

LO.a: Compare dividends, free cash flow, and residual income as inputs to discounted cash flow models and identify investment situations for which each measure is suitable.

- Which of the following situations is *best* suited for a discounted dividend valuation?
 - Valuing a technology start-up for financing.
 - Valuing a large, profitable confectioner that started out on a small scale but is now the largest player in the market for portfolio investment.
 - Valuing a tyre manufacturer for a possible takeover.
- Delta Inc. has the following earnings and dividend history:

	2009	2010	2011	2012
Earnings per share	\$4.00	\$5.50	\$6.05	\$6.66
Dividend per share	\$2	\$2	\$2	\$2

Which of the following statements is *most likely* true?

- A dividend discount model is not suitable for valuation as dividends do not follow earnings.
 - A dividend discount model is suitable for valuation because dividends are stable.
 - A dividend discount model is not suitable for valuation as dividend payout ratio is low.
- CRG is in the manufacturing industry. The company has found it difficult to pay dividends over the years due to debt financing requirements. Moreover, even though the company has been profitable over the last few years, its free cash flows have been negative owing to large capital investment requirements. The debt retirement over the years has made its capital structure quite volatile. Which of the following is *least likely* true with respect to identifying a model to value the company?
 - A dividend discount model is unsuitable.
 - A free cash flow based model is unsuitable because free cash flows have been negative despite profits.
 - A free cash flow to equity model is suitable because the company's capital structure is volatile.
 - A residual income model is *least* suited for:
 - Companies with poor dividend-paying histories.
 - Companies with negative free cash flows within the forecast period.
 - Companies with poor quality of accounting disclosures.

LO.b: Calculate and interpret the value of a common stock using the dividend discount model (DDM) for single and multiple holding periods.

- Terra's shares currently trade at \$40. In one year the company is expected to pay a \$5 dividend and the expected stock price after one year is \$36. The required return is 8%. Terra's shares are *most likely*:
 - overvalued.
 - undervalued.
 - fairly valued.
- Tescon Motors is expected to pay annual dividends of \$5, \$6 and \$7 at the end of year 1, year 2 and year 3 respectively. The expected stock price at the end of three years is \$105. The required return is 9%. The intrinsic value of the stock is *closest* to:
 - \$96.
 - \$113.
 - \$133.

LO.c: Calculate the value of a common stock using the Gordon growth model and explain the model's underlying assumptions.

7. Alpha Corp has the following earnings and dividend history; the trend is expected to last forever:

	2009	2010	2011	2012
Earnings per share	\$8.00	\$9.20	\$10.60	\$12.20
Dividend per share	\$2.40	\$2.76	\$3.18	\$3.66

The company's required return on equity is 11%. Which of the following is *most likely* true?

- A. The Gordon growth model cannot be applied because the growth rate is higher than the required rate.
 - B. The Gordon growth model cannot be applied because there is no relation between dividend and earnings.
 - C. The Gordon growth model cannot be applied because the payout ratio is greater than the required return.
8. The following information is given for Beta Corp.:

Recent earnings	\$6
Payout ratio	30%
Expected annual growth rate	5%
Cost of equity	10%

The intrinsic value of the stock is *closest* to:

- A. \$38.
 - B. \$126.
 - C. \$63.
9. Frost Co. paid a dividend of \$8 last year. Earnings are expected to grow annually by 9%. The payout ratio is expected to stay constant. The company's cost of equity is 12%. The intrinsic value of the stock is *closest* to:
- A. \$67.
 - B. \$291.
 - C. \$267.

LO.d: Calculate and interpret the implied growth rate of dividends using the Gordon growth model and current stock price.

10. The stock of Casa Inc. currently trades at \$80. Its recent earnings and dividends are \$10 and \$6 respectively. The required rate of return is 9%. The implied constant growth rate in dividends is *closest* to:
- A. 1.2%
 - B. 1.3%
 - C. 1.4%
11. Boswaq Ltd. currently trades at \$66 per share. The recent dividend was \$2 and the required rate of return is 10%. Which of the following is true?
- A. The stock is undervalued if its actual growth rate is less than 6.76%.

