The Morning Session of the 2015 Level III CFA® Examination has 11 questions. For grading purposes, the maximum point value for each question is equal to the number of minutes allocated to that question.

Question	Topic	Minutes
1	Portfolio Management – Institutional	14
2	Portfolio Management – Institutional	17
3	Portfolio Management – Fixed Income	19
4	Portfolio Management – Alternative Investments	20
5	Portfolio Management – Performance Evaluation	15
6	Portfolio Management – Risk Management	14
7	Portfolio Management – Individual	18
8	Portfolio Management – Individual	16
9	Portfolio Management – Asset Allocation	15
10	Portfolio Management – Economics	14
11	Portfolio Management – Individual/Behavioral	18
	Total:	**180**

Questions 1 and 2 relate to Saylor Guitars and Sandeep Nayar. A total of 31 minutes is allocated to these questions. *Candidates should answer these questions in the order presented.*

QUESTION 1 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 14 MINUTES.

Saylor Guitars was established 25 years ago in the US. Today, the company employs a highly-skilled workforce to produce handmade guitars. Ten years ago, the company instituted a defined-benefit pension plan (the Plan). There is no provision for early retirement. The average age of the workforce is 35 years, and there are no current pension recipients.

Until last year, Saylor made annual contributions to the Plan and it had a surplus. However, the latest economic downturn reduced sales of Saylor's premium-priced guitars, which resulted in lower profitability. This led the company to omit Plan contributions and now the Plan is just fully funded with no surplus. Customer orders have begun to increase with an improvement in the overall economy. Based on past experience, the company is forecasting that it will return to its typical high profit levels in the next several months. Saylor also expects to resume its contributions to the Plan in the first half of the upcoming year.

The average annual return on the Plan's asset portfolio since inception has been 4.8%. The portfolio is well-diversified across asset classes and has low return correlation with the broad equity market. Saylor uses a discount rate of 4.5% to compute its pension benefit obligation. The expected inflation rate is 1.5%. Saylor's debt-to-assets ratio is 0.42 compared to the industry average of 0.40.

A.   **Determine** whether the risk tolerance of the Plan is below-average or above-average. **Justify** your response with *two* reasons.

   Note: Restating case facts is an incomplete justification and will not receive credit.

5 minutes (Answer 1-A on page 3)

B.   **State** the minimum return requirement of the Plan. **Explain** your response.

4 minutes (Answer 1-B on page 4)

One month later, Saylor's management decides to offer to employees over age 50, a one-time lump-sum early retirement option that will be payable next year. Ten percent of Saylor's employees accept this option.

C.   **Discuss** how the acceptance of the early retirement option changed *each* of the following:

   i.   Liquidity requirement
   ii.   Duration of Plan liabilities

5 minutes (Answer 1-C on page 5)

Answer Question 1-A on This Page

1-A. **Determine** whether the risk tolerance of the Plan is below-average or above-average. **Justify** your response with *two* reasons.

Note: Restating case facts is an incomplete justification and will not receive credit.

Answer Question **1-B** on This Page

1-B.   **State** the minimum return requirement of the Plan. **Explain** your response.

Answer Question 1-C on This Page

1-C. **Discuss** how the acceptance of the early retirement option changed *each* of the following:

i.   Liquidity requirement

ii. Duration of Plan liabilities

Questions 1 and 2 relate to Saylor Guitars and Sandeep Nayar. A total of 31 minutes is allocated to these questions. *Candidates should answer these questions in the order presented.*

QUESTION 2 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 17 MINUTES.

Two years have passed and the fund manager for Saylor Guitars' defined-benefit pension plan (the Plan) is Sandeep Nayar. The Plan's portfolio currently has an asset allocation of 80% nominal bonds and 20% equities. Nayar believes the portfolio lies on the efficient frontier and the returns have a relatively low correlation with Saylor's operating results.

The profile of the Plan is presented in Exhibit 1.

Exhibit 1
Saylor Pension Plan Profile

Average age of workforce	33
Retirement age	60
Percentage of retired lives	8%
Expected annual wage growth	4%

Retirement benefits are fully indexed for inflation. Expected annual wage growth includes wage inflation of 1% and productivity increases of 3%.

During a meeting with the company founder, Tom Anderson, Nayar describes his approach to managing pension risk as an asset-only approach. Anderson asks about other approaches to managing pension risk. Nayar explains the liability-relative approach to pension fund investing.

A.   **Contrast** Nayar's approach with the liability-relative approach for *each* of the following:

    i.   The Plan's liability risk exposure
    ii.   The characteristics of a low-risk investment

6 minutes (Answer 2-A on page 8)

B.   **Recommend** *two* changes to the Plan's current asset allocation that would be consistent with the liability-relative approach. **Justify** *each* response.

6 minutes (Answer 2-B on page 9)

Nayar also manages the investment portfolio of the Anderson Community Foundation (the Foundation). The purpose of the Foundation is to provide scholarships to local students for graduate study in science. The Foundation is intended to operate in perpetuity. The Foundation's Board instructs Nayar to take a conservative approach to managing the investment portfolio. There is a 5% annual spending goal but no minimum spending requirement.

