typical bond portfolio.

58) A perpetuity is defined as a sequence of:
A) equal cash flows occurring at equal intervals of time for a specific number of periods.
B) equal cash flows occurring at equal intervals of time forever.
C) unequal cash flows occurring at equal intervals of time forever.
D) unequal cash flows occurring at equal intervals of time for a specific number of periods.

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59) Which of the following is generally considered an example of a perpetuity?
A) Interest payments on a 10-year bond
B) Interest payments on a 30-year bond
C) Interest payments on a consol
D) Interest payments on government bonds

60) You would like to have enough money saved after your retirement such that you and your heirs can receive $100,000 per year in perpetuity. How much would you need to have saved at the time of your retirement in order to achieve this goal? Assume that the perpetuity payments start one year after the date of your retirement. The annual interest rate is 12.5 percent.
A) $1,000,000
B) $10,000,000
C) $800,000
D) $1,125,000

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61) What is the present value of $10,000 per year in perpetuity at an annual interest rate of 10 percent? Assume the perpetuity starts in one year.
A) $10,000
B) $100,000
C) $200,000
D) $1,000

62) You would like to have enough money saved to receive $80,000 per year in perpetuity after retirement for you and your heirs. How much would you need to have saved in your retirement fund to achieve this goal? Assume that the perpetuity payments start one year from the date of your retirement. The annual interest rate is 8 percent.
A) $7,500,000
B) $750,000
C) $1,000,000
D) $800,000

63) You would like to have enough money saved to receive a $50,000 per year perpetuity after retirement. How much would you need to have saved in your retirement fund to achieve this goal? Assume that the perpetuity payments start on the day of your retirement. The annual interest rate is 8 percent.
A) $1,000,000
B) $675,000
C) $625,000
D) $500,000

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64) You would like to have enough money saved to receive an $80,000 per year perpetuity after retirement. How much would you need to have saved in your retirement fund to achieve this goal? Assume that the perpetuity payments start on the day of your retirement. The annual interest rate is 10 percent.
A) $1,500,000
B) $880,000
C) $800,000
D) $80,000

65) An annuity is defined as a set of:
A) equal cash flows occurring at equal intervals of time for a specified period.
B) equal cash flows occurring at equal intervals of time forever.
C) unequal cash flows occurring at equal intervals of time forever.
D) unequal cash flows occurring at equal intervals of time for a specified period.

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66) If you are paid $1,000 at the end of each year for the next five years, what type of cash flow did you receive?
A) Uneven cash flow stream
B) An annuity
C) An annuity due
D) A perpetuity

67) If the three-year present value annuity factor is 2.673 and the two-year present value annuity factor is 1.833, what is the present value of $1 received at the end of the three years?
A) $1.19
B) $0.84
C) $0.89
D) $0.92

68) If the five-year present value annuity factor is 3.60478 and the four-year present value annuity factor is 3.03735, what is the present value of the $1 received at the end of five years?
A) $0.63552
B) $1.76233
C) $0.56743
D) $1.2132

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69) What is the eight-year present value annuity factor at a discount rate of 11 percent?
A) 5.7122
B) 11.8594
C) 5.1461
D) 6.9158

70) What is the six-year present value annuity factor at an interest rate of 9 percent?
A) 7.5233
B) 4.4859
C) 1.6771
D) 3.1432

71) What is the present value of a $1,000 per year annuity for five years at an interest rate of 12 percent?
A) $6,352.85
B) $3,604.78
C) $567.43
D) $2,743.28

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72) What is the present value of a six-year, $5,000 per year annuity at a discount rate of 10 percent?
A) $21,776.30
B) $3,371.91
C) $16,760.78
D) $18,327.82

73) After retirement, you expect to live for 25 years. You would like to have $75,000 in income each year. How much should you have saved in your retirement account to receive this income if the annual interest rate is 9 percent per year? (Assume that the payments start on the day of your retirement.)
A) $736,693.47
B) $802,995.88
C) $2,043,750.21
D) $1,427,831.93

