1.01 Rates and Returns

Question 1
An analyst compares portfolios in which the amount invested changes each year. Which of the following is the *most appropriate* measure for the analyst to use in comparing the portfolios' returns over a multiyear period?
A. Holding period return
B. Arithmetic mean return
C. Geometric mean return

Question 2
At year end, a bondholder reviews performance records of a INR 1,000 par value bond. The holding period return of the security is 3.0%. If the beginning price of the bond was INR 998 and the ending price of the bond was INR 1,008, the bond's interest income for the period was *closest* to:
A. INR 19.94
B. INR 29.94
C. INR 39.94

Question 3
A hedge fund manager invested in three investments, A, B, and C, with differing holding periods. The manager collected the following information:

Investment performance	A	B	C
Holding period return	0.5%	50.0%	350.0%
Holding period return	5 days	23 months	6.7 years

Which of the three investments has the lowest annualized rate of return?
A. Investment A
B. Investment B
C. Investment C

Question 4
An analyst records the price of an asset over a two-year period:

Time (years)	Price (AUD)
0	99
1	105
2	113

Based only on price, the asset's Year 1 continuously compounded return is *closest* to:

A. 5.88%
B. 6.06%
C. 6.41%

Question 5

A lender gathers data on three different loans in its portfolio:

Loan	Stated Annual Interest Rate (r_s)	Compounding Frequency
X	10.40%	weekly
Y	10.45%	monthly
Z	10.50%	quarterly

Based on the data above, the loan with the highest effective annual rate is:
A. Loan X.
B. Loan Y.
C. Loan Z.

Question 6

For a manager reporting historical performance of an open-end mutual fund, the *most appropriate* measure of return is the:
A. arithmetic mean return.
B. time-weighted rate of return.
C. money-weighted rate of return.

Question 7

The following table shows a company's sales growth over a five-year period:

Year	Sales Growth Rate
2008	6.8%
2009	12.2%
2010	4.3%
2011	−6.9%
2012	14.7%

The company's geometric mean for sales from 2008 to 2012 is *closest* to:

A. 5.9%
B. 6.2%
C. 6.8%

Question 8
The rate on a US Treasury bill (T-bill) is *least likely* to include a(n):
A. risk-free rate.
B. inflation premium.
C. liquidity premium.

Question 9
An analyst reviews the performance of three exchange-traded funds (ETFs):

ETF Annual Returns	Large-cap	Mid-cap	Small-cap
Year 1	13.0%	17.0%	10.0%
Year 2	14.0%	−1.5%	18.5%
Year 3	−0.1%	9.6%	−5.3%

Which ETF had the highest three-year annual geometric mean return?
A. Large-cap ETF
B. Mid-cap ETF
C. Small-cap ETF

Question 10
An asset's present value is £1,150 and its annual continuously compounded rate of return is 5.9%. Assuming no income, if the asset is sold in 4 years, its value (in £) is *closest* to:
A. 1,220
B. 1,446
C. 1,456

Question 11
A mutual fund has the following annual rates of return:

Year	20X1	20X2	20X3
Returns	−10%	5%	16%

The mutual fund's annual geometric mean return (%) is *closest* to:
A. 3.1
B. 3.7
C. 9.6

Question 12
An analyst gathers monthly investment returns for a 9-month period:

Monthly Portfolio Returns

Month	Return
January	5%
February	6%
March	−4%
April	16%
May	8%
June	6%
July	8%
August	5%
September	13%

The analyst notes that the data set has outliers and decides to calculate the average considering all nine observations while limiting the range of returns to be between the 20th and 80th percentile. Using these parameters, the mean is *closest* to:
A. 7.00%
B. 7.29%
C. 7.67%

Question 13
If an asset's two-year continuously compounded return is 13.42%, then its holding period return for the same period is *closest* to:
A. 13.00%
B. 13.87%
C. 14.36%

Question 14
The following table shows an investment's closing price on each day:

Date	Closing Price
March 1	50
April 1	74
May 1	65

Based only on this information, the continuously compounded return of the investment from March 1 to May 1 is *closest* to:
A. 23.1%
B. 26.2%
C. 30.0%

Question 15

An investment fund holds investments X, Y, and Z. An analyst reviews the following information:

	20X8		20X9	
	Allocation	Annual Return	Allocation	Annual Return
Investment X	0.40	0.30	0.30	0.25
Investment Y	0.05	0.10	0.10	0.10
Investment Z	0.55	0.20	0.60	−0.10

