

**LO.a: Classify and describe basic forms of real estate investments.**

1. Which of the following is *most likely* correct for investment in REIT shares? Investment in shares of REITs, compared with direct investment in property:
  - A. involves larger outlay due to indivisibility of real estate property.
  - B. offers liquidity and diversification.
  - C. requires expertise in property management.

**LO.b: Describe the characteristics, the classification, and basic segments of real estate.**

2. Which of the following is *not* a characteristic of real estate investment?
  - A. Heterogeneity and fixed location.
  - B. High unit value.
  - C. Low transaction costs.
3. Residential properties *most likely* include:
  - A. multi-family properties.
  - B. farmlands.
  - C. timberland.
4. Commercial real estate properties *least likely* include:
  - A. industrial and warehouse properties.
  - B. office buildings.
  - C. timberland.

**LO.c: Explain the role in a portfolio, economic value determinants, investment characteristics, and principal risks of private real estate.**

5. The *least likely* reasons for including real estate equity investments in a portfolio of stocks and bonds is:
  - A. providing a hedge against inflation.
  - B. risk reduction because of diversification.
  - C. lower after-tax returns on real estate investments.
6. A person investing in commercial real estate should be *least* concerned about risks due to:
  - A. changes in business conditions.
  - B. inflation in strong economic conditions.
  - C. leverage.

**LO.d: Describe commercial property types, including their distinctive investment characteristics.**

7. The demand for which type of commercial real estate is *most likely* dependent upon consumer spending:
  - A. retail.
  - B. industrial and warehouse.

C. office.

8. If the gross rent is \$25 per square foot and operating expenses are \$10 per square foot, the net rent for an office building (per square foot) is equivalent to:
- A. \$15.
  - B. \$35.
  - C. \$25.

**LO.e: Compare the income, cost, and sales comparison approaches to valuing real estate properties.**

9. The income approach gives an estimate of the property value based on the:
- A. cost of buying land and constructing a comparable property.
  - B. present value of the expected future income from the property and its resale price at the end of holding period.
  - C. sales price of similar properties in the current market.
10. The cost approach gives an estimate of the property value based on the:
- A. price an investor would pay based on the expected rate of return from the investment.
  - B. price of similar properties with adjustments to reflect the differences from the subject property.
  - C. cost of land and construction of new property on site with the same utility as the subject property.

**LO.f: Estimate and interpret the inputs (for example, net operating income, capitalization rate, and discount rate) to the direct capitalization and discounted cash flow valuation methods.**

11. The direct capitalization method is an income approach which gives an estimate of property value based on the:
- A. first-year net operating income using a growth implicit capitalization rate.
  - B. present value of future net operating income discounted at a discount rate.
  - C. ratio of sale price to gross income from property in the first year after sale.
12. The net operating income (NOI) of a property:
- A. is similar to accounting net income.
  - B. is a measure of the income after deducting operating expenses but before deducting financing costs and taxes.
  - C. is known as an after-tax leveraged measure of income.
13. A 30-unit apartment building rents for \$1,000 per unit per month with 10% vacancy. Operating expenses are 45% of effective gross income, and management costs are 10% of effective gross income. Other income averages \$450 per rented unit per year. The NOI is *closest* to:
- A. \$151,000.
  - B. \$187,000.

- C. \$155,000.
14. The capitalization or cap rate given that income and value are growing at a constant compound growth rate, is defined as:
- discount rate plus growth rate.
  - discount rate minus growth rate.
  - required total return.
15. If income and value of a property are growing at a constant growth rate, the discount rate is 7.00% and the cap rate is 5.00%, growth rate is *closest* to:
- 5.00%.
  - 2.00%.
  - 1.25%.
16. If the sales price for a comparable property is a good reflection of the value of the subject property, then cap rate is given as:
- NOI divided by the sale price.
  - Sale price divided by the NOI.
  - Rent divided by ARY.