74) After retirement, you expect to live for 25 years. You would like to have $75,000 in income each year. How much should you have saved in your retirement account to receive this income if the annual interest rate is 9 percent per year? (Assume that the payments start one year after your retirement.)
A) $736,693.47
B) $83,431.17
C) $1,875,000.00
D) $1,213,487.12

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75) For $10,000, you can purchase a five-year annuity that will pay $2,504.57 per year for five years. The payments occur at the end of each year. Calculate the effective annual interest rate implied by this arrangement.
A) 8 percent
B) 9 percent
C) 10 percent
D) 11 percent

76) If the present value annuity factor for 10 years at 10 percent interest rate is 6.1446, what is the present value annuity factor for an equivalent annuity due?
A) 6.1446
B) 7.3800
C) 6.7590
D) 5.7321

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77) If the present value annuity factor is 3.8896, what is the present value annuity factor for an equivalent annuity due if the interest rate is 9 percent?
A) 3.5684
B) 4.2397
C) 3.8896
D) 5.3127

78) For $10,000, you can purchase a five-year annuity that will pay $2,358.65 per year for five years. The payments occur at the beginning of each year. Calculate the effective annual interest rate implied by this arrangement.
A) 8 percent
B) 9 percent
C) 10 percent
D) 11 percent

79) Zhuan Chao has taken a $250,000 mortgage on his house at an interest rate of 6 percent per year. If the mortgage calls for 20 equal, annual payments, what is the amount of each payment?
A) $21,796.14
B) $10,500.00
C) $16,882.43
D) $24,327.18

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80) Mila Cabellero has taken a 20-year, $250,000 mortgage on her house at an interest rate of 6 percent per year. What is the remaining balance (or value) of the mortgage after the payment of the fifth annual installment?
A) $128,958.41
B) $211,689.53
C) $141,019.50
D) $248,719.21

81) If the present value of $1 received *n* years from today at an interest rate of *r* is 0.3855, then what is the future value of $1 invested today at an interest rate of *r* percent for *n* years?
A) $1.3855
B) $2.594
C) $1.701
D) Not enough information is given to solve the problem.

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82) If the present value of $1 received *n* years from today at an interest rate of *r* is 0.621, then what is the future value of $1 invested today at an interest rate of *r*% for *n* years?
A) $1.000
B) $1.610
C) $1.621
D) Not enough information is given to solve the problem.

83) If the future value of $1 invested today at an interest rate of *r* percent for *n* years is 9.6463, what is the present value of $1 to be received in *n* years at *r* percent interest rate?
A) $9.6463
B) $1.0000
C) $0.1037
D) $0.4132

84) If the future value annuity factor at 10 percent and five years is 6.1051, calculate the equivalent present value annuity factor:
A) 6.1051
B) 3.7908
C) 6.7156
D) 4.8127

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85) If the present value annuity factor at 10 percent for 10 years is 6.1446, what is the equivalent future value annuity factor?
A) 3.1080
B) 15.9375
C) 2.5937
D) 8.4132

86) If the present value annuity factor at 12 percent for five years is 3.6048, what is the equivalent future value annuity factor?
A) 2.0455
B) 6.3529
C) 1.7623
D) 5.1237

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87) If the present value annuity factor at 8 percent for 10 years is 6.71, what is the equivalent future value annuity factor?
A) 3.108
B) 14.486
C) 2.159
D) 5.384

88) You are considering investing in a retirement fund that requires you to deposit $5,000 per year, and you want to know how much the fund will be worth when you retire. What financial technique should you use to calculate this value?
A) Future value of a single payment
B) Future value of an annuity
C) Present value of an annuity
D) Present value of a perpetuity

89) Mr. Mendoza expects to retire in 25 years, and he wishes to accumulate $750,000 in his retirement fund by that time. If the interest rate is 10 percent per year, how much should Mr. Mendoza put into his retirement fund each year in order to achieve this goal? (Assume that he makes payments at the end of each year.)
A) $4,559.44
B) $2,500.00
C) $7,626.05
D) $8,418.29

