## Learning Module 2: Portfolio Risk & Return: Part II

Q.131 The variance of the market is 5% and the market risk premium is 10%. The risk-free rate is 3%. If the covariance between Allison Company and the market is 6%, Allison's required return is *closest to*:

A. 3.7%.

B. 14%.

C. 15%.

The correct answer is **C.**

$$Bi = \frac{Cov(r_i, R_m)}{(s_m^2)} = \frac{0.06}{0.05} = 1.2$$

$$E(r_i) = R_f + (R_m - R_f)B_i$$

$$r_i = 3\% + (10\%) \times 1.2 = 15\%$$

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (b): Explain the capital allocation line (CAL) and the capital market line (CML).***

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Q.134 Company ABC is expected to return 15% per year to its investors, the market expected return is 8% and the risk-free rate is 3.5%. What is ABC's stock beta?

A. 1.4375

B. 1.8750

C. 2.5556

The correct answer is **C.**

$$E(R_i) = Rf + \beta_i E(Rm - Rf)$$

$$15\% = 3.5\% + (4.5\%)\beta_i$$

$$11.5\% = (4.5\%)\beta_i$$

$$\beta_i = 2.5556$$

**A is incorrect.** This calculation does not align with the given values and the correct application of the CAPM equation.
**B is incorrect.** This value does not result from the correct application of the CAPM equation with the given expected return of ABC, the expected market return, and the risk-free rate. The calculation leading to a beta of 1.875 does not accurately reflect the relationship between the expected return of ABC's stock, the market's expected return, and the risk-free rate as dictated by the CAPM.

***CFA Level 1, Portfolio Management, Learning Module 1: Portfolio Risk and Return: Part I, LOS (a) Describe characteristics of the major asset classes that investors consider in forming portfolios.***

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Q.135 JJK's stock price is $30 and, in one year, its price is expected to be $40. The risk-free rate is 5% and the historical S&P return is 15%. If analysts say that the stock is fairly valued, then JJK's beta is *closest to*:

A. 1.8887.

B. 2.

C. 2.833.

The correct answer is **C.**

$$\text{Holding period return} = \frac{(D_1 + S_1 - S_0)}{S_0}$$

$$\text{Holding period return} = \frac{(0 + 40 - 30)}{30} = 0.3333$$

$$E(R_i) = R_f + E(R_m - R_f)\beta_i$$

$$33.33\% = 5\% + (15\% - 5\%)\beta_i$$

$$28.33\% = (10\%)\beta_i$$

$$\beta_i = 2.833$$

**A is incorrect.** A beta of 1.8887 does not accurately reflect the relationship between JJK's expected return and the market's expected return given the risk-free rate and the expected market return.

**B is incorrect.** A beta of 2.0 suggests a different level of volatility and risk in relation to the market than what is calculated using the CAPM formula and the given data.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (e): Calculate and interpret beta.***

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Q.136 Given the Markowitz Portfolio Theory, which of the following statements is *least likely* accurate?

A. Investors seek to maximize their utility.

B. Investors measure risk in terms of an investment's variance or standard deviation.

C. Given the same level of expected return, an investor will choose the investment with the highest amount of risk.

The correct answer is **C.**

This statement is contrary to the fundamental principles of the Markowitz Portfolio Theory, which posits that investors are risk-averse by nature. The theory suggests that for a given level of expected return, investors will prefer the portfolio with the least amount of risk. This preference is rooted in the concept of maximizing utility, where utility is a measure of the satisfaction or benefit that an investor derives from their investment choices. The theory uses the variance or standard deviation of portfolio returns as a measure of risk, indicating that lower variance or standard deviation is preferred for the same level of expected return, as it implies less uncertainty and potential for loss.
**A is incorrect.** Utility maximization involves selecting a portfolio that offers the highest expected return for a given level of risk or the lowest risk for a given level of expected return. This principle is central to the theory and guides investors in making rational, utility-maximizing choices among different investment portfolios.

**B is incorrect.** The theory introduces the concept of measuring risk in terms of an investment's variance or standard deviation. This approach to risk measurement is a key aspect of the theory, as it allows for the quantification of risk and the comparison of different investments or portfolios on a standardized basis. By considering both the expected return and the risk (as measured by variance or standard deviation) of an investment, investors can make more informed decisions that align with their risk tolerance and investment objectives.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.409 Taking into account a 2% risk-free rate and using the Sharpe ratio, which of the following portfolios has the best risk-adjusted performance?

Portfolio A: A mean return of 5% with a standard deviation of 3%.
Portfolio B: A mean return of 10% with a standard deviation of 18%.
Portfolio C: A mean return of 17% with a standard deviation of 16%.

A. Portfolio A

B. Portfolio B

C. Portfolio C

The correct answer is **A.**

$$\text{Sharpe ratio} = \frac{R_p - R_f}{\sigma_p}$$

For Portfolio A, the mean return is 5% with a standard deviation of 3%. Using the Sharpe ratio formula, we calculate the Sharpe ratio as follows:

$$S_A = \frac{(5-2)}{3} = 1$$

For Portfolio B, the mean return is 10% with a standard deviation of 18%. The Sharpe ratio for Portfolio B is calculated as:

$$S_B = \frac{(10-2)}{18} = 0.4444$$

For Portfolio C, the mean return is 17% with a standard deviation of 16%. The Sharpe ratio for Portfolio C is calculated as:

$$S_C = \frac{(17-2)}{16} = 0.9375$$

**B is incorrect.** Portfolio B has a Sharpe ratio of 0.4444, which is lower than Portfolio A's Sharpe ratio. This indicates that, despite its higher mean return, Portfolio B's risk-adjusted performance is not as favorable as Portfolio A's when considering the volatility of returns.
**C is incorrect.** Portfolio C has a Sharpe ratio of 0.9375, which, while close, is still lower than Portfolio A's Sharpe ratio. This suggests that even though Portfolio C has a significantly higher mean return than Portfolio A, its risk-adjusted performance is slightly less favorable due to its higher standard deviation.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (i): Calculate and interpret the Sharpe ratio, Treynor ratio, M2, and Jensen's alpha.***

Q.782 Which of the following is *not* a characteristic of an active portfolio?

A. The portfolio contains positive weighting for assets that are undervalued, or have a chance of offering above-normal returns.

B. The portfolio generally has high costs as a significant effort is made in valuing securities.

C. The portfolio mostly replicates and tracks market indices, constructed on the basis of market prices and market capitalizations.

The correct answer is **C.**

Active investors do not rely on market valuations and invest more in undervalued securities or securities offering above-normal returns on the basis of their own estimate of cash flows, growth rates and discount rates.
**A is incorrect.** This option describes a fundamental characteristic of an active portfolio. Active portfolio management involves identifying and investing in assets that are perceived to be undervalued or have the potential to offer above-normal returns. This process requires extensive research and analysis to uncover investment opportunities that are not accurately reflected in their current market prices. By focusing on these opportunities, active managers aim to generate higher returns compared to passive strategies that simply track market indices.