**LO.g: Calculate the value of a property using the direct capitalization and discounted cash flow valuation methods.**

17. A property has an NOI of \$300,000 for the first year, and a capitalization rate of 7% on comparable properties. The value of the property in millions is *closest* to:
- \$4.3.
  - \$0.3.
  - \$5.0.
18. Following tables gives the future expected NOI in millions and DCF assumptions of an office building in a town's business center:

	Year 1	Year 2	Year 3	Year 4	Year 5
NOI	\$2.75	\$2.83	\$2.92	\$3.01	\$3.10

**DCF Assumptions for the office building**

Investment holding period	4 years
Going-in Cap Rate	5.00%
Terminal Cap Rate	5.75%
Discount Rate	7.00%
Income/Value Growth Rate	Constant

Using the discounted cash flow method, the value of the office building (in million dollars) is *closest* to:

- 48.
- 12.
- 51.

**LO.h: Compare the direct capitalization and discounted cash flow valuation methods.**

19. Estimating a property's value using the direct capitalization involves applying a capitalization rate to the projected:
- NOI for each year until the sale of the property.
  - first-year NOI.
  - NOI in the terminal year.
20. The DCF method as opposed to the direct capitalization method, discounts the forecasted:
- first-year NOI with the capitalization rate to find the property value.
  - resale price with the going-in cap rate to find the property value.
  - income at a discount rate and the expected resale price at a terminal cap rate to find the property value.
21. If the holding period of a retail property is 10 years, the resale price is estimated by:
- applying a terminal cap rate to the projected Year 11 NOI.
  - discounting the Year 11 NOI by a discount rate.
  - applying a cap rate to the projected Year 10 NOI.
22. In the direct capitalization approach, the growth in the future NOI is:
- implicit in the cap rate.
  - implicit in the discount rate.
  - explicit in the discount rate

**LO.i: Calculate the value of a property using the cost and sales comparison approaches.**

23. Sharmeen Chaudhry works for SIA Investments and has identified an office building for investment. The following table gives some information related to the building.

Estimated Land value	\$4,000,000
Replacement costs: Building costs	\$10,000,000
Developer's profit	\$470,000
Curable physical depreciation	\$600,000
Total economic life	50 years
Effective age	10 years
Incurable physical depreciation	1,970,000
Functional obsolescence	\$1,500,000
Locational obsolescence	\$1,000,000
Economic obsolescence	\$1,000,000

The value of the office building (in million dollars) using the cost approach is *closest* to:

- 14.0
  - 8.4
  - 10.4
24. Sally Hun is a portfolio manager for Standard Insurance Company. She uses the following data to determine the value of a shopping center for investment purposes.

Variable	Subject	Comparable 1	Comparable 2	Comparable 3
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	Property			
Size (sq. feet)	5,000	3,500	4,000	6,000
Age (years)	5	1	5	10
Condition	Good	Good	Average	Good
Location	Prime	Prime	Secondary	Prime
Date of sale (months ago)		3	9	6
Sale price psf		\$1,750	\$1,000	\$1,250
Adjustments				
Age(years)		-10%	0%	12.5%
Condition		0%	10%	
Location		0%	20%	0%
Date of sale (months ago)		1.5%	4.5%	3.0%
Adjusted price psf		1,601.25		1,443.75
Average price psf				

Calculate the adjusted price in psf (per square foot) of Comparable 2 and using the sales comparison approach calculate the value of the shopping center.

- A. \$1,345psf; \$7,315,000.
- B. \$655psf; \$6,170,000.
- C. \$1,045psf; \$6,817,000.

**LO.j: Describe due diligence in private equity real estate investment.**

25. Ross Williams, a portfolio manager for United Pension Fund, is considering an investment in a multi-family building but is concerned that the building might have structural issues. Which due diligence item would be *most appropriate* to address his concerns regarding the multi-family building?

- A. Property survey.
- B. Review of service and maintenance agreement.
- C. Physical/engineering inspection.

26. The *least likely* reason for due diligence is:

- A. to lower the risk of acquiring a property with unexpected legal or physical problems.
- B. to protect the seller against a lower price or cancellation of the transaction by the buyer.
- C. to ascertain that there are no legal or unanticipated problems before lending funds on a property.