C.   **Determine** whether the Foundation's ability to take risk is lower than, equal to, or higher than that of the Saylor pension plan. **Justify** your response with *two* reasons.

Note: Restating case facts is an incomplete justification and will not receive credit.

5 minutes (Answer 2-C on page 10)

Answer Question 2-A on This Page

2-A. **Contrast** Nayar's approach with the liability-relative approach for *each* of the following:

   i. The Plan's liability risk exposure

   ii. The characteristics of a low-risk investment

Answer Question 2-B on This Page

2-B.   **Recommend** *two* changes to the Plan's current asset allocation that would be consistent with the liability-relative approach. **Justify** *each* response.

Answer Question 2-C on This Page

Note: Restating case facts is an incomplete justification and will not receive credit.

Determine whether the Foundation's ability to take risk is lower than, equal to, or higher than that of the Saylor pension plan. (circle one)	**Justify** your response with *two* reasons.
lower than equal to higher than	1. 2.

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QUESTION 3 HAS FOUR PARTS (A, B, C, D) FOR A TOTAL OF 19 MINUTES.

Camille Blanc is a fixed income manager who recently started the Optima mutual fund. The fund is invested in a diversified portfolio of government and corporate bonds. The fund's mandate requires the effective duration of its portfolio to match that of its benchmark. Blanc's objective is to outperform a fixed-income benchmark by using an enhanced-indexing strategy.

Blanc evaluates the price sensitivities of Optima relative to its benchmark for changes in the yield curve using scenario analysis:

> Scenario 1:   She simulates an immediate 10 basis point (bps) parallel shift in the yield curve and finds no difference in the price sensitivities between Optima and its benchmark.

> Scenario 2:   She simulates an immediate 30 bps change in the 5-year spot rate and holds all other rates constant. She finds a 19 bps difference in the price sensitivities between Optima and its benchmark.

A.   **Determine** whether Optima *most likely* violates its mandate under *each* of the following:

   i.   Scenario 1
   ii.   Scenario 2

Justify your response for *each* scenario.

Note: Consider *each* scenario independently.

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6 minutes (Answer Question 3-A on page 14)

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Both Optima and its benchmark hold positions in Treasury bonds, non-callable corporate bonds, and callable corporate bonds. Based on her analysis of the market, Blanc expects credit spreads to narrow and yields to experience a downward parallel shift. She evaluates the following trade: buy a callable corporate bond and sell a non-callable corporate bond of the same maturity and credit quality. Both bonds are trading at par.

B.   **Determine**, given Blanc's expectations, whether she should implement the trade. **Justify** your response.

Note: Ignore transaction costs and assume volatility is unchanged.

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3 minutes (Answer Question 3-B on page 15)

</div>

One year later, Blanc is managing another mutual fund, Intrepid, which is more actively managed than Optima. Blanc forecasts a stronger economy and an upward parallel shift in the yield curve. She evaluates the following two trades:

        Trade 1:   Buy a 10-year Ba1/BB+ consumer cyclical sector bond and sell a 10-year Baa3/BBB– consumer cyclical sector bond of another issuer

        Trade 2:   Buy a 3-year non-callable bond with a 5% coupon and sell a 3-year non-callable bond with a zero coupon of the same issuer and credit quality

C.   **Determine** the expected effect (negative, no effect, positive) on Intrepid's performance from *each* of the following trades, assuming Blanc's forecasts are realized:

        i.   Trade 1
        ii.   Trade 2

        Justify *each* response.

        Note: Ignore transaction costs and assume volatility is constant.

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6 minutes (Answer Question 3-C on page 16)

</div>

Blanc decides to add another bond to the Intrepid portfolio. She uses mean-reversion analysis to determine which of the three bonds shown in Exhibit 1 to purchase. The three bonds have similar durations. Their credit spreads are normally distributed and no structural changes are expected in the market.

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Exhibit 1
Proposed Bond Purchases
Credit Spread and Standard Deviation
(in bps)

</div>

Bond	Current Spread	Historical Mean Spread	Standard Deviation of Spread
Aries	300	210	50
Libra	320	230	30
Taurus	340	240	40

D.   **Determine** the *most* appropriate bond to purchase using mean-reversion analysis. **Justify** your response.

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4 minutes (Answer Question 3-D on page 17)

</div>

Answer Question 3-A on This Page

3-A. **Determine** whether Optima *most likely* violates its mandate under *each* scenario. **Justify** your response for *each* scenario.

Note: Consider *each* scenario independently.

i. Scenario 1

ii. Scenario 2

Answer Question 3-B on This Page

3-B.   **Determine**, given Blanc's expectations, whether she should implement the trade. **Justify** your response.

Note: Ignore transaction costs and assume volatility is unchanged.

Answer Question **3-C** on This Page

Note: Ignore transaction costs and assume volatility is constant.