- B. The stock is overvalued if its actual growth rate is greater than 6.76%.
- C. The stock is undervalued if its actual growth rate is greater than 6.76%.

LO.e: Calculate and interpret the present value of growth opportunities (PVGO) and the component of the leading price-to-earnings ratio (P/E) related to PVGO;

12. Safeway Inc.'s shares currently trade at \$80. It is expected to have average earnings of \$7 per share, and earnings are expected to grow by 6%. The required rate of return is 10%. If price reflects value, then PVGO is *closest* to:
- A. \$5.8.
 - B. \$10.0.
 - C. \$8.0.
13. Bestway Inc.'s shares trade at \$65. Its expected average earnings are \$6 a share and the required rate of return is 11%. The portion of P/E related to PVGO is *closest* to:
- A. 1.74.
 - B. 1.94.
 - C. 1.63.
14. Inway Inc.'s shares trade at \$99. Its recent annual earnings were \$8 a share and earnings are expected to grow by 9%. The required rate is 12%. The value of the no-growth P/E is *closest* to:
- A. 12.
 - B. 8.
 - C. 9.

LO.f: Calculate and interpret the justified leading and trailing P/Es using the Gordon growth model.

15. Parma Ltd.'s recent annual earnings were \$8 a share and current annual dividend per share is \$4.8. Its earnings and dividends are expected to grow by 8%. The company operates in the technology sector therefore has a high beta of 1.7. The risk free rate is 3% and the equity risk premium is 5%. The company's stock trades at \$115. Its justified leading P/E ratio is *closest* to:
- A. 13.3.
 - B. 17.1.
 - C. 14.2.

LO.g: Calculate the value of noncallable fixed-rate perpetual preferred stock.

16. Brigand Publishers has preferred stock outstanding which carries a dividend of 8% per annum based on a par value of \$100. The dividends for its common stock are expected to grow at 3% per annum. The company's cost of preferred equity is 9%. The value of its preferred stock is *closest* to:
- A. 91.6.
 - B. 88.9.
 - C. 137.3.

LO.h: Describe strengths and limitations of the Gordon growth model and justify its selection to value a company's common shares.

17. Which of the following is a potential weakness of the Gordon growth model?
- A. It is not applicable for valuing stable and mature dividend-paying companies.
 - B. It cannot be used to value broad equity market indices.

- C. The model cannot be applied to non-dividend paying stocks.
18. Which of the following statements is *most likely* true about the Gordon growth model?
- A. The Gordon growth model can be used to determine price implied growth rates and required rates of return. However, it cannot be used to determine the present value of growth opportunities.
 - B. The Gordon growth model works only in isolation and cannot be used to supplement more complex valuation methods.
 - C. Unpredictable growth patterns make the model's outputs unreliable.

LO.i: Explain the assumptions and justify the selection of the two-stage DDM, the H-model, the three-stage DDM, or spreadsheet modeling to value a company's common shares;

19. A company is expected to experience high annual growth rate of 15% as long as its product is covered by a patent. The patent is due to expire in 5 years after which growth is expected to fall abruptly to an annual long-term rate of 5%. Which of the following dividend discount models is *most* suitable for valuation?
- A. A two-stage DDM.
 - B. H-Model.
 - C. A three-stage DDM.

LO.j: Explain the growth phase, transitional phase, and maturity phase of a business.

20. Xantex Ltd. is experiencing high earnings growth. The company needs to make significant capital investments to support earnings growth due to which its free cash flows are negative and dividends are not declared. Which life-cycle phase is the company *most likely* in?
- A. Growth phase.
 - B. Transition phase.
 - C. Mature phase.

LO.k: Describe terminal value and explain alternative approaches to determining the terminal value in a DDM.

