**Chapter 8:**

**1.**

P3 = $49.24

P15 = $99.07

**2.**

*R* = 9.38%

**3.**

Dividend yield = 4.38%

Capital gains yield = 5%

**4.**

P0 = $42.22

**5.**

*R* = 11.50%

**6.**

D0 = $2.45

**7.**

P0 = $63.33

**8.**

*R* = 5.09%

**9.**

The price of each company’s stock today is:

Red stock price : $78.33

Yellow stock price : $39.17

Blue stock price : $26.11

**10.**

P0 = $63.47

**11.**

P0 = $34.17

**12.** P0 = $63.45

**13.**

P0 = $40.09

**14.**

P0 **=** $48.70

**15.**

P0 = $76 = D0{1.25/1.13 + 1.252/1.132 + 1.253/1.133 + [(1.25)3(1.15) + 48.52] / 1.134}

D0 = $2.18

D1 = $2.73

**16.**

P0 = $64.78

**17.**

D0 = $3.37

**18.**

P0 = $96.15

**20.**

P0 **=** $69.55

**21.**

P0 **=** $142.14

**22.**

W: P0 = $4.50(1.10)/(.19 – .10) = $55.00

Dividend yield = D1/P0 = 9%

Capital gains yield = .19 – .09 = 10%

X: P0 = $23.68

Dividend yield = 19%

Capital gains yield = 0%

Y: P0 = $17.81

Dividend yield = 24%

Capital gains yield = –5%

Z: P2 = $103.68

P0 = $82.33

Dividend yield = 6.6%

Capital gains yield = 12.4%

**23.** *a*.

P0 = $56.53

*b*.

P0 = $3.54/(.12 – .06) = $59.02

**24.**

P0 = $55.70

**25.** P = $2.45(1.20)/(1 + *R*) + $2.45(1.20)(1.15)/(1 + *R*)2 + $2.45(1.20)(1.15)(1.10)/(1 + *R*)3

+ [$2.45(1.20)(1.15)(1.10)(1.05)/(*R* – .05)]/(1 + *R*)3 = $63.82

By using spreadsheet, trial and error, or a calculator with a root solving function, we find that:

*R* = 10.24%

**26.** Even though the question concerns a stock with a constant growth rate, we need to begin with the equation for two-stage growth given in the chapter, which is:

P0 = + 

We can expand the equation (see Problem 27 for more detail) to the following:

P0 =  +  

Since the growth rate is constant, *g*1 = *g*2 , so:

P0 =  +  

Since we want the first *t* dividends to constitute one-half of the stock price, we can set the two terms on the right hand side of the equation equal to each other, which gives us:

 =  

Since appears on both sides of the equation, we can eliminate this, which leaves:

1 –  = 

Solving this equation, we get:

1 =  + 

1 = 2

1/2 = 

*t* ln  = ln(0.5)

*t* = 

This expression will tell you the number of dividends that constitute one-half of the current stock price.

**27.** To find the value of the stock with two-stage dividend growth, consider that the present value of the first *t* dividends is the present value of a growing annuity. Additionally, to find the price of the stock, we need to add the present value of the stock price at time *t*. So, the stock price today is:

P0 = PV of *t* dividends + PV(Pt)

Using *g*1 to represent the first growth rate and substituting the equation for the present value of a growing annuity, we get:

P0 = D1 + PV(Pt)

Since the dividend in one year will increase at *g*1, we can re-write the expression as:

P0 = D0(1 + *g*1) + PV(Pt)

Now we can re-write the equation again as:

P0 = + PV(Pt)

To find the price of the stock at time *t*, we can use the constant dividend growth model, or:

Pt = 

The dividend at *t + 1* will have grown at *g*1 for *t* periods, and at *g*2 for one period, so:

Dt + 1 = D0(1 + *g*1)*t*(1 + *g*2)

So, we can re-write the equation as:

Pt = 

Next, we can find value today of the future stock price as:

PV(Pt) = × 

which can be written as:

PV(Pt) = × 

Substituting this into the stock price equation, we get:

P0 =  + × 

In this equation, the first term on the right hand side is the present value of the first *t* dividends, and the second term is the present value of the stock price when constant dividend growth forever begins.

**28.** To find the expression when the growth rate for the first stage is exactly equal to the required return, consider we can find the present value of the dividends in the first stage as:

PV =  +  + + …

Since *g*1 is equal to *R*, each of the terns reduces to:

PV = *D*0 + *D*0 + *D*0 + ….

PV = *t* × *D*0

So, the expression for the price of a stock when the first growth rate is exactly equal to the required return is:

Pt = *t* × *D*0 + 