**LO.k: Discuss private equity real estate investment indices, including their construction and potential biases.**

27. The two types of real estate indices are:

- A. appraisal-based indices and transaction-based indices.
- B. momentum-based indices and performance-based indices.
- C. total return indices and current income indices.

28. Appraisal-based indices have appraisal lag which may:

- A. overestimate the volatility of real estate returns.
- B. underestimate the volatility of real estate returns.
- C. create a “noisy” effect on the index returns.

**LO.I: Explain the role in a portfolio, the major economic value determinants, investment characteristics, principal risks, and due diligence of private real estate debt investment.**

29. Which of the following is *least likely* a characteristic of private real estate debt investment?

Investors using debt financing for property will:

- A. expect a higher return on their equity investment.
- B. take a higher risk as opposed to investors who purchase property on an all-cash basis.
- C. face lower uncertainty of return, since a small decline in property value will not significantly alter the return.

**LO.m: Calculate and interpret financial ratios used to analyze and evaluate private real estate investments.**

30. A property has an appraised value of \$6 million and is expected to have NOI of \$450,000 in the first year. The property can be financed as an interest-only loan by Real Life Insurance Company at an 8% interest rate, if the loan-to-value does not exceed 75%. The loan amount, and the debt service coverage ratio (DSCR) are closest to:

- A. \$4.5 million; 1.20.
- B. \$4.5 million; 1.25.
- C. \$5.0 million; 1.20.

**Solutions**

1. B is correct. Investment in REITs allows real estate property to remain undivided but the ownership on the property to be divided. This results in relatively high liquidity. REITs also enable diversification due to purchase of ownership interests in multiple properties. A & C are correct regarding private ownership in real estate properties. Section 2.
2. C is correct. Investment in Real estate involves high transaction costs compared to investments in stocks and bonds. A & B are characteristics of real estate investment that differentiate it from other asset classes. Section 3.
3. A is correct. Residential properties include single-family houses and multi-family properties. Section 3.2.
4. C is correct. Timberland is a unique category of real estate. A & B are included in the category of commercial real estate properties. Section 3.2.
5. C is correct. Private real estate investments may receive a favorable tax treatment compared with other investments. Because of this, real estate investments may result in a *higher* after-tax return compared with after-tax return of other investments. A & B are motivations for investing in real estate. Section 4.
6. B is correct. Real estate investments offer some inflation protection in the form of rent increases and higher real estate value when inflation is high. A & C are risk factors linked to investing in commercial real estate. Section 4.1.
7. A is correct. Retail space demand largely depends upon trends in consumer spending. B is incorrect because industrial/warehouse demand is incumbent on economy and economic growth. C is incorrect because demand for office properties is driven by job growth. Section 4.3.3.
8. A is correct. In a gross lease the owner pays the operating expenses whereas a net lease requires the tenant to pay the operating expenses. Hence the net rent =  $\$25 - \$10 = \$15$  per square foot. Section 4.3.1.
9. B is correct. The income approach gives the value estimate as the present value of the expected future income from the property, including resale price at the end of the investment holding period. A gives the cost approach and C gives the sales comparison approach. Section 5.2.
10. C is correct. The cost approach gives the value based on the cost of land and construction of new property that has the same functionality as the appraised property. Section 5.2.
11. A is correct. The direct capitalization method capitalizes the current NOI at the growth implicit capitalization rate. B is incorrect because it's the DCF method and C is the gross income multiplier approach. Section 6.1.

12. B is correct. “NOI is a before-tax unleveraged measure of income.” A & C are incorrect. NOI of real estate property is similar to EBITDA in financial reports. Section 6.1.

13. A is correct. NOI is calculated as follows:

Rental income at full occupancy	$30 \times \$1,000 \times 12 = \$360,000$
Other income	$30 \times \$450 = 13,500$
<i>Potential gross income</i>	\$373,500
Less: Vacancy loss	$10\% \times \$373,500 = -37,350$
<i>Effective gross income</i>	\$336,150
Property management cost	$10\% \times 336,150 = -33,615$
Other operating expenses	$45\% \times 336,150 = -151,268$
<i>Net operating income</i>	\$151,267

Section 6.1.