21. Lehman and Darry Co. currently pays no dividends. It is expected to have earnings of \$10 per share in ten years' time. Its expected dividend payout ratio in ten years will be 60% and dividends are expected to grow at a stable rate of 4% thereafter. The cost of equity is 8%. The value of the stock today is *closest* to:
- A. \$150.
 - B. \$109.
 - C. \$75.
22. E-For-Life, a beverage company, sells vitamin water and other vitamins and minerals enhanced beverages. It paid a \$1.00 dividend last year that is expected to grow at 15% annually for the next three years. At the end of Year 3, the dividend is expected to be 30% of EPS and the trailing P/E to equal 15. The terminal value of E-For-Life stock is *closest* to:
- A. \$52.
 - B. \$49.
 - C. \$76.

LO.l: Calculate and interpret the value of common shares using the two-stage DDM, the H-model, and the three-stage DDM.

23. Rooster Ltd. recently paid a dividend of \$8. The analyst forecasts that earnings and dividends will grow at a constant rate of 8% for the next 5 years after which growth will stabilize at 3%. The cost of equity is 6%. The current value of the stock is *closest* to:
- A. \$344.
 - B. \$359.
 - C. \$365.
24. Berry Berry Ltd. currently pays a dividend of \$5. The current growth rate is 15% which is expected to decline linearly to a perpetual growth rate of 5% over the next 10 years. The cost of equity is 10%. The current value of the stock is *closest* to:
- A. \$165.
 - B. \$145.
 - C. \$155.
25. Airmiles Ltd. paid a dividend of \$2 last year. Its earnings and dividends are expected to grow by 20% for the next three years after which growth is expected to decline linearly to 5% over 6 years. The company's cost of equity is 9%. Its current value is *closest* to:
- A. \$107.5.
 - B. \$115.6.
 - C. \$65.2.

LO.m: Estimate a required return based on any DDM, including the Gordon growth model and the H-model.

26. Mary and Mars Ltd. paid a recent dividend of \$2.5. Its dividends are expected to grow at 6% per annum and the stock is trading at \$60. The implied required return is *closest* to:
- A. 10.4%.
 - B. 10.2%.
 - C. 10.1%.
27. Lothric Co. recently paid a dividend of \$8 which has been growing at a rate of 15%. The growth is expected to decline linearly to 5% over the next 5 years and remain at that level indefinitely. The stock is currently trading at \$125. The implied cost of equity is *closest* to:
- A. 12.8%.
 - B. 14.6%.
 - C. 13.3%.

LO.n: Explain the use of spreadsheet modeling to forecast dividends and to value common shares.

28. Which of the following statements regarding spreadsheet modeling is *most likely* true?
- A. Spreadsheet model is unsuitable for modeling scenarios where a firm's dividends do not grow at a constant rate for an extended period.
 - B. A potential drawback of spreadsheet modeling is lack of computational power and flexibility.
 - C. Spreadsheet modeling allows analysts to build complicated models to value stocks with dividends that change significantly through time.

LO.o: Calculate and interpret the sustainable growth rate of a company and demonstrate the use of DuPont analysis to estimate a company's sustainable growth rate.

29. Mandose Electrical has grown at an average rate of 9% over the last ten years. The company's ROE is 15% and it pays 20% of its earnings as dividends. The sustainable growth rate is *closest* to:

- A. 8%.
- B. 12%.
- C. 15%.

30. The following data relates to Ingrain Chemicals:

Retention ratio	60%
Net profit margin	8%
Asset turnover	1.5
Equity/Total Assets	0.8

The company's sustainable growth rate is *closest* to:

- A. 9.6%.
- B. 15.0%.
- C. 9.0%.

LO.p: Evaluate whether a stock is overvalued, fairly valued, or undervalued by the market based on a DDM estimate of value.

31. ABC Ltd. is currently trading at \$40/share. The analyst estimates its intrinsic value as \$30 using relative valuation and \$45 using DDM. The stock is:
- A. Overvalued according to DDM and undervalued according to relative valuation.
 - B. Overvalued according to relative valuation and undervalued according to DDM.
 - C. Overvalued according to relative valuation and fairly valued according to DDM.

