Reading 6: The Time Value of Money

Question #1 of 86

You borrow $15,000 to buy a car. The loan is to be paid off in monthly payments over 5 years at 12% annual interest. What is the amount of each payment?

A) $546.

B) $334.

C) $456.

Question #2 of 86

Suppose you are going to deposit $1,000 at the start of this year, $1,500 at the start of next year, and $2,000 at the start of the following year in an savings account. How much money will you have at the end of three years if the rate of interest is 10% each year?

A) $5,346.00.

B) $5,750.00.

C) $4,000.00.

Question #3 of 86

An investor makes 48 monthly payments of $500 each beginning today into an account that will have a value of $29,000 at the end of four years. The stated annual interest rate is *closest to*:

A) 9.00%.

B) 10.00%.

C) 9.50%.

Question #4 of 86

An investor deposits $10,000 in a bank account paying 5% interest compounded annually. Rounded to the nearest dollar, in 5 years the investor will have:

A) $12,500.

B) $12,763.

C) $10,210.

Question #5 of 86

What is the present value of a 10-year, $100 annual annuity due if interest rates are 0%?

- **A)** $1,000.
- **B)** No solution.
- **C)** $900.

Question #6 of 86

A local loan shark offers 4 for 5 on payday. What it involves is that you borrow $4 from him and repay $5 on the next payday (one week later). What would the stated annual interest rate be on this loan, with weekly compounding? Assuming 52 weeks in one year, what is the effective annual interest rate on this loan? Select the respective answer choices closest to your numbers.

- **A)** 25%; 300%.
- **B)** 1,300%; 10,947,544%.
- **C)** 25%; 1,300%.

Question #7 of 86

Jamie Morgan needs to accumulate $2,000 in 18 months. If she can earn 6% at the bank, compounded quarterly, how much must she deposit today?

- **A)** $1,840.45.
- **B)** $1,829.08.
- **C)** $1,832.61.

Question #8 of 86

How much should an investor have in a retirement account on his 65th birthday if he wishes to withdraw $40,000 on that birthday and each of the following 14 birthdays, assuming his retirement account is expected to earn 14.5%?

- **A)** $274,422.
- **B)** $234,422.
- **C)** $272,977.

Question #9 of 86

A stated interest rate of 9% compounded quarterly results in an effective annual rate *closest to*:

A) 9.3%.

B) 9.4%.

C) 9.2%.

Question #10 of 86

A recent ad for a Roth IRA includes the statement that if a person invests $500 at the beginning of each month for 35 years, they could have $1,000,000 for retirement. Assuming monthly compounding, what annual interest rate is implied in this statement?

A) 6.988%.

B) 7.411%.

C) 7.625%.

Question #11 of 86

Concerning an ordinary annuity and an annuity due with the same payments and positive interest rate, which of the following statements is *most* accurate?

A) There is no relationship.

B) The present value of the ordinary annuity is less than an annuity due.

C) The present value of the ordinary annuity is greater than an annuity due.

Question #12 of 86

Natalie Brunswick, neurosurgeon at a large U.S. university, was recently granted permission to take an 18-month sabbatical that will begin one year from today. During the sabbatical, Brunswick will need $2,500 at the beginning of each month for living expenses that month. Her financial planner estimates that she will earn an annual rate of 9% over the next year on any money she saves. The annual rate of return during her sabbatical term will likely increase to 10%. At the end of each month during the year before the sabbatical, Brunswick should save approximately:

A) $3,356.

B) $3,505.

C) $3,330.

Question #13 of 86

Lois Weaver wants to have $1.5 million in a retirement fund when she retires in 30 years. If Weaver can earn a 9% rate of return on her investments, approximately how much money must she invest at the end of each of the next 30 years in order to reach her goal?

A) $11,005.

B) $28,725.

C) $50,000.

Question #14 of 86

An investor has the choice of two investments. Investment A offers interest at 7.25% compounded quarterly. Investment B offers interest at the annual rate of 7.40%. Which investment offers the *higher* dollar return on an investment of $50,000 for two years, and by how much?

A) Investment B offers a $36.92 greater return.

B) Investment A offers a $53.18 greater return.

C) Investment A offers a $122.18 greater return.

Question #15 of 86

As the number of compounding periods increases, what is the effect on the EAR? EAR:

A) does not increase.

B) increases at a decreasing rate.

C) increases at an increasing rate.

Question #16 of 86

How much would the following income stream be worth assuming a 12% discount rate?

- $100 received today.
- $200 received 1 year from today.
- $400 received 2 years from today.
- $300 received 3 years from today.

A) $1,112.44.