**B is incorrect.** High costs are indeed a characteristic of active portfolio management. This is due to the extensive research, analysis, and frequent trading activities required to identify and capitalize on investment opportunities. Active managers incur costs related to obtaining market data, conducting financial analysis, and executing trades. These costs, which include management fees and transaction costs, are typically higher than those associated with passive portfolio management. The rationale behind these higher costs is the expectation of achieving superior returns through active management strategies.

Passive portfolio management involves constructing a portfolio that mirrors the composition of a specific market index or benchmark. The goal of passive management is not to outperform the market but to replicate its performance, thereby minimizing costs and avoiding the risks associated with active management strategies.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

Q.783 Which of the following situations is referred to as the leveraged position in the risky portfolio?

A. When there is a positive amount invested in the risk-free asset and in the risky asset.

B. When there is no amount invested in the risk-free asset.

C. When there is a negative investment in the risk-free asset.

The correct answer is **C.**

When an investor borrows money at the risk-free rate of interest and then invests his available wealth with the borrowed funds in the risky portfolio, this borrowing portfolio is referred to as the leveraged position in the risky portfolio.
**A is incorrect.** Having a positive amount invested in both the risk-free asset and the risky asset does not constitute a leveraged position. This scenario describes a diversified portfolio where the investor allocates funds between a risk-free asset and a risky asset without borrowing. This strategy is typically aimed at balancing risk and return, rather than amplifying them through leverage.

**B is incorrect.** Simply having no amount invested in the risk-free asset does not automatically imply a leveraged position. An investor could be fully invested in risky assets without borrowing to increase their investment size. This scenario indicates a preference for risk but does not involve leveraging. Leveraging specifically involves borrowing funds to increase the potential investment and return, which is not necessarily implied by having all investments in risky assets.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.784 Two portfolios have the following characteristics:

| Portfolio | Return | Beta |
|---|---|---|
| A | 8% | 0.7 |
| B | 7% | 1.1 |

Given a market return of 10% and a risk-free rate of 4%, calculate Jensen's Alpha for both portfolios and comment which portfolio has performed better.

A. -0.2% and -3.6% respectively
Portfolio A has performed better than Portfolio B.

B. -0.2% and -3.6% respectively
Portfolio B has performed better than Portfolio A.

C. 0.2% and 3.6% respectively
Portfolio B has performed better than Portfolio A.

The correct answer is **A.**

Jensen's Alpha is calculated as follows:

$$\text{Jensen's Alpha} = R_p - [R_f + B_p(R_m - R_f)$$

$$\text{Jensen's Alpha}_{Portfolio A} = 0.08 - [0.04 + 0.7(0.1 - 0.04)] = -0.002$$

$$\text{Jensen's Alpha}_{Portfolio B} = 0.07 - [0.04 + 1.1(0.1 - 0.04)] = -0.036$$

Jensen's Alpha is -0.2% and -3.6% for A and B respectively. A higher Alpha indicates that a portfolio has performed better.
**B is incorrect.** It incorrectly states that Portfolio B has performed better than Portfolio A. This is not supported by the calculated Jensen's Alphas, which show that Portfolio A has a less negative Alpha, indicating better performance relative to its expected return based on its beta.

**C is incorrect.** The values of Jensen's Alpha provided do not match the calculations based on the given data. Additionally, the conclusion that Portfolio B has performed better than Portfolio A contradicts the calculated Jensen's Alphas, which indicate that Portfolio A has outperformed Portfolio B.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (i): Calculate and interpret the Sharpe ratio, Treynor ratio, M2, and Jensen's alpha.***

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Q.785 The capital asset pricing model (CAPM) is used for the pricing of securities considering:

A. Non-systematic risk.

B. Systematic risk.

C. Total risk.

The correct answer is **B.**

CAPM emphasizes that the expected returns of assets vary only by their systematic risk as measured by beta. Two assets with the same beta will have the same expected return irrespective of the nature of those assets. Given this relationship, all assets are defined only by their beta risk i.e., systematic risk.
**A is incorrect.** Non-systematic risk, also known as idiosyncratic risk or specific risk, pertains to factors that affect a specific company or industry. Examples include management decisions, product recalls, or regulatory changes affecting a particular sector. CAPM assumes that investors hold diversified portfolios, which effectively eliminates non-systematic risk.

**C is incorrect.** It underscores the principle that investors are compensated for the risk that cannot be diversified away (systematic risk), rather than the total risk of an investment. Therefore, stating that CAPM is used for pricing securities considering total risk misrepresents the model's focus and application.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.786 Which of the following portfolio has a systematic risk equivalent to its total risk?

A. A diversified portfolio

B. An unachievable portfolio

C. A borrowing portfolio

The correct answer is **A.**

In a diversified portfolio, the unsystematic risk (specific to individual assets) is minimized through the inclusion of various assets with different risk factors. As a result, the systematic risk (market risk) becomes the dominant component of total risk. Therefore, in a well-diversified portfolio, the systematic risk is equivalent to the total risk.

**B is incorrect.** An unachievable portfolio, is incorrect because the term "unachievable portfolio" doesn't provide information about the systematic or unsystematic risk. It's not a standard term in the context of portfolio risk.

**C is incorrect.** A borrowing portfolio, is incorrect because the term "borrowing portfolio" doesn't inherently imply anything about the systematic risk. The composition and risk characteristics of a portfolio depend on the assets held and their weights, not just on whether the portfolio involves borrowing.
***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (c): Explain systematic and nonsystematic risk, including why an investor should not expect to receive additional return for bearing nonsystematic risk.***

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Q.787 Which of the following is an example of systematic risk?

A. Regulatory changes

B. Credit crunches

C. Product recalls

The correct answer is **A.**

Systematic risk refers to the risk that is inherent to the entire market or an entire market segment. It is also known as market risk. Regulatory changes can have a broad impact on the market as a whole, affecting various industries and companies. Therefore, regulatory changes are an example of systematic risk.

**B and C are incorrect.**Credit crunches and product recalls may impact specific companies or industries but are not necessarily inherent to the entire market, making them more associated with unsystematic or specific risks.
***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (c): Explain systematic and nonsystematic risk, including why an investor should not expect to receive additional return for bearing nonsystematic risk.***

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Q.788 Which of the following portfolio performance evaluation measures provides the extent of the performance of a particular portfolio?

A. Sharpe ratio

B. Treynor ratio

C. Jensen's alpha

The correct answer is **C.**

Both Sharpe and Treynor ratios allow the ranking of portfolios. However, neither ratio gives any information about the extent of the performance, whereas Jensen's alpha and M-Squared both provide such results.
**A is incorrect.** The Sharpe ratio measures the performance of an investment compared to a risk-free asset, after adjusting for its risk. It is calculated by subtracting the risk-free rate from the return of the portfolio and dividing the result by the standard deviation of the portfolio returns. While the Sharpe ratio is useful for understanding how much excess return is being received for the extra volatility that an investor takes on, it does not provide specific insights into the extent of the portfolio's performance beyond this risk-adjusted measure.