The geometric mean return for the fund over two years is *closest* to:
A. 12.5%
B. 13.0%
C. 14.0%

Question 16

A bank offers a certificate of deposit (CD) with a stated annual rate of 7% compounded continuously. The CD's effective annual rate is *closest*
to:
A. 6.77%
B. 7.00%
C. 7.25%

Question 17

An investor purchases stock for $20 and sells it for $14. On the date of sale, the stock paid a $1 dividend. The investor's continuously compounded rate of return for the investment is *closest* to:
A. −25.0%
B. −28.8%
C. −35.7%

Question 18

In portfolio management, it is assumed that the expected return is:
A. never equal to the historical mean return.
B. equal to the historical mean return over the next 30 years.
C. equal to the historical mean return over a future period of unknown length.

Question 19

An investor is reviewing investment performance and collects the following information:

(AUD *millions*)	Year 1	Year 2	Year 3
Beginning value of investment	0	1,150	1,285
Beginning of year contributions	1,000	500	0
Total investment at beginning of year	1,000	1,650	1,285
Portfolio performance (%)	15%	−10%	20%
Portfolio performance	150	(165)	257
Portfolio withdrawals	0	(200)	0
Ending value of investment	1,150	1,285	1,542

If withdrawals only occur at year-end, the investor's money-weighted return over the three years is *closest* to:
A. 6.03%
B. 7.49%
C. 8.28%

Question 20

An analyst gathers the following information on three investments with a two-year holding period:

Investment	Type of Return	Returns (%)
X	Holding period return over two years	8.0
Y	Holding period return each year for two years	3.9
Z	Continuously compounded return for two years	7.9

Which investment *most likely* has the highest continuously compounded return over the two-year period?
A. Investment X
B. Investment Y
C. Investment Z

Question 21

A student chooses to spend $100 today on a concert ticket instead of investing that money in a savings account that earns interest. The interest that could have been earned can be *best* interpreted as this student's:
A. sunk cost.
B. opportunity cost.
C. required rate of return.

Question 22

An investor deposits $5,000 into an account with a stated interest rate of 10%. The bank will compound interest using annual compounding for the first year and continuous compounding thereafter. If all interest is reinvested and there are no withdrawals from the account, the number of years needed for the account to grow from $5,000 to $10,000 is *closest* to:

A. 6.0

B. 7.0

C. 7.3

Question 23

A university receives contributions to its endowment fund at the beginning of each year. The fund generates the returns displayed in the chart below:

Year of investment	Contributions ($ millions)	Return during year of investment
1	20	12%
2	50	16%
3	70	18%
4	200	−2%

Over the four-year period, the measure that shows the *highest* return is the:

A. internal rate of return.

B. time-weighted rate of return.

C. money-weighted rate of return.

Question 24

An analyst is comparing three investments:

Investment	Frequency of Compounding	Stated Annual Rate
X	Semiannually	6.1%
Y	Quarterly	6.0%
Z	Continuously	5.9%

The investment with the greatest effective annual rate is:

A. Investment X

B. Investment Y

C. Investment Z

Question 25

A credit union offers an investment that pays interest quarterly. If the investment's effective annual rate is 5.93%, then its stated annual rate (r_s) quoted by the credit union is *closest* to:

A. 5.76%

B. 5.80%

C. 6.06%

Question 26

The price of silver is $14.00 per ounce at the beginning of the year and $14.50 at the end of the year. The continuously compounded rate of return for silver is *closest* to:

A. 3.51%

B. 3.57%

C. 3.64%

Question 27

An analyst compares the performance of portfolios that receive annual contributions in addition to earning returns. The analyst *most appropriately* uses a(n):

A. internal rate of return.

B. time-weighted rate of return

C. money-weighted rate of return.

Question 28

An initial investment of $9,520 grows to $15,000 in five years with quarterly compounding. If there are no withdrawals or deposits during those five years, the investment's effective annual rate is *closest* to:

A. 9.2%

B. 9.5%

C. 11.5%

Question 29

A charity foundation invests donations it has received at the beginning of each year. The foundation has had the following yearly returns:

Year of Investment	Contributions ($ millions)	Return During Year of Investment
1	40	10%
2	45	4%
3	40	12%
4	60	5%

Over the four years, the fund *most likely* had an annual:

A. time-weighted return of 7.75%.
B. money-weighted return of 7.27%.
C. money-weighted return of 7.70%.

Question 30

Two AUD 50,000 investments have a 3-year term. One compounds quarterly at a stated annual rate of 2.00%. The other compounds at a continuous rate of 1.75%. The difference in their future values (in AUD) at the end of 3 years is *closest* to:
A. 364
B. 389
C. 540

Question 31

A manager buys 500 shares of a stock at $15.00 per share at the beginning of the year. At the end of the year, the stock's price appreciates to $18.50. If this stock pays its annual dividend of $0.50 at the end of the year, then the manager's holding period return is *closest* to:
A. 21.6%
B. 23.3%
C. 26.7%

Question 32

Two investors each initially invest ¥6 million in the same fund, which earns 5% during Year 1. At the beginning of Year 2:
● Investor X invests an additional ¥8 million to the fund, and
● Investor Y invests an additional ¥9 million to the fund.
The fund's return is −2% in Year 2. After two years, which of the following *best* describes the investors' returns?
A. Investor Y will have a greater money-weighted return
B. Both investors will have equal geometric mean returns
C. Both investors will have negative time-weighted returns

Question 33

A manager is concerned about the current inflation rate and gathers the following information:

	Expected annual return (%)
Certificates of deposit	1.8
Treasury bills	2.3
Commercial paper	2.8
Equities	8.0

If the equity risk premium is 3.5%, what is the current inflation rate?

A. 1.5%
B. 2.0%
C. 2.5%

Question 34
An investment has an effective annual rate of 7.7% with monthly compounding. Its stated annual rate is *closest* to:
A. 7.44%
B. 7.70%
C. 7.97%

Question 35
An investor buys a share of stock for €50 today. At the end of the Year 1, the investor buys another share of the same stock for €60 and receives a dividend of €2. At the end of Year 2, the investor receives total dividends of €4 and then sells both shares for €130. The money-weighted rate of return is *closest* to:
A. 12.05%
B. 13.05%
C. 15.68%

Question 36
An analyst has gathered the following data to calculate the expected return of an asset:

Selected data (%)	
Economic growth rate	2.0
Risk-free rate	3.0
Expected risk premium	4.0
Expected inflation	1.8

The asset's expected return is *closest* to:
A. 7.99%
B. 8.80%
C. 9.05%

Question 37
An asset's one-year continuously compounded return is 9.2%. Assuming no income from the asset, if its beginning price is BRL 136.50, then its price at the end of one year (in BRL) is *closest* to:
A. 149.06
B. 149.65
C. 150.33

Question 38
 A portfolio manager has compiled an investment's annual returns for three years:

Time Period	Return (%)
Year 1	−3%
Year 2	11%
Year 3	−5%

The average annual compounded return on the investment over the three-year holding period is *closest* to:
A. 0.76%
B. 1.00%
C. 2.29%

Question 39
An investor deposits ¥100 million into a fund at the beginning of Year 1 and deposits another ¥50 million at the beginning of Year 2. At the beginning of Year 3, the investor withdraws ¥15 million. The fund has the following returns:

Year	Return (%)
1	20
2	10
3	−20

The investor's money-weighted annual rate of return over the three-year period is *closest* to:
A. 0.7%
B. 1.0%
C. 1.8%

Question 40
An individual makes the following deposits, one every six months with the first deposit beginning today:

Deposit	Amount (SGD)
1	15,000
2	26,000
3	4,000

If the stated interest rate is 5.4% compounded monthly, the value of the account (in SGD) six months after the last deposit is made is *closest* to:
A. 46,540
B. 47,779
C. 47,811

Question 41
Country A and Country B are both large issuers of government debt, and each country issues approximately the same amount of debt. The interest rate for one-year government debt is 3% in Country A and 3.5% in Country B. With respect to variables such as credit rating and issuance in multiple maturities, the characteristics of each country's government debt are similar. Based only on the information given, which of the following risk premiums *most likely* accounts for the difference in the interest rates?
A. Default premium
B. Inflation premium
C. Liquidity premium

Question 42
An investor creates a portfolio by buying one share of stock for CAD 100 today. At the end of the Year 1, the investor buys another share of the same stock for CAD 105. At the end of Year 2, the investor sells both shares for CAD 115 each. The stock paid a dividend of CAD 10 at the end of Year 1 and paid total dividends of CAD 20 at the end of Year 2. The dividend at the end of Year 1 was reinvested in the portfolio. The time-weighted rate of return is *closest* to:
A. 9.23%
B. 14.32%
C. 17.01%