Trade	**Determine** the expected effect (negative, no effect, positive) on Intrepid's performance from *each* of the following trades, assuming Blanc's forecasts are realized. (circle one)	**Justify** *each* response.
i. Trade 1	negative no effect positive	
ii. Trade 2	negative no effect positive	

Answer Question 3-D on This Page

3-D.   **Determine** the *most* appropriate bond to purchase using mean-reversion analysis. **Justify** your response.

QUESTION 4 HAS FIVE PARTS (A, B, C, D, E) FOR A TOTAL OF 20 MINUTES.

The Vizyon Foundation promotes scientific research in the US. Vizyon's investment portfolio is allocated 60% to equities and 40% to bonds. Given the low-return environment, Vizyon is researching opportunities to expand into different assets and hires an analyst, Olivia Andrich, to lead this effort.

Vizyon's trustees are evaluating the expected impact on the Foundation's portfolio characteristics if they reallocate 10% of existing equities to non-leveraged direct real estate investments. Andrich wants to determine the index that best represents the portfolio characteristics of direct real estate investments and examines the indices in Exhibit 1. The expected Sharpe ratio of Vizyon's current portfolio is 0.70.

Exhibit 1
Real Estate Index Analysis

Index	Index Characteristics	Expected Sharpe Ratio of the Index
NAREIT	Security-based	0.81
NAREIT (hedged)	Security-based	0.71
NCREIF	Appraisal-based	0.79
NCREIF (unsmoothed)	Appraisal-based	0.74

A.   **Determine** the *most* appropriate index to represent the expected characteristics of Vizyon's proposed investment in real estate. **Justify** your response with *two* reasons.

5 minutes (Answer Question 4-A on page 20)

Vizyon's trustees recently received two real estate investment proposals. The first proposal is to acquire a privately owned shopping center valued at USD 230 million. The second proposal is to acquire 10% of the equity in a publicly listed hotel chain with a USD 2.3 billion market capitalization. Andrich summarizes the key points of the two proposals in Exhibit 2. She expects a higher return from the shopping center.

Exhibit 2
Summary of Investment Proposals

Direct Investment in Shopping Center
- Luxury shopping center located in a fashionable district
- 100% privately owned by the original owner since development 7 years ago
- Fixed transaction cost of USD 18 million

Public Equity Investment in Hotel Chain
- Budget hotel chain offering affordable accommodations across the US
- Listed on the New York Stock Exchange for 10 years
- 10 million shares outstanding
- Estimated transaction cost of 18 basis points (bps)
- Hotel chain's board rejected several buyout offers from different investors in the past 5 years

B.   **Discuss**, based *only* on the information provided, *three* disadvantages to Vizyon of a direct investment in the shopping center relative to an investment in the publicly traded equity of the hotel chain.

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6 minutes (Answer Question 4-B on page 21)

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Next, Andrich considers an investment in distressed debt. She uses a 3-year horizon for evaluating the investment. Andrich analyzes Khepri Capital, a newly formed distressed debt hedge fund, and notes the following about Khepri:

- 1% annual management fee on average NAV
- 15% performance fee paid monthly and calculated based on the monthly change in NAV, subject to a high-water mark provision
- 3-year lock-up period
- 14% of NAV is invested in a distressed automotive company that recently filed for bankruptcy protection
- NAV per unit at the end of May was a new all-time high of USD 3,100

Khepri Capital's subsequent month-end NAV per unit was USD 3,260 in June, USD 2,900 in July, and USD 3,140 in August. There were no interim cash flows from clients during this three-month period.

C.   **Calculate** the performance fee (in USD per unit) for the three months from June to August.

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3 minutes (Answer Question 4-C on page 22)

</div>

D.   **Explain** why Khepri Capital is subject to J-factor risk.

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3 minutes (Answer Question 4-D on page 23)

</div>

Andrich learns of a competing distressed debt hedge fund with a similar performance fee and expected return, but only a 1-year lock-up period. Andrich contacts Khepri Capital and states that she is considering investing in the competitor's fund. A representative for Khepri Capital replies that its 3-year lock-up period is likely to be more favorable to Vizyon than the competitor's 1-year lock-up period.

E.   **Support** the representative's reply about Khepri Capital's lock-up period.

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3 minutes (Answer Question 4-E on page 24)

</div>

Answer Question 4-A on This Page

4-A. **Determine** the *most* appropriate index to represent the expected characteristics of Vizyon's proposed investment in real estate. **Justify** your response with *two* reasons.

Answer Question **4-B** on This Page

4-B.   **Discuss**, based *only* on the information provided, *three* disadvantages to Vizyon of a direct investment in the shopping center relative to an investment in the publicly traded equity of the hotel chain.

Answer Question 4-C on This Page

4-C.   **Calculate** the performance fee (in USD per unit) for the three months from June to August.

Answer Question 4-D on This Page

4-D.   **Explain** why Khepri Capital is subject to J-factor risk.

Answer Question **4-E** on This Page

4-E.   **Support** the representative's reply about Khepri Capital's lock-up period.

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QUESTION 5 HAS FOUR PARTS (A, B, C, D) FOR A TOTAL OF 15 MINUTES.