**B is incorrect.** The Treynor ratio, similar to the Sharpe ratio, is a risk-adjusted measure of return. However, it uses beta (a measure of volatility or systematic risk compared to the market as a whole) instead of the standard deviation of portfolio returns. The Treynor ratio is calculated by subtracting the risk-free rate from the return of the portfolio and dividing the result by the portfolio's beta. This ratio helps in understanding how well the portfolio is compensated for the risk taken, considering the market volatility. However, like the Sharpe ratio, the Treynor ratio does not provide a direct measure of the extent of the portfolio's performance in terms of actual versus expected returns based on market movements.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (i): Calculate and interpret the Sharpe ratio, Treynor ratio, M2, and Jensen's alpha.***

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Q.789 Which of the following portfolio performance evaluation measures is based on systematic risk?

A. Sharpe ratio

B. Treynor ratio

C. M-Squared (M2)

The correct answer is **B.**

The Sharpe ratio uses the total risk of the portfolio and the M-Squared is an extension of the Sharpe ratio in that it is based on total risk. On the other hand, the Treynor ratio uses beta (systematic risk).
**A is incorrect.** The Sharpe ratio is a measure of the performance of an investment compared to a risk-free asset, after adjusting for its risk. It is calculated by subtracting the risk-free rate from the return of the investment and dividing the result by the standard deviation of the investment returns, which represents total risk, including both systematic and unsystematic risk. This makes the Sharpe ratio a broader measure of risk-adjusted performance, not specifically focused on systematic risk.

**C is incorrect.** M-Squared (M2) is an extension of the Sharpe ratio that also considers total risk. It measures the absolute difference in performance between the portfolio and a benchmark portfolio, adjusted for the risk of the portfolio. The M2 ratio does this by scaling the portfolio to have the same level of risk as the benchmark and then comparing their performances. Like the Sharpe ratio, M2 uses total risk in its calculation, making it unsuitable for evaluating performance based solely on systematic risk.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (i): Calculate and interpret the Sharpe ratio, Treynor ratio, M2, and Jensen's alpha.***

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Q.790 With respect to security selection using SML, a rational investor is more likely to invest in points:

A. Directly lying on the SML.

B. Above the SML.

C. Below the SML.

The correct answer is **B.**

The asset will have a low level of risk relative to the amount of expected return and would be a good choice for investors.
**A is incorrect.** Securities lying directly on the SML are correctly priced according to their risk level and the market's expected return. While these are not poor choices for investment, they do not offer the additional value that securities above the SML do. Securities on the SML provide returns that are commensurate with their risk, but rational investors seek opportunities to maximize returns for any given level of risk, which is more likely found in securities above the SML.

**C is incorrect.** Securities below the SML are considered overvalued, as they offer lower expected returns for their level of risk compared to the market average. Investing in these securities would not be in line with the objective of maximizing returns for a given level of risk. Rational investors aim to optimize their investment portfolios by selecting securities that either lie on or above the SML, with a preference for the latter, as these offer better returns for the risk undertaken. Therefore, investing in securities below the SML would contradict the principles of efficient and rational investment decision-making.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.791 Which of the following is *most likely* the intercept of the security characteristics line (SCL)?

A. Jensen's alpha

B. Beta

C. M-Squared (M2)

The correct answer is **A.**

The security characteristic line (SCL) is a regression line, plotting performance of a particular security or portfolio against that of the market portfolio at every point in time. The slope of the SCL is the beta, and the intercept is its Jensen's alpha.
**B is incorrect.** Beta is the measure of a security's or portfolio's volatility in relation to the overall market. It represents the slope of the SCL, not the intercept. A beta greater than 1 indicates that the security is more volatile than the market, while a beta less than 1 suggests it is less volatile. Beta is used to estimate the relative risk of a security or portfolio but does not provide information about its absolute performance, which is the role of Jensen's alpha in the context of the SCL.

**C is incorrect.** M-Squared (M2) is a performance measurement that adjusts the returns of a portfolio for risk to compare it against a benchmark. M2 is not related to the SCL directly; instead, it is a separate measure used to evaluate the risk-adjusted performance of a portfolio relative to a benchmark. M2 takes into account the volatility of the portfolio and the risk-free rate to provide a single number that indicates how much better or worse a portfolio has performed relative to its benchmark, after adjusting for risk. While M2 is useful for performance evaluation, it does not serve as the intercept of the SCL, which is specifically represented by Jensen's alpha.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS i: calculate and interpret the Sharpe ratio, Treynor ratio, M2, and Jensen's alpha.***

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Q.792 Which of the following securities has the highest expected return calculated using a capital asset pricing model if the market risk premium is 8%?

| Security | Beta |
|---|---|
| A | 0.75 |
| B | 0.12 |
| C | 1.30 |
| D | 1.70 |

A. Security B

B. Security D

C. It depends on the risk-free rate

The correct answer is **B.**

Regardless of the risk-free rate, Security D has the highest expected return using the following formula:

$$R_i = R_f + B_i[R_m - R_f]$$

As the beta of Security D is the highest, it will have the highest return, regardless of the risk-free rate.
**A is incorrect.** Security B has the lowest beta of 0.12, which would suggest it has the lowest sensitivity to market movements and, consequently, the lowest expected return according to CAPM.

**C is incorrect.** The statement "It depends on the risk-free rate" is misleading in this context. While the risk-free rate is a component of the CAPM formula, the question asks for the security with the highest expected return given a constant market risk premium. The risk-free rate affects all securities equally in this scenario, so the determining factor for the highest expected return is the beta of the securities.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.1329 What is the standard deviation of an equally weighted portfolio consisting of one risky asset and one risk-free asset if the standard deviation of the risky asset is 36%?

A. 0.18

B. 0.36

C. 0.0648

The correct answer is **A.**

Since the standard deviation of the risk-free rate is zero, the standard deviation of the portfolio is the weight of the risky asset multiplied by the standard deviation of the risky asset:

$$\sigma_P = 0.5 \times 36\% + 0.5 \times 0 = 18\%$$

**B is incorrect.** It suggests that the standard deviation of the portfolio is the same as the standard deviation of the risky asset. This ignores the impact of diversification and the presence of a risk-free asset in the portfolio, which reduces the overall portfolio risk.
**C is incorrect.** It seems to be a misunderstanding of how the standard deviation of a portfolio is calculated, especially in the context of combining a risky asset with a risk-free asset.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.1330 Which of the following terms appropriately defines the difference between the expected return of the market and the risk-free rate of return?

A. Capital allocation line

B. Market risk premium

C. Capital market line

The correct answer is **B.**

The difference between the expected return of the market and the risk-free rate of return is called the market risk premium. The market risk premium reflects the additional return investors expect to receive for taking on the higher risk associated with investing in the stock market compared to risk-free securities, such as government bonds. The risk-free rate represents the return on an investment with zero risk, indicating the time value of money.
**A is incorrect.** The Capital Allocation Line (CAL) represents a line that shows all possible combinations of risk-free assets and risky assets for an investor. It is used to illustrate the risk-return trade-off in the investment portfolio. The CAL is specific to each investor, depending on their risk tolerance and investment choices. It does not specifically define the difference between the expected return of the market and the risk-free rate of return, which is the definition of the market risk premium.