B) $721.32.

C) $810.98.

Question #17 of 86

As the number of compounding periods increases, what is the effect on the annual percentage rate (APR) and the effective annual rate (EAR)?

A) APR increases, EAR increases.

B) APR remains the same, EAR increases.

C) APR increases, EAR remains the same.

Question #18 of 86

An annuity will pay eight annual payments of $100, with the first payment to be received one year from now. If the interest rate is 12% per year, what is the present value of this annuity?

A) $1,229.97.

B) $556.38.

C) $496.76.

Question #19 of 86

What's the effective rate of return on an investment that generates a return of 12%, compounded quarterly?

A) 12.00%.

B) 14.34%.

C) 12.55%.

Question #20 of 86

Given the following cash flow stream:

End of Year	Annual Cash Flow
1	$4,000
2	$2,000
3	-0-
4	-$1,000

Using a 10% discount rate, the present value of this cash flow stream is:

A) $3,415.

B) $3,636.

C) $4,606.

Question #21 of 86

Justin Banks just won the lottery and is trying to decide between the annual cash flow payment option or the lump sum option. He can earn 8% at the bank and the annual cash flow option is $100,000/year, beginning today for 15 years. What is the annual cash flow option worth to Banks today?

  A) $924,423.70.

  B) $1,080,000.00.

  C) $855,947.87.

Question #22 of 86

An investor who requires an annual return of 12% has the choice of receiving one of the following:

  A. 10 annual payments of $1,225.00 to begin at the end of one year.
  B. 10 annual payments of $1,097.96 beginning immediately.

Which option has the highest present value (PV) and approximately how much greater is it than the other option?

  A) Option A's PV is $42 greater than option B's.

  B) Option B's PV is $27 greater than option A's.

  C) Option B's PV is $114 greater than option A's.

Question #23 of 86

The following stream of cash flows will occur at the end of the next five years.

Yr 1	-2,000
Yr 2	-3,000
Yr 3	6,000
Yr 4	25,000
Yr 5	30,000

At a discount rate of 12%, the present value of this cash flow stream is *closest* to:

  A) $33,004.

  B) $36,965.

  C) $58,165.

Question #24 of 86

If a $45,000 car loan is financed at 12% over 4 years, what is the monthly car payment?

  A) $985.

B) $1,565.

C) $1,185.

Question #25 of 86

If $1,000 is invested at the beginning of the year at an annual rate of 48%, compounded quarterly, what would that investment be worth at the end of the year?

A) $4,798.

B) $1,574.

C) $1,048.

Question #26 of 86

Given: an 11% annual rate compounded quarterly for 2 years; compute the future value of $8,000 today.

A) $9,857.

B) $8,962.

C) $9,939.

Question #27 of 86

An investor deposits $4,000 in an account that pays 7.5%, compounded annually. How much will this investment be worth after 12 years?

A) $5,850.

B) $9,358.

C) $9,527.

Question #28 of 86

What is the maximum price an investor should be willing to pay (today) for a 10 year annuity that will generate $500 per quarter (such payments to be made at the end of each quarter), given he wants to earn 12%, compounded quarterly?

A) $11,557.

B) $11,300.

C) $6,440.

Question #29 of 86

An investor wants to receive $1,000 at the beginning of each of the next ten years with the first payment starting today. If the investor can earn 10 percent interest, what must the investor put into the account today in order to receive this $1,000 cash flow stream?

A) $6,759.

B) $6,145.

C) $7,145.

Question #30 of 86

If 10 equal annual deposits of $1,000 are made into an investment account earning 9% starting today, how much will you have in 20 years?

A) $35,967.

B) $42,165.

C) $39,204.

Question #31 of 86

What is the total present value of $200 to be received one year from now, $300 to be received 3 years from now, and $600 to be received 5 years from now assuming an interest rate of 5%?

A) $905.87.

B) $980.89.

C) $919.74.

Question #32 of 86

A local bank offers a certificate of deposit (CD) that earns 5.0% compounded quarterly for three and one half years. If a depositor places $5,000 on deposit, what will be the value of the account at maturity?

A) $5,949.77.

B) $5,875.00.

C) $5,931.06.

Question #33 of 86

Wei Zhang has funds on deposit with Iron Range bank. The funds are currently earning 6% interest. If he withdraws $15,000 to purchase an automobile, the 6% interest rate can be best thought of as a(n):

A) opportunity cost.

B) financing cost.

C) discount rate.

Question #34 of 86

A major brokerage house is currently selling an investment product that offers an 8% rate of return, compounded monthly. Based on this information, it follows that this investment has:

A) a stated rate of 0.830%.