Solutions

1. **B** is correct. A discounted dividend valuation is most suitable for valuing a mature company as the company is likely to have a history of dividends and the valuation is from a minority shareholder's perspective. Start-ups do not have a dividend history and dividend based models are not suitable for valuing acquisitions. Section 2.2.
2. **A** is correct. Dividend discount model cannot be applied because there is no relation between earnings and dividends. Constant dividends do not warrant an application of a dividend discount model if there is no understandable relationship of dividends with earnings. Payout ratio does not determine the application of a dividend discount model. Section 2.2.
3. **C** is correct. Options A and B are true statements. Option C is not a true statement, and hence the correct answer. Section 2.2.
4. **C** is correct. Residual income model will give erroneous results for companies with poor quality accounting disclosures such that the determinants of residual income model (book value and ROE) are not predictable. Options A and B state the criteria for the application of the residual income model. Section 2.2.
5. **A** is correct. The dividend after one year is \$5 and the stock price would be \$36. The present value of the shares is therefore: $\frac{5+36}{1.08} = 37.96$. At \$40, Terra shares appear to be overvalued. Section 3.1.
6. **A** is correct. The intrinsic value is calculated as $\frac{5}{1.09} + \frac{6}{1.09^2} + \frac{7+105}{1.09^3} = \96.1 . Section 3.2.
7. **A** is correct. The Gordon growth model cannot be applied when the growth rate (15% in this case) is higher than the cost of equity (11% in this case). Options B & C are incorrect, because payout rate is constant thus dividends and earnings are both growing at a constant rate of 15% and the payout ratio if greater than the required return does not imply that the GGM cannot be applied. Section 4.1.
8. **A** is correct. The recent dividend is $6 \times 0.3 = 1.8$. D_1 is therefore $1.8 \times 1.05 = 1.89$. Using the Gordon growth model, the intrinsic value is $\frac{1.89}{0.1 - 0.05} = \37.8 . Section 4.1.
9. **B** is correct. As payout ratio is constant, the growth rate of dividends would be same as growth rate of earnings. D_1 is therefore $8 \times 1.09 = 8.72$. The intrinsic value is $\frac{8.72}{0.12 - 0.09} = \290.67 . Section 4.2.
10. **C** is correct. Using the Gordon growth equation: $\frac{6(1+g)}{0.09-g} = 80$; $6 + 6g = 7.2 - 80g$; $86g = 1.2$; $g = 1.40\%$. Section 4.4.
11. **C** is correct. Using the Gordon growth equation: $\frac{2(1+g)}{0.1-g} = 66$; $2 + 2g = 6.6 - 66g$; $68g = 4.6$; $g = 6.76\%$. The implied growth rate is 6.76% therefore if the actual growth rate is greater than 6.76%, the stock is undervalued. Section 4.4.
12. **B** is correct. $80 = \frac{E}{r} + PVGO$; $80 = \frac{7}{0.1} + PVGO$; $PVGO = \$10$. Section 4.5.

13. **A** is correct. $65 = \frac{E_1}{r} + PVGO$; $65 = \frac{6}{0.11} + PVGO$; $PVGO = \$10.45$. Portion of P/E_1 related to $PVGO$ is $10.45/6 = 1.74$. Section 4.5.
14. **B** is correct. $99 = \frac{E_1}{r} + PVGO$; $P/E_1 = \frac{1}{0.12} + PVGO$; The no-growth P/E_1 or P/E is $1/r = 1/0.12 = 8.33$, which is the multiple the company should at if it has no growth opportunities. Section 4.5.
15. **B** is correct. The payout ratio is $4.8/8 = 0.6$; the retention ratio (b) is $1 - 0.6 = 0.4$. The required return is $3\% + (1.7 \times 5\%) = 11.5\%$. The justified leading P/E ratio is given as $\frac{1-b}{r-g} = \frac{1-0.4}{0.115-0.08} = 17.14$. Section 4.6.
16. **B** is correct. The value of preferred equity is calculated as $D_p/r_p = 0.08 \times 100 / 0.09 = \$88.89/\text{share}$. Section 4.1.
17. **C** is correct. A potential weakness of the Gordon growth model is that it is not appropriate for non-dividend paying stocks. Options A & B are NOT a weakness, but the conditions for the application of the GGM. Section 4.1.
18. **C** is correct. Unpredictable growth patterns of some companies make the model difficult to apply and its results unreliable. Option A is incorrect because GGM may be used to calculate the implied dividend growth rate and a required rate of return. Option B is incorrect because GGM can be used to calculate the terminal value under certain conditions therefore it may supplement other valuation models. Sections 4.1, 4.4, 4.7.
19. **A** is correct. Since growth is expected to decline to a stable long-term rate abruptly, the two stage DDM is most suitable. H-Model is not applicable because abnormal growth rate in Stage 1 abruptly declines to mature growth rate in Stage 2. A three-stage model is not applicable as there are only two stages of growth. Section 5.1.
20. **A** is correct. The growth phase is characterized by high earnings growth, high capital investments and usually low or no dividends. Section 5.
21. **C** is correct. Dividend in year 10 is $\$10 \times 0.6 = \6 per share. Using the Gordon growth model, $V_n = \frac{D_{n+1}}{r-g}$ the value in year 9 = $6 / (0.08 - 0.04) = \$150$. The present value is the value of the stock today (using FC) = $\$75.04$. [N=9; I/Y=8; PMT=0; FV=150, CPT PV]. Section 5.2.