Javier Costa is an analyst for a fund sponsor in Latin America. The fund sponsor uses two equity managers (Manager A and Manager B) and each invests in developed and emerging markets.

Costa prepares a performance attribution analysis for the total fund. He identifies the fund's sources of return and develops the macro attribution table in Exhibit 1.

Exhibit 1
Total Fund Level
Macro Attribution for 1 January – 31 March

Decision-Making Level (Investment Alternative)	Fund Value (in USD)	Incremental Return Contribution (%)	Incremental Value Contribution/(Withdrawal) (in USD)
Beginning value	360,000,000	---	---
Risk-free asset	361,800,000	0.50	1,800,000
Asset category	388,872,000	7.52	27,072,000
Benchmarks	389,376,000	0.14	504,000
Investment managers	389,664,000	0.08	288,000
Allocation effects	389,304,000	–0.10	(360,000)
Total fund	389,304,000	8.14	29,304,000

A.   **Demonstrate** whether the total fund outperformed a pure indexing strategy.

3 minutes (Answer Question 5-A on page 28)

B.   **Determine** how much of the fund's return was due to *each* of the following:

    i.   Style bias
    ii.   Active management

4 minutes (Answer Question 5-B on page 29)

Costa gathers the information in Exhibit 2 to evaluate the performance of Manager A.

Exhibit 2
Equity Manager A
Valuations and Cash Flows
(in USD)

Date	Contribution/(Withdrawal)	Market Value (After Cash Flows)
31 March	---	121,000,000
8 April	13,000,000	135,000,000
23 April	(8,000,000)	127,000,000
30 April	---	123,000,000

C.   **Calculate** the time-weighted rate of return for Manager A for the month of April. **Show** your calculations.

4 minutes (Answer Question 5-C on page 30)

Next, Costa presents the micro attribution analysis for Manager B shown in Exhibit 3. Manager B's objective is to outperform her benchmark through superior security selection.

Exhibit 3
Equity Manager B
Micro Attribution

Sector	Portfolio Weight (%)	Benchmark Weight (%)	Portfolio Return (%)	Benchmark Return (%)
Consumer durables	21.53	28.70	9.47	4.16
Energy	34.91	45.44	8.21	5.43
Financial	31.35	11.79	6.82	4.98
Technology	12.21	14.07	–9.02	–1.71
Total portfolio	100.00	100.00	5.94	4.01

D.   **Calculate** *each* of the following for Manager B:

   i.   Pure sector allocation return for the Financial sector
   ii.   Within-sector selection return for the Technology sector

   Show your calculations.

   Note: Ignore interaction effects.

4 minutes (Answer Question 5-D on page 31)

Answer Question 5-A on This Page

5-A.   **Demonstrate** whether the total fund outperformed a pure indexing strategy.

Answer Question 5-B on This Page

5-B.   **Determine** how much of the fund's return was due to *each* of the following:

  i.   Style bias

  ii.   Active management

Answer Question 5-C on This Page

5-C.   **Calculate** the time-weighted rate of return for Manager A for the month of April. **Show** your calculations.

Answer Question **5-D** on This Page

5-D.   **Calculate** *each* of the following for Manager B. **Show** your calculations.

Note: Ignore interaction effects.

i.   Pure sector allocation return for the Financial sector.

ii.   Within-sector selection return for the Technology sector.

QUESTION 6 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 14 MINUTES.

Tartan Management is a hedge fund that uses derivatives in its portfolio. Tartan's new director of risk management, Jan Magnuson, is reviewing Tartan's credit risk exposures. Tartan's current policy is to use a different counterparty for each derivative holding to limit its credit exposure to any single counterparty. Its current derivatives holdings are shown in Exhibit 1. All derivatives are over-the-counter (OTC) and are not subject to collateral requirements.

Exhibit 1
Derivatives Holdings of Tartan Management
(all figures in USD)

Holding	Description	Notional Principal	Current Value
Interest rate swap	1 year; quarterly payments; pay floating, receive fixed	2,000,000	56,000
Forward	2 years; long natural gas	5,000,000	–225,000
Option	6 months; long call option on S&P 500 equity index	5,000,000	487,000

A.   **Determine** Tartan's total amount (in USD) at risk of credit loss from its derivatives portfolio under its current policy.

4 minutes (Answer Question 6-A on page 34)

Magnuson considers whether Tartan's credit risk in the event of a default could be reduced by using a single counterparty with payment netting for all derivatives. The single counterparty would be a different company than any of the three current counterparties.

B.   **Discuss**, based on Tartan's current holdings shown in Exhibit 1, *one* positive effect and *one* negative effect that payment netting with a single counterparty could have on Tartan's credit risk.

Note: Assume there is no difference in the cost of credit monitoring between the two alternatives.

4 minutes (Answer Question 6-B on page 35)

Magnuson wants to reduce the credit risk that Tartan might incur with derivative positions in the future. He asks his staff to research sources of credit risk. The staff recommends the following for Tartan:

Recommendation 1: Use only currency futures rather than currency swaps.

Recommendation 2: Buy OTC put options rather than write OTC call options.