**C is incorrect.** The Capital Market Line (CML) represents the efficient frontier of optimal portfolios that offer the highest expected return for a given level of risk or the lowest risk for a given level of expected return, including a risk-free asset. The CML is a special case of the CAL when the portfolio on the efficient frontier includes all risky assets in the market. While the slope of the CML can be interpreted as the market price of risk, which is related to the market risk premium, the CML itself does not define the difference between the expected return of the market and the risk-free rate of return. The market risk premium is a component used in the calculation of the CML's slope but is not synonymous with the CML.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.1331 The optimal capital allocation line for all investors is called the:

A. Efficient frontier.

B. Capital allocation line.

C. Capital market line.

The correct answer is **C.**

When all investors in the market have homogenous expectations of risk and return, the optimal capital allocation line (CAL) for all investors is called the capital market line (CML).
**A is incorrect.** The Efficient Frontier represents a set of portfolios that offer the highest expected return for a given level of risk or the lowest risk for a given level of expected return, without considering the inclusion of a risk-free asset. It is a curved line in the risk-return space formed by the combination of risky assets only. While the Efficient Frontier is crucial for understanding the risk-return trade-off among portfolios of risky assets, it does not account for the risk-free rate or the combination of risky and risk-free assets, which is a key aspect of the Capital Market Line.

**B is incorrect.** The Capital Allocation Line (CAL) represents the risk-return trade-off for a specific combination of a risk-free asset and a portfolio of risky assets. Each investor can have their own CAL based on their risk preference and the specific risky portfolio they choose. However, the CAL becomes the Capital Market Line (CML) when the risky portfolio is the market portfolio, which is the optimal portfolio of all risky assets that every investor would choose if they had homogenous expectations. Unlike the CML, which is universally optimal for all investors under the assumption of homogenous expectations, individual CALs can vary significantly among investors.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.1333 Calculate the asset beta when the standard deviation of market returns is 21% and the covariance of assets return with the market return is 0.039.

A. 0.19

B. 0.88

C. 1.3

The correct answer is **B.**

$$\text{Beta of asset} = \frac{\text{Covariance of assets return}}{\text{Variance of market returns}} = \frac{0.039}{0.21^2} = 0.88$$

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Q.1334 Which of the following is a risk that can be diversified away?

A. Diversification risk

B. Unsystematic risk

C. Systematic risk

The correct answer is **B.**

Unsystematic can be mitigated by diversification. The rationale behind this is that unsystematic risks are unique to a particular company or sector and do not affect the market as a whole. Therefore, by investing in a variety of assets across different sectors, an investor can reduce the impact of any one asset's poor performance on the overall portfolio.
**A is incorrect.** Diversification risk is not a recognized term in finance. The concept seems to be a misunderstanding of what diversification aims to achieve. Diversification is a strategy used to reduce risk by allocating investments among various financial instruments, industries, and other categories. It aims to maximize return by investing in different areas that would each react differently to the same event. Therefore, the term "diversification risk" contradicts the established principles of risk management and diversification.

**C is incorrect.** It affects all investments to some degree. The only way to protect against systematic risk is through hedging strategies or by investing in assets that are negatively correlated with the market.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (c): Explain systematic and nonsystematic risk, including why an investor should not expect to receive additional return for bearing nonsystematic risk.***

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Q.1335 Which of the following is *least likely* an assumption of the capital pricing model?

A. Investors require higher returns with higher risks.

B. Investors are subject to taxes and transaction costs.

C. All investors have the same one-period time horizon.

The correct answer is **B.**

CAPM assumes there are no taxes and no transaction costs.
Assumptions of the model include:

- There are no transaction costs
- There are no taxes
- Assets are infinitely divisible
- Unlimited short-selling is permissible
- All assets are marketable/liquid
- Investors are price takers whose individual buy and sell transactions have no effect on the price
- Investors' utility functions are based solely on expected portfolio return and risk
- The only concern among investors is the risk and return over a single period and this single period is the same for all investors

**A is incorrect.** The assumption that investors require higher returns for taking on higher risks is a core principle of the CAPM. The model explicitly incorporates this idea through the concept of the security market line (SML), which plots the expected return of a security or portfolio against its beta with the market. The beta measures the sensitivity of the security's returns to market returns, serving as a proxy for its systematic risk. According to CAPM, the expected return on a security is equal to the risk-free rate plus the security's beta times the market risk premium (the difference between the market's expected return and the risk-free rate). This relationship directly links higher risk (as measured by beta) with the expectation of higher returns, aligning perfectly with the assumption in question.

**C is incorrect.** The assumption that all investors have the same one-period time horizon is another foundational aspect of CAPM. This assumption simplifies the model by ensuring that all

investors are making decisions based on the same timeframe, which facilitates the derivation of a unified expected return for each asset that applies to all investors. By assuming a single-period investment horizon, CAPM can focus on the relationship between risk and return without the added complexity of varying investment durations and the timing of cash flows. This assumption is critical for the model's theoretical underpinnings, even though it may not fully capture the diverse investment horizons present in the real world.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.1337 Which of the following uses systematic risk on the X-axis?

A. Security market line

B. Capital market line

C. Capital allocation line

The correct answer is **A.**

The SML uses the Beta (or systematic risk) on the X-axis while the CML and the CAL use standard deviation on the X-axis.
**B is incorrect.** The Capital Market Line (CML) represents portfolios that optimally combine risk and return. It is plotted using the standard deviation of portfolio returns, which measures total risk (both systematic and unsystematic), on the X-axis, not systematic risk. The CML emanates from the risk-free rate and touches the efficient frontier at the market portfolio, indicating the highest Sharpe ratio or the best risk-return combination available to investors. The use of total risk rather than systematic risk differentiates the CML from the SML.

**C is incorrect.** The Capital Allocation Line (CAL) represents the risk-return trade-off of a particular portfolio and includes all possible combinations of risk-free assets and a risky portfolio. Like the CML, the CAL uses the standard deviation of portfolio returns on the X-axis as a measure of total risk. The slope of the CAL indicates the risk premium per unit of total risk, which varies depending on the specific risky portfolio chosen. The CAL is personalized for individual investors based on their risk preferences and the specific risky assets they include in their portfolio, contrasting with the SML's focus on systematic risk and the market as a whole.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (h): Describe and demonstrate applications of the CAPM and the SML.***

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Q.1339 The standard deviation of an asset's return is 10%, and the standard deviation of markets return is 14%. If the correlation of returns with the market index is 0.7, then the beta of the asset is *closest to*:

A. 0.5.

B. 0.1.

C. 1.8.

The correct answer is **A.**

$$\text{Assets beta} = \text{Correlation of markets return} \times \left(\frac{\text{Standard deviation of the asset}}{\text{Standard deviation of market returns}}\right)$$

$$\text{Assets beta} = 0.7 \times \frac{10\%}{14\%} = 0.5$$

**B is incorrect.** A beta of 0.1 would imply an extremely low level of volatility in relation to the market, which does not align with the given correlation and standard deviations. Such a low beta would suggest that the asset's returns are almost entirely unaffected by market movements, which is not supported by the given data.
**C is incorrect.** A beta of 1.8 would indicate a high level of volatility relative to the market, suggesting that the asset's returns are much more sensitive to market movements than the given data supports. A beta significantly greater than 1 would imply that the asset is expected to outperform the market in rising markets and underperform in falling markets to a much greater extent than the calculated beta of 0.5 indicates.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (e): Calculate and interpret beta.***