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90) Ms. Richert expects to retire in 30 years, and she wishes to accumulate $1,000,000 in her retirement fund by that time. If the interest rate is 12 percent per year, how much should Ms. Richert put into her retirement fund at the end of each year in order to achieve this goal?
A) $4,143.66
B) $12,483.17
C) $8,287.32
D) $4,000.00

91) You would like to have enough money saved to receive a growing annuity for 20 years, growing at a rate of 5 percent per year, with the first payment of $50,000 occurring exactly one year after retirement. How much would you need to save in your retirement fund to achieve this goal? The interest rate is 10 percent.
A) $1,000,000.00
B) $425,678.19
C) $605,604.20
D) $827,431.28

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92) You would like to have enough money saved to receive a growing annuity for 25 years, growing at a rate of 4 percent per year, with the first payment of $60,000 occurring exactly one year after retirement. How much would you need to save in your retirement fund to achieve this goal? The interest rate is 12 percent.
A) $1,500,000
B) $632,390
C) $452,165
D) $1,043,287

93) The managers of a firm can maximize stockholder wealth by:
A) taking all projects with positive NPVs.
B) taking all projects with NPVs greater than the cost of investment.
C) taking all projects with NPVs greater than the present value of cash flows.
D) taking only the highest NPV project each year.

94) Suppose you invest $100 at 12 percent which you hold for three years. How much would you have at the end of three years using compound interest?
A) $136.00
B) $140.49
C) $240.18
D) $173.18

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95) Which of the following statements is true?
A) The process of discounting is the inverse of the process of compounding.
B) Ending balances using simple interest are always greater than ending balances using compound interest at positive interest rates.
C) The present value of an annuity due is always less than the present value of an equivalent ordinary annuity at positive interest rates.
D) The future value of an annuity due is always less than the present value of an equivalent ordinary annuity at positive interest rates.

96) The concept of compound interest is best described as:
A) interest earned on an investment.
B) the total amount of interest earned over the life of an investment.
C) interest earned on interest and principal.
D) the inverse of simple interest.

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97) Mrs. Koehler has just taken out a $150,000 mortgage at an interest rate of 6 percent per year. If the mortgage calls for equal monthly payments for 20 years, what is the amount of each payment? Assume monthly compounding or discounting.
A) $1,254.70
B) $1,625.00
C) $1,263.06
D) $1,074.65

98) An investment having a 10.47 percent effective annual rate (EAR) has what APR? Assume monthly compounding.
A) 10.99 percent
B) 9.57 percent
C) 10.00 percent
D) 8.87 percent

99) An investment at 12 percent APR compounded monthly is equal to an effective annual rate of:
A) 12.68 percent.
B) 12.36 percent.
C) 12.00 percent.
D) 11.87 percent.

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100) Mr. Kyung-Soo expects to retire in 30 years and would like to accumulate $1 million in his pension fund. If the annual interest rate is 12 percent, how much should Mr. Kyung-Soo put into his pension fund each month in order to achieve his goal? (Assume that Mr. Kyung-Soo will deposit the same amount each month into his pension fund, using monthly compounding.)
A) $286.13
B) $771.60
C) $345.30
D) $437.13

101) An investment at 10 percent compounded continuously has an equivalent annual rate of:
A) 10.250 percent.
B) 10.517 percent.
C) 10.381 percent.
D) none of the options.

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102) The present value of a $100 per year perpetuity at 10 percent per year interest rate is $1,000. What would be the present value of this perpetuity if the payments were compounded continuously?

A) $1,000.00
B) $1,049.21
C) $1,024.40
D) $986.14

103) You just inherited a trust that will pay you $100,000 per year in perpetuity. However, the first payment will not occur for exactly four more years. Assuming an 8 percent annual interest rate, what is the value of this trust?

A) $918,787
B) $992,290
C) $1,000,000
D) $1,250,000

104) You just inherited a trust that will pay you $100,000 per year in perpetuity. However, the first payment will not occur for exactly four more years. Assuming a 10 percent annual interest rate, what is the value of this trust?