B) a periodic interest rate of 0.667%.

C) an effective annual rate of 8.00%.

Question #35 of 86

If $2,500 were put into an account at the end of each of the next 10 years earning 15% annual interest, how much would be in the account at the end of ten years?

A) $41,965.

B) $50,759.

C) $27,461.

Question #36 of 86

In 10 years, what is the value of $100 invested today at an interest rate of 8% per year, compounded monthly?

A) $180.

B) $222.

C) $216.

Question #37 of 86

Nikki Ali and Donald Ankard borrowed $15,000 to help finance their wedding and reception. The annual payment loan carries a term of seven years and an 11% interest rate. Respectively, the amount of the first payment that is interest and the amount of the second payment that is principal are *approximately*:

A) $1,650; $1,468.

B) $1,650; $1,702.

C) $1,468; $1,702.

Question #38 of 86

If $10,000 is invested in a mutual fund that returns 12% per year, after 30 years the investment will be worth:

A) $300,000.

B) $10,120.

C) $299,599.

Question #39 of 86

John is getting a $25,000 loan, with an 8% annual interest rate to be paid in 48 equal monthly installments. If the first payment is due at the end of the first month, the principal and interest values for the first payment are *closest* to:

	Principal	Interest
A)	$410.32	$200.00
B)	$443.65	$166.67
C)	$443.65	$200.00

Question #40 of 86

What is the maximum an investor should be willing to pay for an annuity that will pay out $10,000 at the beginning of each of the next 10 years, given the investor wants to earn 12.5%, compounded annually?

A) $62,285.

B) $55,364.

C) $52,285.

Question #41 of 86

Bill Jones is creating a charitable trust to provide six annual payments of $20,000 each, beginning next year. How much must Jones set aside now at 10% interest compounded annually to meet the required disbursements?

A) $154,312.20.

B) $95,815.74.

C) $87,105.21.

Question #42 of 86

A local bank advertises that it will pay interest at the rate of 4.5%, compounded monthly, on regular savings accounts. What is the effective rate of interest that the bank is paying on these accounts?

A) 4.65%.

B) 4.59%.

C) 4.50%.

Question #43 of 86

A $500 investment offers a 7.5% annual rate of return. How much will it be worth in four years?

A) $650.

B) $892.

C) $668.

Question #44 of 86

Paul Kohler inherits $50,000 and deposits it immediately in a bank account that pays 6% interest. No other deposits or withdrawals are made. In two years, what will be the account balance assuming monthly compounding?

A) $56,400.

B) $50,500.

C) $53,100.

Question #45 of 86

If an investment has an APR of 18% and is compounded quarterly, its effective annual rate (EAR) is *closest to*:

A) 18.00%.

B) 18.81%.

C) 19.25%.

Question #46 of 86

Which one of the following statements *best* describes the components of the required interest rate on a security?

A) The real risk-free rate, the default risk premium, a liquidity premium and a premium to reflect the risk associated with the maturity of the security.

B) 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.

C) The nominal 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.

Question #47 of 86

An annuity will pay eight annual payments of $100, with the first payment to be received three years from now. If the interest rate is 12% per year, what is the present value of this annuity? The present value of:

A) a lump sum discounted for 3 years, where the lump sum is the present value of an ordinary annuity of 8 periods at 12%.

B) an ordinary annuity of 8 periods at 12%.

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

Question #48 of 86

Given investors require an annual return of 12.5%, a perpetual bond (i.e., a bond with no maturity/due date) that pays $87.50 a year in interest should be valued at:

A) $1,093.

B) $700.

C) $70.

Question #49 of 86

T-bill yields can be thought of as:

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

B) real risk-free rates because they contain an inflation premium.

C) nominal risk-free rates because they do not contain an inflation premium.

Question #50 of 86

The real risk-free rate can be thought of as:

A) approximately the nominal risk-free rate reduced by the expected inflation rate.

B) approximately the nominal risk-free rate plus the expected inflation rate.

C) exactly the nominal risk-free rate reduced by the expected inflation rate.

Question #51 of 86

What is the effective annual rate if the stated rate is 12% compounded quarterly?

A) 12.00%.

B) 57.35%.

C) 12.55%.

Question #52 of 86

A certain investment product promises to pay $25,458 at the end of 9 years. If an investor feels this investment should produce a rate of return of 14%, compounded annually, what's the most he should be willing to pay for it?

A) $9,426.

B) $7,829.

C) $7,618.