14. B is correct. Cap rate = Discount rate – Growth rate. Section 6.2.1.

15. B is correct. Growth rate = Discount rate – Cap rate = 7.00% - 5.00% = 2.00%. Section 6.2.1.

16. A is correct. Cap rate = NOI/Sale price of comparable. Rent/ARY gives the market value. Section 6.2.2.

17. A is correct. Value = NOI/Cap rate = 300,000/0.07 = \$4,285,714. Section 6.2.

18. C is correct. Terminal Value = Year 5 NOI/terminal cap rate = 3.10/0.0575 = \$53.91 million. Using the financial calculator: CF1 = 2.75, CF2 = 2.83, CF3 = 2.92, CF4 = 3.01 + 53.91 = 56.92, I = 7, CPT NPV = 50.85 = \$51 million. Section 6.3.

19. B is correct. Direct capitalization applies a cap rate to the forecasted first-year NOI. Section 6.3.

20. C is correct. The DCF method is based on forecasting income (cash flows) for the investment holding period and discounting the cash flows and the expected resale price (at the end of the holding period) at a discount rate. A is the direct capitalization method, hence incorrect. B is incorrect because the expected resale price is discounted at the terminal cap rate in the DCF method. Section 6.3.

21. A is correct. If the holding period for a property is 10 years, the resale price in Year 10 is calculated by capitalizing the Year 11 income by a terminal cap rate. The terminal cap rate is selected to incorporate the effect of the change in income and value for the new investor. Section 6.4.6.

22. A is correct. Growth is implicit in the cap rate as opposed to the discount rate. Growth rate is made explicit for valuation by DCF method. Section 6.3.1.



23. B is correct. Using the cost approach, the value of the building is: replacement cost + developer's profit - curable and incurable deterioration - functional obsolescence - locational obsolescence - economic obsolescence + land value.  $10,000,000 + 470,000 - 600,000 = 9,870,000$ . Incurable physical depreciation = ratio of effective age to total economic life  $= 20\% \times 9,870,000 = 1,974,000$ . Value of the building:  $9,870,000 - 1,974,000 - 1,500,000 - 1,000,000 - 1,000,000 + 4,000,000 = \$8,396,000$ . Section 7.1.
24. A is correct. Adding all the adjustments:  $10\% + 20\% + 4.5\% = 34.5\%$ . Multiplying the sales price psf of Comparable 2 with 1.345 = \$1,345 psf. Average price psf =  $(1601.25 + 1345 + 1443.75)/3 = \$1,463.33$ . Value of shopping center =  $1,463 \times 5000 = \$7,315,000$ . Section 7.2.
25. C is correct. Physical/engineering inspection is done to ascertain that there are no structural issues with the property and to check the condition of the building systems, structures, foundation and adequacy of utilities. Section 9.
26. B is correct. Due diligence is done to lower the risk of the buyer or lender against any legal, environmental, physical and other unanticipated issues with the property that could negatively affect the value. If such issues are identified, the buyer can either renegotiate a lower price or walk away from the deal. Section 9.
27. A is correct. The two types are: appraisal-based indices and transaction-based indices. Section 11.
28. B is correct. "Appraisal lag tends to "smooth" the index meaning that it has less volatility." "Thus appraisal-based indices may underestimate the volatility of real estate returns." Transaction-based indices include random elements therefore can be noisy. Section 11.3.
29. C is correct. By borrowing money to finance the property, an investor takes more risk in anticipation of higher return. The risk is higher due to more uncertainty about the investor's return on equity. A small decline in property value can decrease the investor's return significantly if a large amount of debt is used for financing. A & B are characteristics of private real estate investment financed with debt. Section 12.
30. B is correct. The LTV = 75%. Hence the loan amount =  $0.75 \times 6,000,000 = \$4,500,000$ . DSCR = NOI/Debt service =  $450,000/(0.08 \times 4,500,000) = 1.25$ . Section 12.