C. **Determine** whether *each* of the following recommendations would *most likely* achieve Magnuson's objective of reducing credit risk:

    i.   Recommendation 1
    ii.   Recommendation 2

Justify *each* response.

6 minutes (Answer Question 6-C on page 36)

Answer Question 6-A on This Page

6-A.   **Determine** Tartan's total amount (in USD) at risk of credit loss from its derivatives portfolio under its current policy.

Answer Question 6-B on This Page

6-B. **Discuss**, based on Tartan's current holdings shown in Exhibit 1, *one* positive effect and *one* negative effect that payment netting with a single counterparty could have on Tartan's credit risk.

Note: Assume there is no difference in the cost of credit monitoring between the two alternatives.

Answer Question 6-C on This Page

6-C. **Determine** whether *each* of the following recommendations would *most likely* achieve Magnuson's objective of reducing credit risk. **Justify** *each* response.

   i.   Recommendation 1.

   ii. Recommendation 2.

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Questions 7 and 8 relate to the Betty Friesen family. A total of 34 minutes is allocated to these questions. *Candidates should answer these questions in the order presented.*

QUESTION 7 HAS FOUR PARTS (A, B, C, D) FOR A TOTAL OF 18 MINUTES.

Adrian Tuggle is a financial advisor counseling Betty Friesen and her husband, Jack Friesen. Betty is 79 years old and has a 42-year-old son, Ryan Smith, from a previous marriage. Ryan has 18-year-old twin daughters. Betty wishes to provide for her family, but intends to donate the majority of her assets to charity. Betty's total asset base is currently USD 120,000,000.

Betty lives in a community property jurisdiction that entitles Jack to receive half of the community property tax-free upon her death. Most of Betty's wealth is considered separate property, with the community property amounting to only 10% of her total assets. Exhibit 1 summarizes gift and inheritance tax rates applicable to the Friesen family.

Exhibit 1
Gift and Inheritance Tax Rates

Tax Type	Tax Rate
Spousal inheritance tax	20%
Spousal gift tax	25%
Non-spousal inheritance tax	50%
Non-spousal gift tax	30%

Note: All taxes are due immediately at the time of the transfer and are paid for by the recipient.

Betty feels that Jack's legal entitlement under the community property rules will not be sufficient to meet his financial needs. Tuggle estimates that if Betty were to die today, Jack would need to inherit USD 8,000,000 net of any taxes to meet his needs.

A. **Calculate** the minimum bequest (in USD) from Betty's estate to Jack in order to meet his spending needs and taxes. **Show** your calculations.

4 minutes (Answer Question 7-A on page 40)

Betty's son, Ryan, works for the local university as an academic advisor. He enjoys an extravagant lifestyle, as Betty provides for his spending needs beyond his salary. Betty states that she will stop providing ongoing support and instead make an immediate one-time gift to Ryan. His goals are to maintain his lifestyle, cover his daughters' university expenses starting next year, and retire in four years. Betty asks Tuggle to estimate the amount of the gift that would cover gift taxes and allow Ryan to achieve his goals. Tuggle will serve as Ryan's financial advisor and gathers the following information from Ryan:

- Until retirement, Ryan's annual after-tax salary will be USD 30,000 and his annual spending needs will be USD 200,000.
- Combined annual cost of education for the twins is USD 190,000 for each of the next four years, and the first payment is due in a year.
- Ryan has no savings.

Tuggle determines that Betty's gift to Ryan could be invested in a portfolio expected to earn a before-tax rate of return of 8% per year for the next four years. When Ryan retires in four years, he will need an investment portfolio valued at USD 5,000,000 to maintain his lifestyle in retirement. Ryan's investment returns will be taxed at 25% annually.

B.   **Calculate** the amount (in USD) of the one-time gift, before gift taxes, that must be transferred from Betty's assets to Ryan to allow him to achieve his goals.

        Note: Assume that salaries and ongoing expenses are end-of-year cash flows.

6 minutes (Answer Question 7-B on page 41)

After the assets are transferred from Betty to Ryan, Tuggle prepares Ryan's IPS.

C.   **Identify** *one* factor that decreases and *one* factor that increases Ryan's ability to take risk.

4 minutes (Answer Question 7-C on page 42)

D.   **Formulate** *each* of the following constraints for Ryan's IPS:

        i.   Time horizon
        ii.   Liquidity

        Note: Ignore gift taxes for purposes of the liquidity constraint.

4 minutes (Answer Question 7-D on page 43)

Answer Question 7-A on This Page

7-A.   **Calculate** the minimum bequest (in USD) from Betty's estate to Jack in order to meet his spending needs and taxes. **Show** your calculations.

Answer Question **7-B** on This Page

7-B.   **Calculate** the amount (in USD) of the one-time gift, before gift taxes, that must be transferred from Betty's
assets to Ryan to allow him to achieve his goals.

Note: Assume that salaries and ongoing expenses are end-of-year cash flows.

Answer Question 7-C on This Page

7-C.   **Identify** *one* factor that decreases and *one* factor that increases Ryan's ability to take risk.

