ANSWERS TO CHAPTER REVIEW AND SELF-TEST PROBLEMS

8.1 The last dividend, D_0, was \$2. The dividend is expected to grow steadily at 8 percent. The required return is 16 percent. Based on the dividend growth model, we can say that the current price is:

$$\begin{aligned} P_0 &= D_1/(R - g) = D_0 \times (1 + g)/(R - g) \\ &= \$2 \times 1.08/(.16 - .08) \\ &= \$2.16/.08 \\ &= \$27 \end{aligned}$$

We could calculate the price in five years by calculating the dividend in five years and then using the growth model again. Alternatively, we could recognize that the stock price will increase by 8 percent per year and calculate the future price directly. We'll do both. First, the dividend in five years will be:

$$\begin{aligned} D_5 &= D_0 \times (1 + g)^5 \\ &= \$2 \times 1.08^5 \\ &= \$2.9387 \end{aligned}$$

The price in five years would therefore be:

$$\begin{aligned} P_5 &= D_5 \times (1 + g)/(R - g) \\ &= \$2.9387 \times 1.08/.08 \\ &= \$3.1738/.08 \\ &= \$39.67 \end{aligned}$$

Once we understand the dividend model, however, it's easier to notice that:

$$\begin{aligned} P_5 &= P_0 \times (1 + g)^5 \\ &= \$27 \times 1.08^5 \\ &= \$27 \times 1.4693 \\ &= \$39.67 \end{aligned}$$

Notice that both approaches yield the same price in five years.

8.2 In this scenario, we have supernormal growth for the next three years. We'll need to calculate the dividends during the rapid growth period and the stock price in three years. The dividends are:

$$\begin{aligned} D_1 &= \$2.00 \times 1.20 = \$2.400 \\ D_2 &= \$2.40 \times 1.20 = \$2.880 \\ D_3 &= \$2.88 \times 1.20 = \$3.456 \end{aligned}$$

After three years, the growth rate falls to 8 percent indefinitely. The price at that time, P_3, is thus:

$$\begin{aligned} P_3 &= D_3 \times (1 + g)/(R - g) \\ &= \$3.456 \times 1.08/(.16 - .08) \\ &= \$3.7325/.08 \\ &= \$46.656 \end{aligned}$$

4. Carrington and Genevieve are unsure how to interpret the price–earnings ratio. After some head scratching, they've come up with the following expression for the price–earnings ratio:

$$\frac{P_0}{E_1} = \frac{1 - b}{R - (\text{ROE} \times b)}$$

Beginning with the constant dividend growth model, verify this result. What does this expression imply about the relationship between the dividend payout ratio, the required return on the stock, and the company's ROE?

5. Assume the company's growth rate slows to the industry average in five years. What future return on equity does this imply, assuming a constant payout ratio?
6. After discussing the stock value with Josh, Carrington and Genevieve agree that they would like to increase the value of the company stock. Like many small business owners, they want to retain control of the company, but they do not want to sell stock to outside investors. They also feel that the company's debt is at a manageable level and do not want to borrow more money. How can they increase the price of the stock? Are there any conditions under which this strategy would not increase the stock price?