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Q.1340 The expected return of a portfolio is 17% and the return on risk-free assets is 8%. The beta of the portfolio is 1.2, and the standard deviation of the portfolio is 5.5%. Assuming that an investor invests 115% of his savings in this portfolio, his expected return is *closest to*:

A. 18.35%.

B. 19.55%.

C. 12.5%.

The correct answer is **A.**

The formula for the expected return in this scenario is given by:

$$E_r = w_f R_f + w_m E[r_m]$$

Since the weight of the market portfolio is more than 100%, the investor is borrowing 15% of funds at the risk-free rate and investing 115% in the market portfolio.

$$E_r = (-15\%)(8\%) + (115\%)(17\%) = 18.35\%$$

**B is incorrect.** The option suggesting 19.55% as the expected return misunderstands the impact of leveraging the investment. While the investor is indeed investing more than 100% of his savings in the portfolio, the calculation must account for the cost of borrowing at the risk-free rate.
**C is incorrect.** The option suggesting 12.5% as the expected return significantly underestimates the impact of leveraging the investment.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (g): Calculate and interpret the expected return of an asset using the CAPM.***

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Q.1341 Which of the following return generating models uses macroeconomic indicators such as GDP growth, inflation along with fundamental factors like earnings, and earnings growth?

A. Market model

B. Multifactor model

C. Revenue model

The correct answer is **B.**

The multifactor model uses macroeconomic indicators such as GDP growth, inflation along with fundamental factors like earnings, earnings growth, etc.
**A is incorrect.** The market model primarily focuses on the relationship between the returns of an individual asset and the returns of the market as a whole. It typically uses the market index as the sole explanatory variable, ignoring the multifaceted influences of macroeconomic indicators and fundamental factors. While the market model can be useful for understanding how assets move in relation to the market, it does not account for the broader range of variables that the multifactor model incorporates, making it less comprehensive in predicting asset returns based on economic and company-specific factors.

**C is incorrect.** The revenue model, while important in financial analysis, primarily focuses on predicting a company's future revenues based on various factors such as market demand, pricing strategies, and competitive environment. It does not directly incorporate macroeconomic indicators or a broad set of fundamental factors to predict asset returns. Unlike the multifactor model, the revenue model is more narrowly focused on forecasting a specific aspect of a company's financial performance rather than offering a comprehensive framework for understanding and predicting overall asset returns in the context of both the economic environment and company-specific factors.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (d): Explain return generating models (including the market model) and their uses.***

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Q.1342 Kate Williams is a portfolio risk analyst for Hampton Funds. She is assigned to calculate the beta of Lion Inc. shares. What is its beta if the standard deviation of market returns is 19% and the covariance of Lions returns with the market return is 0.163?

A. 0.85

B. 4.51

C. 0.0451

The correct answer is **B.**

$$\text{Beta} = \frac{\text{Covariance of Asset's return with market return}}{\text{Variance of market returns}}$$

$$\text{Beta} = \frac{0.163}{0.0361} = 4.51$$

**A is incorrect.** A beta of 0.85 would suggest a lower volatility relative to the market, which does not align with the given covariance and variance values. A beta less than 1 indicates that the asset is less volatile than the market, but the calculation based on the provided data results in a beta significantly higher than 1, indicating a higher volatility compared to the market.
**C is incorrect.** A beta of 0.0451 significantly underestimates the stock's volatility in relation to the market.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (e): Calculate and interpret beta.***

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Q.1343 What is the expected return of a stock if the expected market return is 11%, the risk-free rate is 9%, and the stock's beta is 0.91?

A. 11%

B. 19.91%

C. 10.82%

The correct answer is **C.**

According to CAPM:

$$\text{Expected return of stock} = \text{Risk-free rate} + \text{beta}\,(\text{Market risk} - \text{Risk-free rate})$$

$$E_r = 9\% + 0.91(11\% - 9\%) = 10.82\%$$

**A is incorrect.** This option suggests that the expected return of the stock is the same as the expected market return, which is 11%. This ignores the influence of the stock's beta and the risk-free rate on its expected return. The CAPM formula clearly shows that the expected return on a stock is a function of both the market return and the stock's specific risk (as measured by beta) in relation to the market, as well as the risk-free rate. Simply equating the stock's expected return with the market return disregards these critical components.
**B is incorrect.** This option suggests an expected return of 19.91%, which significantly overestimates the stock's return. This calculation does not seem to follow the CAPM formula or any known financial principle.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (g): Calculate and interpret the expected return of an asset using the CAPM/***

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Q.1345 What is the covariance of an asset's returns with the market if the beta of the asset is 1.7 and the variance of market returns is 20%?

A. 0.34

B. 0.85

C. 0.12

The correct answer is **A.**

$$\text{Covariance of asset returns with the market} = \text{Beta} \times \text{Variance of market returns}$$

$$\text{Covariance of asset returns with the market} = 1.7 \times 0.20 = 0.34$$

**B is incorrect.** It suggests a covariance of 0.85, which does not align with the calculated value based on the given parameters. To arrive at a covariance of 0.85, either the beta or the variance of the market returns would have to be different from the values provided. This option does not accurately reflect the relationship between the asset's beta, the variance of market returns, and their resulting covariance.
**C is incorrect.** It proposes a covariance of 0.12, which is significantly lower than the calculated value of 0.34. A covariance of 0.12 would suggest a much weaker relationship between the asset's returns and the market returns than what is indicated by the given beta of 1.7 and market variance of 0.20.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (e): Calculate and interpret beta.***

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Q.1346 What is the market risk premium if the expected return on the market is 13%, the average stock's beta is 1, and the risk-free rate is 8%?

A. 9%

B. 13%

C. 5%

The correct answer is **C.**

$$\text{Market risk premium} = \text{Expected return of market} - \text{Risk-free rate of return}$$

$$\text{Market risk premium} = 13\% - 8\% = 5\%$$

**A is incorrect.** It suggests a market risk premium of 9%, which does not align with the given values. The calculation of the market risk premium does not involve adding the risk-free rate to the expected return on the market or any other method that would result in a 9% premium.
**B is incorrect.** It confuses the expected return on the market with the market risk premium. The expected return on the market is indeed 13%, but this is not the market risk premium. The market risk premium is the excess return over the risk-free rate that investors require as compensation for the additional risk of investing in the market as a whole. It is calculated by subtracting the risk-free rate from the expected market return, resulting in a 5% premium, not the full 13% expected market return.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.1351 A stock is trading at $35 and its expected price next year is $47. Determine whether the stock is undervalued or overvalued if the market risk premium is 8%, the risk-free rate is 5% and the Beta of the stock is 1.8.