Answer Question **7-D** on This Page

7-D.   **Formulate** *each* of the following constraints for Ryan's IPS:

   i.   Time horizon

   ii.   Liquidity

   Note: Ignore gift taxes for purposes of the liquidity constraint.

> **Questions 7 and 8 relate to the Betty Friesen family. A total of 34 minutes is allocated to these questions.** *Candidates should answer these questions in the order presented.*

QUESTION 8 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 16 MINUTES.

Twenty-five years have passed and Ryan Smith is now 67 years old. He is currently meeting with his new financial advisor, Tanya Hamilton. Ryan's 43-year-old twin daughters, Debra and Kelly, are both married with children. He is planning to give his daughters annual cash gifts for the next several years.

Ryan's retirement portfolio consists of 60% equities and 40% fixed income, and he withdraws funds from the portfolio to meet his cash flow needs in retirement. Ryan asks Hamilton if he should make any changes to his portfolio as a result of his gifting plan. Hamilton recommends substantially increasing the portfolio's allocation to fixed income.

A.   **Determine** whether implementing Hamilton's recommendation would *most likely* decrease, not change, or increase Ryan's:

        i.   financial market risk.
       ii.   longevity risk.

     Justify *each* response.

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6 minutes (Answer Question 8-A on page 46)

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Ryan is concerned about the performance of his portfolio due to a current low interest rate environment and expectations of rising inflation. Ryan tells Hamilton that he recently read an article in a personal finance magazine about annuities that pay a lifetime income stream. Hamilton explains to Ryan that an immediate fixed annuity with a non-trade-out provision would provide lifetime income and could be a possible alternative to his current portfolio. Ryan considers converting his entire portfolio to this annuity.

B.   **Discuss**, using *only* the information provided, *two* reasons why investing entirely in the immediate fixed annuity might not be appropriate for Ryan.

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4 minutes (Answer Question 8-B on page 47)

</div>

Later in his meeting with Hamilton, Ryan shares a concern that his daughters do not have enough life insurance. Both daughters are in good health. Hamilton explains to Ryan the role of human capital in assessing a person's life insurance needs. Ryan provides the following information about his daughters:

- Debra works for a publicly traded financial services company. In addition to her salary, she receives an annual bonus that is directly related to the performance of her company's equity. Although volatile, her total compensation averages USD 100,000 per year. Debra has an investment portfolio valued at USD 200,000.

- Kelly works for the local city government. She earns USD 75,000 per year. Her job is secure and her salary is stable. Kelly's investment portfolio is valued at USD 500,000.

C. **Identify** *one* factor that indicates Debra needs:

i. *less* life insurance than Kelly.
ii. *more* life insurance than Kelly.

Justify *each* response.

6 minutes (Answer Question 8-C on page 48)

Answer Question 8-A on This Page

Risk	**Determine** whether implementing Hamilton's recommendation would *most likely* decrease, not change, or increase Ryan's risk. (circle one)	**Justify** *each* response.
i. financial market risk	decrease not change increase	
ii. longevity risk	decrease not change increase	

Answer Question 8-B on This Page

8-B. **Discuss**, using *only* the information provided, *two* reasons why investing entirely in the immediate fixed annuity might not be appropriate for Ryan.

Answer Question 8-C on This Page

8-C.   **Identify** *one* factor that indicates Debra needs: (see i. and ii. below)
         Justify *each* response.

    i.   *less* life insurance than Kelly.

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    ii.   *more* life insurance than Kelly.

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QUESTION 9 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 15 MINUTES.

Michael Delaney, Chief Investment Officer for investment management firm Gulf & Co., is developing a new mutual fund that invests only in US-based technology companies. The fund will be an actively managed, concentrated equity portfolio with a bias toward small-cap stocks. The minimum and maximum position sizes will be 3% and 5% of the portfolio, respectively.

Delaney would like to use a market sector index that is representative of its portfolio as the benchmark. The US technology sector is currently dominated by a few very large-capitalization companies. Additionally, several companies in the sector have very high per-share prices. Delaney believes the sector is undervalued.

Delaney considers two market sector indexes for the benchmark, one capitalization-weighted and the other equal-weighted. Both are US-only, all-capitalization technology sector indexes with similar constituent stocks. Delaney chooses the equal-weighted sector index.

A.   **Support**, with *two* reasons, Delaney's choice of the equal-weighted index as a benchmark rather than the capitalization-weighted index, based *only* on the information provided.

<div align="center">

4 minutes (Answer Question 9-A on page 52)

</div>

Pete Aron, portfolio manager for Gulf & Co.'s European technology fund, is concerned about currency fluctuations related to the equity portfolio (the Portfolio). The Portfolio is valued in USD, but has exposure to multiple European currencies, primarily the EUR.