Question #53 of 86

Nortel Industries has a preferred stock outstanding that pays (fixed) annual dividends of $3.75 a share. If an investor wants to earn a rate of return of 8.5%, how much should he be willing to pay for a share of Nortel preferred stock?

A) $31.88.

B) $44.12.

C) $42.10.

Question #54 of 86

Compute the present value of a perpetuity with $100 payments beginning four years from now. Assume the appropriate annual interest rate is 10%.

A) $683.

B) $751.

C) $1000.

A local bank offers an account that pays 8%, compounded quarterly, for any deposits of $10,000 or more that are left in the account for a period of 5 years. The effective annual rate of interest on this account is:

A) 9.01%.

B) 8.24%.

C) 4.65%.

Peter Wallace wants to deposit $10,000 in a bank certificate of deposit (CD). Wallace is considering the following banks:

- Bank A offers 5.85% annual interest compounded annually.
- Bank B offers 5.75% annual interest rate compounded monthly.
- Bank C offers 5.70% annual interest compounded daily.

Which bank offers the highest effective interest rate and how much?

A) Bank A, 5.85%.

B) Bank B, 5.90%.

C) Bank C, 5.87%.

Sarah Parker is buying a new $25,000 car. Her trade-in is worth $5,000 so she needs to borrow $20,000. The loan will be paid in 48 monthly installments and the annual interest rate on the loan is 7.5%. If the first payment is due at the end of the first month, what is Sarah's monthly car payment?

A) $483.58.

B) $480.57.

C) $416.67.

An investment offers $100 per year forever. If Peter Wallace's required rate of return on this investment is 10%, how much is this investment worth to him?

A) $500.

B) $1,000.

C) $10,000.

Steve Hall wants to give his son a new car for his graduation. If the cost of the car is $15,000 and Hall finances 80% of the value of the car for 36 months at 8% annual interest, his monthly payments will be:

A) $289.

B) $376.

C) $413.

Which of the following statements about compounding and interest rates is *least* accurate?

A) Present values and discount rates move in opposite directions.

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

C) On monthly compounded loans, the effective annual rate (EAR) will exceed the annual percentage rate (APR).

It will cost $20,000 a year for four years when an 8-year old child is ready for college. How much should be invested today if the child will make the first of four annual withdrawals 10-years from today? The expected rate of return is 8%.

A) $66,243.

B) $30,683.

C) $33,138.

What will $10,000 become in 5 years if the annual interest rate is 8%, compounded monthly?

A) $14,693.28.

B) $14,898.46.

C) $14,802.44.

Renee Fisher invests $2,000 each year, starting one year from now, in a retirement account. If the investments earn 8% or 10% annually over 30 years, the amount Fisher will accumulate is *closest* to:

     8%   10%

A) $225,000 $360,000

B) $225,000 $330,000

C) $245,000 $360,000

Question #64 of 86

Given a 5% discount rate, the present value of $500 to be received three years from today is:

A) $432.

B) $400.

C) $578.

Question #65 of 86

A stated interest rate of 9% compounded semiannually results in an effective annual rate *closest to*:

A) 9.3%.

B) 9.2%.

C) 9.1%.

Question #66 of 86

An individual borrows $200,000 to buy a house with a 30-year mortgage requiring payments to be made at the end of each month. The interest rate is 8%, compounded monthly. What is the monthly mortgage payment?

A) $1,480.46.

B) $2,142.39.

C) $1,467.53.

Question #67 of 86

Assuming a discount rate of 10%, which stream of annual payments has the *highest* present value?

A)	$20	-$5	$20	$110
B)	$110	$20	$10	$5
C)	-$100	-$100	-$100	$500

Question #68 of 86

If an investor puts $5,724 per year, starting at the end of the first year, in an account earning 8% and ends up accumulating $500,000, how many years did it take the investor?

A) 27 years.

B) 26 years.

C) 87 years.

Question #69 of 86

Selmer Jones has just inherited some money and wants to set some of it aside for a vacation in Hawaii one year from today. His bank will pay him 5% interest on any funds he deposits. In order to determine how much of the money must be set aside and held for the trip, he should use the 5% as a:

A) discount rate.

B) required rate of return.

C) opportunity cost.

Question #70 of 86

What is the present value of a 12-year annuity due that pays $5,000 per year, given a discount rate of 7.5%?

A) $38,676.

B) $36,577.

C) $41,577.

Question #71 of 86

Which of the following is the *most* accurate statement about stated and effective annual interest rates?

A) So long as interest is compounded more than once a year, the stated annual rate will always be more than the effective rate.

B) The stated annual interest rate is used to find the effective annual rate.

C) The stated rate adjusts for the frequency of compounding.