A) $683,013
B) $751,315
C) $1,000,000
D) $1,100,000

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105) You just inherited a trust that will pay you $100,000 per year in perpetuity. However, the first payment will not occur for exactly five more years. Assuming an 8 percent annual interest rate, what is the value of this trust?

A) $850,729
B) $918,787
C) $1,000,000
D) $1,250,000

106) You just inherited a trust that will pay you $100,000 per year in perpetuity. However, the first payment will not occur for exactly five more years. Assuming a 10 percent annual interest rate, what is the value of this trust?

A) $620,921
B) $683,013
C) $1,000,000
D) $1,100,000

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SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

107) Briefly explain the term *discount rate*.

108) Intuitively explain the concept of present value.

109) State the net present value rule.

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110) Briefly explain the concept of risk.

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111) State the rate of return rule.

112) Define the term *perpetuity*.

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113) Describe how you would go about finding the present value of any annuity given the formula for the present value of a perpetuity.

114) What is the difference between simple interest and compound interest?

115) Briefly explain continuous compounding.

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Answer Key

Test name: Chapter 02

1) TRUE
2) TRUE
3) FALSE
4) TRUE
5) FALSE
6) FALSE
7) TRUE
8) TRUE
9) FALSE
10) TRUE
11) FALSE
12) TRUE
13) FALSE
14) TRUE
15) D
PV = $120/(1.06^2) = $106.80.

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16) C
PV = ($138,600)/(1.10) = $126,000.

17) A
PV = $113,000/(1 + 0.25) = $90,400.

18) B
NPV = −$220,000 + $290,000 = $70,000.

19) A
PV = $106,000/1.09 + ($156,000/(1.09^2)) + $206,000/(1.09^3) = $387,619.58.

20) A
PV = (−$106,000/1.16) + ($306,000/(1.16^2)) = $136,028.54.

21) A
NPV = −$265,000 + ($115,000/1.09) + ($165,000/(1.09^2)) + ($215,000/(1.09^3)).
NPV = $145,401.23.

22) B

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PV = [$70,000/0.08)] × (1.08) = $945,000; or PV = $70,000 + ($70,000/0.08).

23) C
PV = (4.96764 − 4.56376) × (1) = $0.40388.

24) B
PV annuity factor = [1/0.12 − 1/(0.12 × 1.12^ 5)] × $1,180 = $4,253.64.

25) A
PV = [1/0.09 − 1/(0.09 × 1.09^25)] × $79,000 = $775,983.79.
Alternatively, ($79,000/0.09) × [1 − 1/(1.09^25)] = $775,983.79.

26) B
Step 1: I = 6%; N = 20; PV = 256,000; FV = 0. Compute PMT = −22,319.25.
Step 2: I = 6%; N = 15; PMT = −22,319.25. Compute PV = 216,770.08.

27) A
Future value annuity factor = [(1.13^30) − 1]/0.13 = 293.1992;
payment = $1,004,000/293.1992 = $3,424.29.

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28) C
PV = $52,800 × {1/(0.1 − 0.05) − [1/(0.1 − 0.05)] × [(1.05^20)/(1.10^20)]} = $639,518.04.

29) B
PV = $60,600 × {1/(0.12 − 0.04) − [1/(0.12 − 0.04)] × [(1.04^25)/(1.12^25)]} = $638,714.

30) D
PV = $100/(1.06^2) = $89.00.

31) A
32) A
DF2 = 1/(1.12^2) = 0.7972.

33) D
PV($x + y$) = PV(x) + PV(y) = $240 + $160 = $400.

34) C
35) C
PV = ($121,000)/(1.10) = $110,000.

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36) C
Discount factor = 1/1.25 = 0.8.

37) B
Discount factor = 1/(1 + 1.00) = 0.5.

38) A
PV = $100,000/(1 + 0.25) = $80,000.

39) B
DF = $1/(1 + r)^1 = 0.8333$; $1 + r = 1/0.8333$; $r = 20\%$.

40) A
Discount factor is = $400/$480 = 0.8333.

41) C
$1 + r = \$250/\$200 = 1.25$; $r = 25\%$.

42) C
PV = ($120)(0.90) = $108.