A. Undervalued

B. Overvalued

C. Properly valued

The correct answer is **A.**

The stock is undervalued because the forecasted return is greater than the required rate of return. The forecasted return is calculated as follows:

$$\text{Forecasted Return} = \text{Expected Price Next Year} - \text{Current Price}\text{Current Price}$$

$$\text{Forecasted Return} = \frac{47 - 35}{35} = 34.3\%$$

The required rate of return can be calculated using the Capital Asset Pricing Model (CAPM), which is given by:

$$\text{Required Rate of Return} = \text{Risk-Free Rate} + \beta(\text{Market Risk Premium})$$

$$\text{Required Rate of Return} = 5\% + 1.8(8\%) = 5\% + 14.4\% = 19.4\%$$

**B is incorrect.** This option incorrectly suggests that the stock is overvalued, which would imply that the forecasted return is less than the required rate of return. However, as calculated, the forecasted return is significantly higher than the required rate of return, indicating that the stock is undervalued, not overvalued.
**C is incorrect.** Suggesting that the stock is properly valued would mean that the forecasted return equals the required rate of return. In this case, the forecasted return significantly exceeds the required rate of return, indicating that the stock is undervalued rather than being properly valued.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.1352 The standard deviation of a portfolio is 15%. If the portfolio's return is 22%, and the risk-free return is 6%, then the Sharpe ratio of the portfolio is *closest to*:

A. 0.91.

B. 1.07.

C. 1.46.

The correct answer is **B.**

$$\text{Sharpe ratio} = \frac{(\text{Portfolio return} - \text{Risk-free return})}{\text{Standard deviation of portfolio}}$$

$$\text{Sharpe ratio} = \frac{(22\% - 6\%)}{15\%} = 1.07$$

**A is incorrect.** A Sharpe ratio of 0.91 would suggest a different set of inputs, possibly a lower portfolio return or a higher standard deviation. It does not accurately reflect the given scenario where the portfolio return is 22%, the risk-free return is 6%, and the standard deviation is 15%.
**C is incorrect.** A Sharpe ratio of 1.46 would imply a significantly higher excess return (portfolio return minus risk-free return) relative to the portfolio's risk (standard deviation) than what is provided by the given data. This would require either a higher portfolio return, a lower risk-free rate, or a lower standard deviation than those specified in the question.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (i): Calculate and interpret the Sharpe ratio, Treynor ratio, M2, and Jensen's alpha.***

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Q.1353 Which of the following measures excess return per unit of total risk?

A. Jensen's alpha

B. Treynor ratio

C. Sharpe ratio

The correct answer is **C.**

The Sharpe ratio is defined as the difference between the returns of the investment and the risk-free return, divided by the standard deviation of the investment (i.e., its volatility). Mathematically:

$$\text{Sharpe ratio} = \frac{R_p - R_f}{\sigma_p}$$

It represents the additional amount of return that an investor receives per unit of increase in risk.
On the contrary, Jensen's alpha and the Treynor ratio use beta (a measure of systematic risk, not total risk) instead of the standard deviation.

**A is incorrect.** Jensen's alpha measures the excess return of a portfolio over the expected return predicted by the Capital Asset Pricing Model (CAPM). While it does account for the performance of an investment relative to its expected risk (as defined by its beta), it does not measure the excess return per unit of total risk. Instead, Jensen's alpha focuses on systematic risk and the portfolio's ability to outperform based on that risk factor alone, without considering the total risk (both systematic and unsystematic) of the portfolio.

**B is incorrect.** The Treynor ratio, similar to Jensen's alpha, focuses on the return of an investment relative to its systematic risk, as measured by beta. The formula for the Treynor ratio is:

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (i): Calculate and interpret the Sharpe ratio, Treynor ratio, M2, and Jensen's alpha.***

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Q.1354 Which of the following is the appropriate action for a stock which is currently trading at $50 with an expected price next year of $56 and a required rate of return of 10%?

A. Buy the stock because it is undervalued.

B. Buy the stock because it is overvalued.

C. Sell the stock because it is undervalued.

The correct answer is **A.**

The correct action for undervalued stocks is to buy them.

$$\text{Expected Return} = \frac{\text{Expected Price Next Year} - \text{Current Price}}{\text{Current Price}}$$

Substituting the given values:

$$\text{Expected Return} = \frac{56 - 50}{50} = 0.12 \text{ or } 12\%$$

The expected return of 12% is higher than the required rate of return of 10%. This indicates that the stock is undervalued, as it is expected to provide a higher return than what is required.
**B is incorrect.** It suggests buying the stock on the premise that it is overvalued, which contradicts the calculation and analysis. An overvalued stock would have an expected return lower than the required rate of return, suggesting that the stock is priced higher than its perceived value. This is not the case here, as the expected return is higher than the required rate of return, indicating undervaluation rather than overvaluation.

**C is incorrect.** It suggests selling the stock due to it being undervalued, which is a contradictory action. Selling an undervalued stock would not be the appropriate action based on the principle of seeking to maximize returns on investments.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (g): Calculate and interpret the expected return of an asset using the CAPM.***

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Q.1355 The 10-year US Treasury rate is 5% and the return on the S&P 500 index is 10%. If the beta of Orange is 1.2, the expected return on shares of Orange Inc. is *closest to*:

A. 11%.

B. 15%.

C. 17%.

The correct answer is **A.**

According to CAPM,

$$\text{Expected return of stock} = \text{Risk-free rate} + \text{Beta}(\text{Market risk} - \text{Risk-free rate})$$

$$E_r = 5\% + 1.2(10\% - 5\%) = 11\%$$

10-year US Treasury bonds are considered the risk-free rate and the S&P 500 return is considered the market return.
**B is incorrect.** An expected return of 15% would imply a different set of inputs into the CAPM formula, specifically a higher market risk premium or a higher beta, neither of which is provided in the question. This option does not accurately reflect the calculation based on the given data.

**C is incorrect.** An expected return of 17% significantly overestimates the return based on the given inputs. This would require either a much higher market return or a significantly higher beta value for Orange Inc., which is not supported by the information provided. This option does not follow the CAPM calculation as specified in the question.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (g): Calculate and interpret the expected return of an asset using the CAPM.***

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Q.1356 Which of the following statements is appropriate regarding the plot of undervalued stocks on the security market line?

A. Undervalued stocks plot above the SML.

B. Undervalued stocks plot under the SML.

C. Stocks always plot on the SML.

The correct answer is **A.**

An undervalued stock will plot above the security market line. In other words, if the plot is above the line, it indicates that the stock is underpriced.
**B is incorrect.** The actual return is less than what would be expected for its level of risk, making it a less attractive investment. Investors seek higher returns for higher risk, and a stock below the SML does not meet this criterion, as it offers lower returns for its risk level.