Aron formulates the following market expectations for the coming year:

- Expected return (in EUR) of the Portfolio: +13.2%
- Standard deviation (in EUR) of the Portfolio: 15%
- Expected USD/EUR spot rate in one year: 1.2045 (1 EUR = 1.2045 USD)
- Standard deviation of the USD/EUR exchange rate: 5%
- Correlation between the USD/EUR exchange rate and the Portfolio (in EUR): –0.07

The market quotes presented in Exhibit 1 are available from a currency dealer:

<div align="center">

Exhibit 1
Select Market Quotes

</div>

USD/EUR spot rate	1.1930
1-year USD/EUR forward rate (bid–offer)	1.2065 – 1.2090

Aron considers selling EUR and buying USD using a one-year forward contract to fully hedge the EUR currency risk. He will execute the trade if he can achieve the following risk/return objectives:

> Objective 1: Increase the Portfolio's expected return (in USD) by at least 25 basis points.
>
> Objective 2: Reduce the Portfolio's expected standard deviation (in USD) by at least 30 basis points.

B.   **Determine**, based on Aron's market expectations, whether he should execute the forward trade with respect to *each* of the following:

> i.   Objective 1
> ii.   Objective 2

Justify your response. **Show** your calculations.

Note: Assume a one-year time horizon. Consider *each* objective independently.

6 minutes (Answer Question 9-B on page 53)

One of the non-EUR currency exposures in the Portfolio is GBP. Aron frequently adjusts his GBP positions based on his short-term tactical outlook. Aron forecasts that the GBP will appreciate by 5% against the USD over the next six months. The current USD/GBP rate is 1.60 (1 GBP = 1.60 USD). Aron is considering the following six-month European option positions with the primary objective of increasing his GBP exposure in line with his forecast, and a secondary objective of minimizing the initial cash outlay:

> Trade 1:   Buy call with 1.68 strike
>   Sell call with 1.72 strike
>
> Trade 2:   Buy call with 1.60 strike
>   Sell call with 1.68 strike
>
> Trade 3:   Buy call with 1.60 strike
>   Sell call with 1.72 strike

C.   **Determine** the trade that will *most likely* satisfy Aron's objectives at expiration. **Justify** your response.

5 minutes (Answer Question 9-C on page 54)

Answer Question 9-A on This Page

9-A.   **Support**, with *two* reasons, Delaney's choice of the equal-weighted index as a benchmark rather than the capitalization-weighted index, based *only* on the information provided.

Answer Question 9-B on This Page

9-B.   **Determine**, based on Aron's market expectations, whether he should execute the forward trade with respect to *each* Objective. **Justify** your response. **Show** your calculations.

  Note: Assume a one-year time horizon. Consider *each* objective independently.

  i.   Objective 1.

  ii.   Objective 2.

Answer Question 9-C on This Page

9-C. **Determine** the trade that will *most likely* satisfy Aron's objectives at expiration. **Justify** your response.

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QUESTION 10 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 14 MINUTES.

Conner Young is an economist at a multi-strategy asset management firm. Each year, he provides his firm with a report that includes a series of market forecasts. As part of his report, Young uses the Grinold-Kroner model to forecast the expected rate of return on equities for the next 10 years. He uses the data in Exhibit 1 to prepare his forecast.

Exhibit 1
Young's Market Forecast

Factor	10-Year Forecast (annualized)
Dividend yield	1.80%
Dividend growth rate	4.00%
Change in P/E multiple	0.50%
Inflation rate	1.20%
Change in number of shares outstanding	–0.30%
Real total earnings growth rate	2.50%

A.   **Determine** the following sources of return for equities, according to the Grinold-Kroner model, using Young's forecasts:

i.   Expected nominal earnings growth return
ii.   Expected repricing return
iii.   Expected income return

Show any calculations.

6 minutes (Answer Question 10-A on page 58)

Young also reviews the central bank's current monetary policy. He uses the data in Exhibit 2 and the Taylor rule to determine whether the central bank is likely to change its target short-term interest rate. The neutral short-term interest rate is equal to the central bank's current target rate.

Exhibit 2
Economic Data and Central Bank Forecasts

Target inflation rate	1.00%
Forecast inflation rate	1.20%
Inflation rate (last 12 months)	2.20%
Neutral short-term interest rate	2.50%
Real GDP trend growth rate	2.00%
Real GDP forecast growth rate	1.50%

B.   **Determine** whether the central bank should loosen or tighten monetary policy, assuming it follows the Taylor rule. **Justify** your response. **Show** your calculations.

4 minutes (Answer Question 10-B on page 59)

One year later, Young meets with his firm's fixed income portfolio manager, Bianca Dvorak. Dvorak manages a domestic bond fund for the firm and is considering whether to purchase a 5-year callable, BBB-rated corporate bond for the fund. The corporate bond currently yields 4.90%.

Dvorak wants to use the risk premium approach to decide whether to purchase the bond for her fund. The trailing 12-month inflation rate is 1.10% and Young expects inflation to be constant at 1.50% per year for the next five years. Dvorak assumes that the illiquidity discount and tax premium are both zero. Dvorak and Young compile the information in Exhibit 3.

