

# Exam RETRPIRM

**Date:** Friday, November 3, 2023

## INSTRUCTIONS TO CANDIDATES

### General Instructions

1. This examination has 6 questions numbered 1 through 6 with a total of 40 points.

The points for each question are indicated at the beginning of the question.

2. While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions provided in this document.

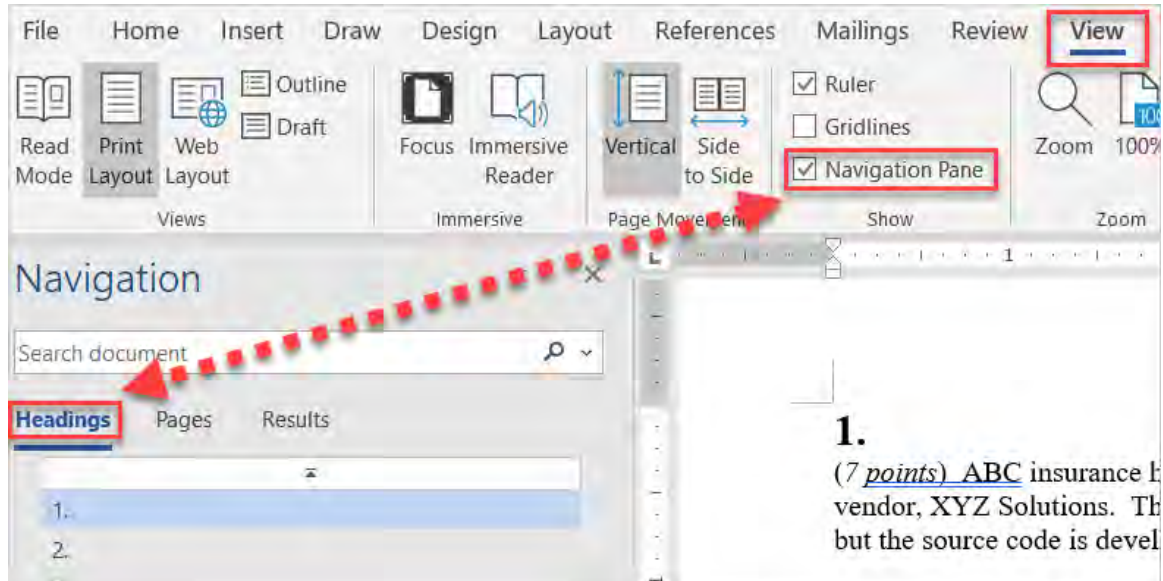
### Written-Answer Instructions

1. Each question part or subpart should be answered either in the Word document or the Excel file as directed. Graders will only look at work in the indicated file.
  - a) In the Word document, answers should be entered in the box marked ANSWER. The box will expand as lines of text are added. There is no need to use special characters or subscripts (though they may be used). For example,  $\beta_1$  can be typed as beta\_1 (and ^ used to indicate a superscript).
  - b) In the Excel document formulas should be entered. Performing calculations on scratch paper or with a calculator and then entering the answer in the cell will not earn full credit. Formatting of cells or rounding is not required for credit.
2. The answer should be confined to the question as set.
3. Prior to uploading your Word and Excel files, each file should be saved and renamed with your five-digit candidate number in the filename.
4. The Word and Excel files that contain your answers must be uploaded before time expires.

## Navigation Instructions

Open the Navigation Pane to jump to questions.

Press Ctrl+F, or click View > Navigation Pane:



# 1.

(7 points)

- (a) (1 point) Describe the impact of a duration gap on a defined benefit pension plan.

ANSWER:

- (b) (3 points) Describe strategies to mitigate a negative duration gap.

ANSWER:

Company XYZ is the sponsor of a defined benefit pension plan.

You are given the following information:

Plan assets	\$87,384
Fixed income allocation	40%
Fixed income average duration	8

Nominal discount rate	4.0%	5.0%	6.0%
Accumulated Benefit Obligation (ABO)	\$113,207	\$87,384	\$67,811

- (c) (3 points) Company XYZ enters into a receive-fixed interest rate swap with notional principal of \$100,000. Determine the swap duration needed to fully hedge interest rate risk on the portfolio funding the ABO.

*The response for this part is to be provided in the Excel spreadsheet.*

## 2.

(6 points)

- (a) (4 points) Critique the following statements related to the financial economics viewpoint:
- (i) Pension plans should invest 100% in bonds
  - (ii) Liabilities must be discounted at the risk-free rate

ANSWER:

- (b) (2 points) Explain why an investment strategy of investing in 100% cash flow matching bonds may not be optimal for a pension plan.

ANSWER:

### 3

(7 points) Company ABC decided to review the pension fund's portfolio and are considering the following two portfolios:

	Portfolio A	Portfolio B
Target fixed income allocation	70%	45%
Target hedge ratio	50%	100%
Fixed income derivatives	Not allowed	Allowed
Minimum credit quality	BBB-	No minimum
Foreign bonds	Not allowed	Maximum 10%
Equities	Domestic only	Global equities

Company ABC's goal is to achieve a higher return, but the company is also concerned by interest rate risk and currency risk.

Compare and contrast Portfolio A and Portfolio B taking into consideration Company ABC's goal and concerns.

ANSWER:

#### 4.

(6 points)

- (a) (1 point) Explain how plan sponsors can consider environmental, social and governance (“ESG”) factors for defined contribution pension plans with member-directed investments.

ANSWER:

- (b) (2 points) Identify the main tasks involved in implementing an ESG factor program into an institutional investment program.

ANSWER:

- (c) (3 points) Describe the considerations when implementing an ESG factor program into an institutional investment program.

ANSWER:

## 5.

(9 points)

- (a) (3 points) Describe the process for conducting an asset/liability modeling (“ALM”) study.

ANSWER:

- (b) (4 points) Describe the inputs for an ALM study.

ANSWER:

- (c) (2 points) Describe the typical financial outputs of an ALM study.

ANSWER:

**6.**

(5 points)

- (a) (1 point) Compare the level of liquidity of each investment type within each asset category below by ranking them from 1 to 4, with 1 being the most liquid and 4 being the least liquid.

<b>Equity</b>	<b>Fixed Income</b>	<b>Real Assets</b>
Venture capital	Mezzanine debt	Private real estate debt
Private equity	Government bonds	Private real estate
Actively managed global small cap equity	Distressed debt	Passive real estate investment trust
Exchange traded funds	High yield bonds	Active commodity fund

ANSWER:

<b>Rank</b>	<b>Equity</b>	<b>Fixed Income</b>	<b>Real Assets</b>
1			
2			
3			
4			

- (b) (4 points) Compare and contrast investing in public markets and private markets for the following:
- (i) Liquidity
  - (ii) Asset valuation
  - (iii) Timing of returns
  - (iv) Implementation

ANSWER:
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**\*\*END OF EXAMINATION\*\***