**C is incorrect.** This option suggests that all stocks always plot on the SML, which is not accurate. While the SML represents the market's expectation of return for a given level of risk (beta), individual securities can and do plot above or below the SML. Securities plotting on the SML are considered fairly valued, as their expected returns align with the market's required return for their level of risk. However, in reality, securities often deviate from this line due to various factors, including market inefficiencies, leading to undervalued or overvalued stocks.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.2875 An unleveraged portfolio is constructed of two assets, including a risky asset with a standard deviation of 18% and a risk-free asset. If the weight of the risk-free asset in the portfolio is 35%, then the standard deviation of the portfolio is *closest to*:

A. 18%.

B. 6.3%.

C. 11.7%.

The correct answer is **C.**

A risk-free asset has a standard deviation of zero.

$$\text{Standard deviation of the portfolio} = \text{Weight of risky asset} \times \text{Standard deviation of risky asset}$$

$$\text{Standard deviation of the portfolio} = 0.65 \times 18\% = 11.7\%$$

**A is incorrect.** This option suggests that the standard deviation of the portfolio is the same as the standard deviation of the risky asset (18%). This interpretation ignores the impact of including a risk-free asset in the portfolio. The presence of a risk-free asset, which has a 0% standard deviation, reduces the overall risk of the portfolio compared to holding only the risky asset.
**B is incorrect.** The calculation that might lead to a 6.3% standard deviation seems to misunderstand the weights or the calculation method. A standard deviation of 6.3% would imply a much higher weight on the risk-free asset than 35% or a misunderstanding of how to combine the standard deviations of portfolio components.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.2876 Which of the following is the most appropriate explanation of the Capital Allocation Line (CAL)?

A. The Capital Allocation Line presents the investor's risk tolerance given risky assets and risk-free assets.

B. The Capital Allocation Line demonstrates the set of portfolios within the investor's budget.

C. The Capital Allocation Line presents the possible risk and return combinations of risky assets and risk-free assets.

The correct answer is **C.**

The Capital Allocation Line (CAL) is a graph created by investors to measure the risk of risky and risk-free assets. The graph displays the return to be made by taking on a certain level of risk. Its slope is known as the "reward-to-variability ratio."
**A is incorrect.** The CAL itself does not present the investor's risk tolerance but rather shows all possible combinations of risk and return that an investor can achieve by mixing a risk-free asset with a portfolio of risky assets. The investor's risk tolerance is reflected in the choice of a specific point on the CAL, not the line itself.

**B is incorrect.** The statement that the Capital Allocation Line demonstrates the set of portfolios within the investor's budget is misleading. The CAL does not directly relate to the investor's budget but to the risk-return trade-off of combining a risk-free asset with a portfolio of risky assets. While an investor's budget or initial investment capital might limit the amount they can invest, the CAL conceptually represents the efficiency frontier of risk and return combinations achievable through diversification and the inclusion of a risk-free asset. It is more about optimizing returns for a given level of risk rather than being constrained by a budget.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.2878 A portfolio manager is constructing a portfolio composed of two assets. Asset A is a risky asset with an expected return of 14% and a standard deviation of 22%, and asset B is a risk-free asset with an expected return of 9%. If the portfolio manager increases the weight of the risky asset to 130%, then the expected return of the portfolio is *closest to*:

A. 18.2%.

B. 15.5%.

C. 16.7%.

The correct answer is **B.**

Expected return of the portfolio = (Weight of Asset A × Return of Asset A) + (Weight of Asset B × I

$$\text{Expected return of the portfolio} = (1.3 \times 14\%) + (-0.3 \times 9\%) = 15.5\%$$

**A is incorrect.** The calculation of 18.2% does not correctly apply the weights of the assets in the portfolio. It seems to misunderstand the impact of leveraging (borrowing at the risk-free rate to invest more in the risky asset) on the expected return of the portfolio.
**C is incorrect.** The calculation leading to 16.7% does not align with the given weights of the assets in the portfolio. This option might result from a miscalculation or misunderstanding of how the weights of the assets influence the overall expected return of the portfolio.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.2879 Amy Stevenson, CFA, has recently emigrated to Germany. She believes the German stock markets are information efficient. Which of the following is *least likely* going to be her investing strategy?

A. Passive investing

B. Investing in index funds

C. Active investing

The correct answer is **C.**

Since Amy believes the markets are information efficient i.e. all the information is already reflected in the market prices, then active investing is going to perform worse than passive investing after commissions.
**A is incorrect.** Passive investing is a strategy that is well-aligned with the belief in market efficiency. This approach involves holding a diversified portfolio of stocks without attempting to outguess the market. Passive investors typically invest in index funds or ETFs that track a market index, relying on the market's overall growth over time rather than trying to pick individual winners. Since Amy believes in market efficiency, passive investing would be a logical approach for her, as it is based on the premise that it is not possible to consistently outperform the market through active stock selection or timing.

**B is incorrect.** Investing in index funds is another strategy that aligns with the belief in market efficiency. Index funds aim to replicate the performance of a specific market index by holding all or a representative sample of the securities in the index. This strategy benefits from the market's overall returns over time, minimizing the costs and risks associated with attempting to outperform the market through active management. Since Amy believes that the German stock markets are information efficient, investing in index funds would be a suitable strategy for her, as it acknowledges that all available information is already reflected in stock prices, making it unlikely for active strategies to consistently achieve superior returns.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.2880 Which of the following statements is *least likely* accurate?

A. When assets are perfectly correlated, an investor can diversify its risk.

B. Firm-specific risk can be decreased with diversification.

C. The risk that cannot be diversified is called systematic risk.

The correct answer is **A.**

Only assets that are not perfectly correlated can diversify a portfolio. Statements B) and C) are true.
**B is incorrect.** It is not correlated with market risk. By investing in a variety of assets, the impact of any one firm's performance on the portfolio's overall performance is minimized. This is because the negative performance of one or a few securities can be offset by the positive performance of others in the portfolio, thereby reducing the overall impact of firm-specific risks.

**C is incorrect.** The statement that the risk that cannot be diversified is called systematic risk is true. Systematic risk, also known as market risk, is the risk inherent to the entire market or market segment. This type of risk is caused by factors that affect all companies, such as economic, political, and social changes, and cannot be eliminated through diversification. No matter how diversified a portfolio is, it cannot escape the effects of systemic factors that impact the entire market. This is why systematic risk remains a critical consideration for all investors, as it represents the inherent risk associated with market-wide fluctuations that cannot be mitigated simply through diversification.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.2881 A manager values a project that is to be financed with 58% equity and 42% debt at the cost of 8.4%. Suppose the market return is 6.5%, the risk-free rate is 5%, and the beta is 0.8, then the expected return of equity is *closest to*:

A. 9.6%.

B. 6.20%.

C. 10.5%.

The correct answer is **B.**

The question is asking to estimate the expected return of equity calculated as follows:

$$E(R_i) = R_f + \beta_i[E(R_m) - R_f] = 5\% + 0.8(6.5\% - 5\%) = 6.20\%$$

**A is incorrect.** The option suggesting 9.6% as the expected return of equity does not align with the calculation based on the CAPM formula. This figure likely overlooks the specific values provided for the risk-free rate, market return, and beta, leading to an inaccurate result.
**C is incorrect.** The option indicating 10.5% as the expected return of equity significantly overestimates the impact of the market risk premium on the equity's return.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (g): Calculate and interpret the expected return of an asset using the CAPM.***

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Q.2883 The expected return of the Karachi Stock exchange is 17%, and the rate on Pakistan's risk-free bonds is 7.5%. Suppose the beta of Bata Corporation shares is 0.75, then the required rate of return on Bata Corporation's shares is *closest to*:

A. 14.63%.

B. 20.25%.

C. 16.73%.

The correct answer is **A.**

The required rate of return on shares is calculated using the Capital Asset Pricing Model (CAPM).

$$\text{Required rate of return} = \text{Risk-free rate} + \text{Beta (Market Return - Risk-free rate)}$$

$$\text{Required rate of return} = 7.5\% + 0.75(17\% - 7.5\%) = 14.63\%$$

**B is incorrect.** 20.25% significantly overestimates the required rate of return. This figure does not accurately reflect the calculation based on the given beta of 0.75 and the difference between the market return and the risk-free rate. It suggests a much higher level of risk or expected market return than what is provided, which is not supported by the given data.
**C is incorrect.** 16.73% also does not accurately reflect the calculation based on the CAPM formula.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (g): Calculate and interpret the expected return of an asset using the CAPM.***

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Q.2885 Which of the following portfolios is/are most appropriately priced?
I. A portfolio with an estimated return above the securities market line (SML).
II. A portfolio with an estimated return plotted on the SML.
III. A portfolio with an estimated return below the SML.