Exhibit 3
Domestic Bond Market Data

Real risk-free interest rate	1.30%
1-year BBB-rated credit risk spread (over Treasuries)	30 basis points
5-year BBB-rated credit risk spread (over Treasuries)	80 basis points
Spread of 5-year Treasury over 1-year Treasury	100 basis points
1-year call risk spread	20 basis points
5-year call risk spread	60 basis points

C.   **Determine**, based on the risk premium approach, whether Dvorak should purchase the corporate bond. **Justify** your response. **Show** your calculations.

4 minutes (Answer Question 10-C on page 60)

Answer Question ▉10-A▉ on This Page

10-A. **Determine** the following sources of return for equities, according to the Grinold-Kroner model, using Young's forecasts: (see i. and ii. below)
    Show any calculations.

    i.   Expected nominal earnings growth return.

    ii. Expected repricing return.

    iii. Expected income return.

Answer Question **10-B** on This Page

10-B. **Determine** whether the central bank should loosen or tighten monetary policy, assuming it follows the Taylor rule. **Justify** your response. **Show** your calculations.

Answer Question 10-C on This Page

10-C. **Determine**, based on the risk premium approach, whether Dvorak should purchase the corporate bond. **Justify** your response. **Show** your calculations.

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QUESTION 11 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 18 MINUTES.

Pablo Rodriquez is an advisor at a brokerage firm with retail clients who are active traders. He acquires four clients from Carla Chee, an advisor who is retiring from the firm. Over the years, Chee regularly surveyed her clients to detect any behavioral biases in their investment decision-making processes. She determined that her clients routinely exhibited the biases summarized in Exhibit 1.

Exhibit 1
Chee Clients: Behavioral Biases

Client	Bias
Client 1	Regret-aversion
Client 2	Loss-aversion
Client 3	Mental accounting
Client 4	Framing

Rodriquez believes that clients act primarily on the basis of their biases. He meets with the clients to evaluate Chee's assessments of their biases.

Client 1 and Client 2:
Rodriquez asks Client 1 and Client 2 to consider two equities, Uno Inc. and Deux Co., which each had purchased for their respective portfolios. The purchase price and current price are shown in Exhibit 2. Neither equity pays dividends.

Exhibit 2
Selected Equity Holdings
(in USD)

Equity	Purchase Price	Current Price
Uno Inc.	55	66
Deux Co.	60	48

A.   **Determine**, assuming Chee's bias assessments are correct, which action (buy additional shares, take no action, sell) *each* client will *most likely* choose for *each* of the following equities:

  i.   Uno Inc.
  ii. Deux Co.

  Justify *each* response.

  Note: Consider *each* client (Client 1 and Client 2) and *each* equity independently.

12 minutes (Answer Question 11-A on page 64)

Client 3:

Client 3 has a preference for only spending the income earned by her portfolio, which is currently allocated 100% to fixed income investments. Rodriquez suggests that she consider changing to a balanced portfolio by adding equities to her existing portfolio. He informs her that the total return from the balanced portfolio should permit her to increase withdrawals from the portfolio without diminishing the real value of her principal. Rodriquez shares with Client 3 the expectations for her current portfolio and the proposed portfolio, shown in Exhibit 3.

Exhibit 3
Investment Portfolio Expectations

Portfolio Allocation Option	Income	Capital Appreciation	Total Return	Standard Deviation
Fixed income portfolio (current)	4.2%	0.0%	4.2%	6.5%
Balanced portfolio (proposed)	3.0%	3.1%	6.1%	9.0%

B.   **Determine**, assuming Chee's bias assessment is correct, which portfolio Client 3 would *most likely* prefer. **Justify** your response.

3 minutes (Answer Question 11-B on page 65)

Client 4:

Client 4 has a history of selecting low-volatility equities and government bonds for his portfolio. Rodriquez presents him with two potential investments for his portfolio. He tells the client that:

- Investment Y has a 20% chance of incurring a loss.
- Investment Z has an 80% chance of not incurring a loss.
- Both investments have the same expected return.

Rodriquez asks Client 4 which investment he would prefer for his portfolio.

C.   **Determine**, assuming Chee's bias assessment is correct, which investment (Y or Z) Client 4 would *most likely* prefer. **Justify** your response.

3 minutes (Answer Question 11-C on page 66)

Answer Question 11-A on This Page

Note: Consider *each* client (Client 1 and Client 2) and *each* equity independently.

Client (Bias)	Equity	**Determine**, assuming Chee's bias assessments are correct, which action *each* client will *most likely* choose for *each* of the following equities. (circle one)	**Justify** *each* response.
Client 1 (Regret-aversion)	Uno Inc.	buy additional shares take no action sell	
	Deux Co.	buy additional shares take no action sell	
Client 2 (Loss-aversion)	Uno Inc.	buy additional shares take no action sell	
	Deux Co.	buy additional shares take no action sell	

Answer Question **11-B** on This Page

11-B. **Determine**, assuming Chee's bias assessment is correct, which portfolio Client 3 would *most likely* prefer. **Justify** your response.

Answer Question 11-C on This Page

11-C. **Determine**, assuming Chee's bias assessment is correct, which investment (Y or Z) Client 4 would *most likely* prefer. **Justify** your response.

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