Question #72 of 86

Marc Schmitz borrows $20,000 to be paid back in four equal annual payments at an interest rate of 8%. The interest amount in the second year's payment would be:

A) $1116.90.

B) $1244.90.

C) $6038.40.

Question #73 of 86

An investor purchases a 10-year, $1,000 par value bond that pays annual coupons of $100. If the market rate of interest is 12%, what is the current market value of the bond?

A) $887.

B) $1,124.

C) $950.

Question #74 of 86

If $2,000 a year is invested at the end of each of the next 45 years in a retirement account yielding 8.5%, how much will an investor have at retirement 45 years from today?

A) $901,060.

B) $100,135.

C) $90,106.

Question #75 of 86

Optimal Insurance is offering a deferred annuity that promises to pay 10% per annum with equal annual payments beginning at the end of 10 years and continuing for a total of 10 annual payments. For an initial investment of $100,000, what will be the amount of the annual payments?

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

A) $25,937.

B) $42,212.

C) $38,375.

Elise Corrs, hedge fund manager and avid downhill skier, was recently granted permission to take a 4 month sabbatical. During the sabbatical, (scheduled to start in 11 months), Corrs will ski at approximately 12 resorts located in the Austrian, Italian, and Swiss Alps. Corrs estimates that she will need $6,000 at the beginning of each month for expenses that month. (She has already financed her initial travel and equipment costs.) Her financial planner estimates that she will earn an annual rate of 8.5% during her savings period and an annual rate of return during her sabbatical of 9.5%. How much does she need to put in her savings account at the end of each month for the next 11 months to ensure the cash flow she needs over her sabbatical? Each month, Corrs should save approximately:

A) $2,080.

B) $2,070.

C) $2,065.

Vega research has been conducting investor polls for Third State Bank. They have found the most investors are not willing to tie up their money in a 1-year (2-year) CD unless they receive at least 1.0% (1.5%) more than they would on an ordinary savings account. If the savings account rate is 3%, and the bank wants to raise funds with 2-year CDs, the yield must be at least:

A) 4.5%, and this represents a discount rate.

B) 4.5%, and this represents a required rate of return.

C) 4.0%, and this represents a required rate of return.

The First State Bank is willing to lend $100,000 for 4 years at a 12% rate of interest, with the loan to be repaid in equal semi-annual payments. Given the payments are to be made at the end of each 6-month period, how much will each loan payment be?

A) $32,925.

B) $16,104.

C) $25,450.

A firm is evaluating an investment that promises to generate the following annual cash flows:

End of Year	Cash Flows
1	$5,000
2	$5,000
3	$5,000
4	$5,000

5	$5,000
6	-0-
7	-0-
8	$2,000
9	$2,000

Given BBC uses an 8% discount rate, this investment should be valued at:

A) $19,963.

B) $22,043.

C) $23,529.

Question #80 of 86

An investor will receive an annuity of $5,000 a year for seven years. The first payment is to be received 5 years from today. If the annual interest rate is 11.5%, what is the present value of the annuity?

A) $13,453.

B) $23,185.

C) $15,000.

Question #81 of 86

The value in 7 years of $500 invested today at an interest rate of 6% compounded monthly is *closest to:*

A) $750.

B) $760.

C) $780.

Question #82 of 86

Find the future value of the following uneven cash flow stream. Assume end of the year payments. The discount rate is 12%.

Year 1	-2,000
Year 2	-3,000
Year 3	6,000
Year 4	25,000
Year 5	30,000

A) $33,004.15.

B) $65,144.33.

C) $58,164.58.

Question #83 of 86

Given: $1,000 investment, compounded monthly at 12% find the future value after one year.

A) $1,120.00.

B) $1,126.83.

C) $1,121.35.

Question #84 of 86

Consider a 10-year annuity that promises to pay out $10,000 per year; given this is an ordinary annuity and that an investor can earn 10% on her money, the future value of this annuity, at the end of 10 years, would be:

A) $110.000.

B) $159,374.

C) $175,312.

Question #85 of 86

Tom will retire 20 years from today and has $34,346.74 in his retirement account. He believes he will need $40,000 at the beginning of each year for 20 years of retirement, with the first withdrawal on the day he retires. Tom assumes his investment account will return 7%. The amount he needs to deposit at the beginning of this year and each of the next 19 years is *closest to*:

A) $6,500.

B) $7,800.

C) $7,300.

Question #86 of 86

If a person needs $20,000 in 5 years from now and interest rates are currently 6% how much do they need to invest today if interest is compounded annually?

A) $15,301.

B) $14,683.

C) $14,945.