A. Portfolios I & II

B. Portfolio II

C. Portfolios II & III

The correct answer is **B.**

The portfolio is underpriced if the portfolio's estimated return is above the SML. Conversely, a portfolio with an estimated return below the SML is overpriced.
The portfolio with an estimated return plotted on the SML is properly priced.

**A is incorrect.** It offers a higher return for its level of risk than what the market would typically offer (as per the SML). Investors seeking to maximize their returns for a given level of risk would find such a portfolio more attractive, as it provides a higher expected return than predicted by its beta. This discrepancy indicates that the market has not fully incorporated the asset's information into its price, making it underpriced.

**C is incorrect.** This option includes portfolios with an estimated return below the SML, suggesting they are also appropriately priced. However, a portfolio with an estimated return below the SML is considered overpriced. It offers a lower return for its level of risk than the market average. This situation implies that the investor is not being compensated adequately for the risk undertaken, as the expected return does not meet the risk-return trade-off depicted by the SML. Such portfolios are less attractive to risk-averse investors, as they can find better returns for the same level of risk elsewhere on the SML.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.2886 Which of the following measures of risk-adjust returns is *least likely* to use beta?

A. Treynor measure

B. Jensen's alpha

C. M-squared measure

The correct answer is **C.**

M-squared and Sharpe ratio measures of risk-adjust returns use standard deviation or total risk. Treynor and Jensen's alpha use beta or systematic risk.
**A is incorrect.** The Treynor measure specifically uses beta to evaluate the risk-adjusted return of a portfolio. It divides the excess return of the portfolio over the risk-free rate by the portfolio's beta. The Treynor measure focuses on systematic risk, which is the risk inherent to the entire market or market segment. Beta is a measure of how much a portfolio's returns are expected to respond to changes in the overall market returns. Therefore, the Treynor measure is directly concerned with assessing how well a portfolio compensates its investors, given the level of systematic risk it is exposed to.

**B is incorrect.** Jensen's alpha also uses beta in its calculation. It measures the average return on a portfolio over and above that predicted by the Capital Asset Pricing Model (CAPM), given the portfolio's beta and the average market return. This metric is a way to determine if a portfolio is outperforming the market-adjusted for its level of systematic risk. Jensen's alpha takes into account the portfolio's sensitivity to market movements, as represented by its beta, to isolate the portion of returns attributable to the portfolio manager's active decision-making. It is a measure of the portfolio's performance on a risk-adjusted basis, specifically focusing on systematic risk.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (i): Calculate and interpret the Sharpe ratio, Treynor ratio, M2, and Jensen's alpha.***

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Q.2887 If the covariance between the market portfolio and Arthemisca's shares is 0.46, the standard deviation of Arthemisca's shares is 0.9, and the standard deviation of market returns is 0.7, then Arthemisca's shares beta is *closest to*:

A. 0.94.

B. 0.57.

C. 1.3.

The correct answer is **A.**

$$\text{Beta} = \frac{\text{Covariance between stock and market}}{\text{Market variance}}$$

$$\text{Beta} = \frac{0.46}{0.7^2} = 0.938$$

**B is incorrect.** A beta of 0.57 would suggest that Arthemisca's shares are significantly less volatile than the market, which does not align with the given covariance and standard deviations. A beta value of 0.57 would imply a much lower covariance or a much higher market variance than provided.
**C is incorrect.** A beta of 1.3 would indicate that Arthemisca's shares are more volatile than the market. This conclusion does not match the calculation based on the given covariance and market variance. A beta of 1.3 would require a higher covariance or a lower market variance than the values provided in the question.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (e): Calculate and interpret beta.***

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Q.2888 A portfolio manager is constructing a portfolio composed of two assets. Asset A is a risky asset with an expected return of 14% and a standard deviation of 22% whereas asset B is a risk-free asset with a return of 9%. Suppose the portfolio manager increases the weight of the risky portfolio to 130%, then the risk of the portfolio is *closest to*:

A. 28.6%.

B. 22%.

C. 53.4%.

The correct answer is **A.**

The risk or the standard deviation of the portfolio = Weight of risky asset × Standard deviation of

$$\text{The risk or the standard deviation of the portfolio} = 1.3 \times 22\% = 28.6\%$$

**B is incorrect.** It suggests that the risk of the portfolio remains the same as the standard deviation of the risky asset alone, at 22%. This option fails to account for the increased weight of the risky asset in the portfolio, which amplifies the overall risk. The risk of a portfolio that includes a leveraged position in a risky asset cannot be the same as the risk of the risky asset itself when its weight exceeds 100%.
**C is incorrect.** It significantly overestimates the risk of the portfolio. A risk of 53.4% would suggest an even higher level of leverage or a combination of risky assets with extremely high volatility, which is not the case presented here. The calculation for option C does not align with the given scenario where the portfolio's risk is determined solely by the leveraged investment in a single risky asset with a known standard deviation.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (f): Explain the capital asset pricing model (CAPM), including its assumptions, and the security market line (SML).***

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Q.3435 The Sharpe ratio is best described as:

A. The excess return generated per unit of total risk.

B. The excess return generated per unit of systematic risk.

C. The excess return generated per unit of unsystematic risk.

The correct answer is **A.**

The Sharpe ratio measures excess return per unit of total risk, because standard deviation (the denominator) represents total risk.
**B is incorrect.** This option describes the excess return generated per unit of systematic risk, which is more accurately associated with the Beta coefficient or the Treynor ratio, not the Sharpe ratio. Systematic risk, also known as market risk, is the risk inherent to the entire market or market segment. The Sharpe ratio, however, uses the standard deviation of the portfolio's excess return in its calculation, which includes both systematic and unsystematic risk, not just systematic risk.

**C is incorrect.** This option suggests that the Sharpe ratio measures the excess return generated per unit of unsystematic risk. Unsystematic risk, also known as specific risk, is the risk that is unique to a particular company or industry. However, the Sharpe ratio uses the standard deviation of the portfolio's excess return as its denominator, which encompasses both systematic and unsystematic risk.

***CFA Level I, Portfolio Management, Learning Module 2: Portfolio Risk & Return: Part II. LOS (i): Calculate and interpret the Sharpe ratio, Treynor ratio, M2, and Jensen's alpha.***

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