22. **C** is correct.

Time	D_t or V_t
1	$D_1 = \$1.00(1.15) = \1.15
2	$D_2 = \$1.00(1.15)^2 = \1.323
3	$D_3 = \$1.00(1.15)^3 = \1.521
3	$V_3 = 15 \times [1.521/0.3] = \76.05

Section 5.1.

23. **A** is correct.

Year	1	2	3	4	5
Dividend	8.64	9.33	10.08	10.89	11.76

Terminal Value					$\frac{11.76 \times 1.03}{0.06 - 0.03} = 403.76$
Total	8.64	9.33	10.08	10.89	415.52
Present Value	8.15	8.30	8.46	8.62	310.50
Total PV	344.03				

Section 5.1.

24. **C** is correct. Using the H Model, the value is $\frac{5 \times (1+0.05)}{0.1-0.05} + \frac{5 \times \left(\frac{10}{2}\right) \times (0.15-0.05)}{0.1-0.05} = \155 . Section 5.3.

25. **A** is correct. Using the three-stage DDM, the cash flows are:

Year	1	2	3
Dividend	2.4	2.88	3.46
Value using H Model			$\frac{3.46 \times (1+0.05)}{0.09-0.05} + \frac{3.46 \times \left(\frac{6}{2}\right) \times (0.2-0.05)}{0.09-0.05} = 129.75$
Total	2.4	2.88	133.21
Present Value at 9%	2.20	2.42	102.86
Total PV	\$107.48		

Section 5.4.

26. **A** is correct. The required return can be calculated as $\frac{D_1}{P_0} + g = \frac{2.5 \times 1.06}{60} + 6\% = 10.4\%$. Section 4.7.

27. **C** is correct. Using the H Model, the required return is calculated as $\left(\frac{8}{125}\right) \times \left[1.05 + \left(\frac{5}{2}(0.15 - 0.05)\right)\right] + 0.05 = 13.32\%$. Section 5.6.

28. **C** is correct. Option C is correct because spreadsheets allow analyst to develop complex models to value stocks with different dividend patterns. Option A is incorrect because spreadsheets allow valuation with varying patterns of dividends. Option B is incorrect because spreadsheets have the requisite computational power and offer flexibility. Section 5.5.

29. **B** is correct. The retention ratio is $b = 1 - 0.2 = 0.8$. The sustainable growth rate is $ROE \times b = 15\% \times 0.8 = 12\%$. Section 6.1.

30. **C** is correct. The company's ROE is given as Net profit margin \times Total asset turnover \times Total assets/equity. Hence ROE is $8\% \times 1.5 \times (1/0.8) = 15\%$. Sustainable growth rate is $ROE \times$ Retention ratio $= 15\% \times 0.6 = 9.0\%$. Section 6.2.

31. **B** is correct. Since the value according to relative valuation is lower than the stock price, the stock is overvalued. But the intrinsic value according to DDM is higher than the stock price, hence the stock is undervalued. Example 5.