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43) D
$1 + r = (\$600)/(\$400) = 1.5$; $r = 50\%$.

44) B
45) A
46) C
NPV = −$400,000 + ($480,000/1.2) = $0.

47) B
NPV = −$200,000 + $250,000 = $50,000.

48) A
PV = $100,000/1.09 + ($150,000/(1.09^2)) + $200,000/(1.09^3) = $372,431.81.

49) A
PV(A) = $777.61; PV(B) = $714.50; PV(C) = $746.05; A is preferred.

50) A
NPV = −$120,000 + ($300,000/1.11) − ($100,000/(1.11^2)) = $69,108.03.

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51) A
PV = (−$100,000/1.16) + ($300,000/(1.16^2)) = $136,741.97.

52) A
NPV = −$250,000 + ($100,000/1.09) + ($150,000/(1.09^2)) + ($200,000/(1.09^3)).
NPV = $122,431.81.

53) C
54) A
Rate of return = ($550 − $500)/$500 = 10%.

55) C
56) A
57) C
58) B
59) C
60) C
PV = ($100,000/0.125) = $800,000.

61) B
PV = ($10,000/0.10) = $100,000.

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62) C
PV = ($80,000/0.08) = $1,000,000.

63) B
PV = [$50,000/0.08)] × (1.08) = $675,000; or PV = $50,000 + ($50,000/0.08).

64) B
PV = [($80,000/0.10)] × (1.1) = $880,000; or PV = $80,000 + $80,000/0.10.

65) A
66) B
67) B
PV = (2.673 − 1.833) × ($1) = $0.84.

68) C
PV = (3.60478 - 3.03735) × ($1) = $0.56743.

69) C

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PV annuity factor = 1/0.11 − 1/(0.11 × 1.11^8) = 5.1461.

70) B
PV annuity factor = 1/0.09 − 1/(0.09 × 1.09^6) = 4.4859.

71) B
PV annuity factor = [1/0.12 − 1/(0.12 × 1.12^ 5)] × $1,000 = $3,604.78.

72) A
PV = [1/0.10 − 1/(0.10 × 1.10^6)] × $5,000 = $21,776.30.

73) B
PV = 1/0.09 − [1/(0.09 × 1.09^25)] × $75,000 × 1.09 = $802,995.88.
Alternatively, ($75,000/0.09) × [1 − 1/(1.09^25)] × 1.09 = $802,995.88.

74) A
PV = [1/0.09 − 1/(0.09 × 1.09^25)] × $75,000 = $736,693.47.
Alternatively, ($75,000/0.09) × [1 − 1/(1.09^25)] = $736,693.47.

75) A
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Using a financial calculator: N = 5; PV = −10,000; PMT = 2504.57; FV = 0.
Compute: I = 8.0% [calculator setting: END].

76) C
Annuity due: 6.1446 × 1.1 = 6.7590.

77) B
Annuity due factor = 3.8896 × 1.09 = 4.2397.

78) B
Using a financial calculator: N = 5; PV = −10,000; PMT = 2358.65; FV = 0.
Compute: I = 9.0% [Calculator setting: BEGIN (BGN)].

79) A
Use a financial calculator: PV = −250,000; I = 6%; N = 20; FV = 0.
Compute PMT = $21,796.14.

80) B

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Step 1: I = 6%; N = 20; PV = 250,000; FV = 0. Compute PMT = −21,796.14.
Step 2: I = 6%; N = 15; PMT = −21,796.14. Compute PV = 211,689. 53.

81) B
FV = $1/(0.3855) = $2.594.

82) B
FV = $1/(0.621) = $1.61.

83) C
PV = $1/9.6463 = $0.1037.

84) B
PV = 6.1051/(1.1)^5 = 3.7908.

85) B
FV annuity factor = 6.1446 × (1.1^10) = 15.9375.

86) B
FV annuity factor = 3.6048 × (1.12^5) = 6.3529.

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87) B
FV annuity factor = 6.71 × (1.08^10) = 14.486.

88) B
89) C
Future value annuity factor = [(1.1^25) − 1]/0.1 = $98.347;
payment = $750,000/$98.347 = $7,626.05.

90) A
Future value annuity factor = [(1.12^30) − 1]/0.12 = $241.3327;
payment = $1,000,000/$241.3327 = $4,143.66.

91) C
PV = $50,000 × {1/(0.1 − 0.05) − [1/(0.1 − 0.05)] × [(1.05^20)/(1.10^20)]} = $605,604.20.

92) B
PV = $60,000 × {1/(0.12 − 0.04) − [1/(0.12 − 0.04)] × [(1.04^25)/(1.12^25)]} = $632,390.

93) A

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94) B
FV = $100 × (1.12^3) = $140.49.

95) A
96) C
97) D
PMT = $150,000/{1/0.005 − 1/[0.005 × (1.005^240)]} = $1,074.65.

98) C
APR = [1.1047^(1/12) − 1] × 12 = 0.1 = 10.00%.

99) A
EAR = ((1 + 0.12/12)^12) − 1 = 0.12683 = 12.68%.

100) A
PMT = $1,000,000/{[1/0.01 − 1/(0.01 × 1.01^360)] × 1.01^360} = $286.13.

101) B
e^(0.1) − 1 = 0.10517 = 10.517 percent.

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102) B
(*e*^*r*) = 1.1; *r* = *ln*(1.1) = 0.09531; PV = $100/0.09531 = $1,049.21.

103) B
PV (@ *t* = 3) = $100,000/0.08 = $1,250,000; PV (@ *t* = 0) = $1,250,000/(1.08)^3 = $992,290.

104) B
PV (@ *t* = 3) = $100,000/0.10 = $1,000,000; PV (@ *t* = 0) = $1,000,000/(1.10)^3 = $751,315.

105) B
PV (@ *t* = 4) = $100,000/0.08 = $1,250,000; PV (@ *t* = 0) = $1,250,000/(1.08)^4 = $918,787.

106) B
PV (@ *t* = 4) = $100,000/0.10 = $1,000,000; PV (@ *t* = 0) = $1,000,000/(1.10)^4 = $683,013.

107) Short Answer
The discount rate is the rate of return used for discounting future cash flows to obtain present values. The discount rate can be obtained by looking at the rate of return on an equivalent-risk investment opportunity in the financial market.

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108) Short Answer
If you have $100 today, you can invest it and start earning interest on it. On the other hand, if you have to make a payment of $100 one year from today, you do not need to invest $100 today, but a lesser amount. The lesser amount invested today plus the interest earned on it should add up to $100. The present value of $100 one year from today at an interest rate of 10 percent is $90.91. [PV = $100/1.1 = $90.91.]

109) Short Answer
Invest in projects with positive net present values. Net present value is the difference between the present value of future cash flows from the project and the present value of the initial investment.

110) Short Answer
If the future cash flows from an investment are not certain, then we call such an investment risky. That means there is an uncertainty about the future cash flows or future cash flows could be different from expected cash flows. The degree of uncertainty varies from investment to investment. Uncertain cash flows are discounted using a higher discount rate than certain cash flows. This is only one method of dealing with risk. There are many ways to consider risk while making financial decisions.

111) Short Answer
Invest as long as the rate of return on the investment exceeds the rate of return on equivalent-risk investments in the financial market.

112) Short Answer
A perpetuity is defined as a sequence of equal cash flows occurring each period forever.

113) Short Answer
The present value of any annuity can be thought of as the difference between two perpetuities: one payment starting in year 1 (immediate) and one starting in year (n + 1) (delayed). By calculating the difference between the present values of these two perpetuities today, we can find the present value of an annuity.

114) Short Answer
When money is invested at compound interest, each interest payment is reinvested to earn more interest in subsequent periods. In the simple interest case, the interest is paid only on the initial investment.

115) Short Answer

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As the frequency of compounding increases, the effective rate on an investment also increases. In the case of continuous compounding, the compounding frequency goes to infinity. In this case, the nature of the function also changes. The effective interest rate is given by $(e^r - 1)$, where the value of e ≈ 2.718, where e is the base for natural logarithms.

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