

Session 27a: Post class test solutions

1. **b. \$280 million.** $FCFF = 1000 (1-.30) + 200 - 500 - 120 = \280 million
2. **c. 12%.** First, compute the reinvestment rate by dividing the total reinvestment by the after-tax operating income:
 $Reinvestment\ rate = (500-200+120)/ 1000 (1-.30) = 60\%$
 Then, compute the return on capital:
 $Return\ on\ capital = 1000 (1-.30)/ (2500 + 1500 - 500) = 20\%$
 $Expected\ growth\ rate = 20\% * 60\% = 12\%$
3. **c. 30%.** The current return on capital is 20% and halved, it would be 10%. To grow 3% a year in perpetuity, you would need to reinvest 30% a year:
 $Reinvestment\ rate = g/ROC = 3\%/10\% = 30\%$
 Bonus: To estimate terminal value, you first need to estimate the after tax operating income in year 6:
 $After\text{-}tax\ operating\ income\ in\ year\ 6 = 1000 (1-.30) (1.12^5) (1.03) = \1233.63
 Next net out the reinvestment in year 6:
 $Expected\ FCFF\ in\ year\ 6 = \$1233.63 (1-.30) = \$863.55$ million
 $Terminal\ value = 863.55/ (.09-.03) = \$14,824$ million
4. **c. \$1,696 million.** The key is to recognize that since your costs of equity is changing over time, you will need to compute a cumulated cost of equity:

	1	2	3
FCFE	-\$25.00	\$50.00	\$150.00
Cost of equity	14%	12%	10%
Terminal value			2207.14
Cumulated COE	1.1400	1.2768	1.40448
PV =	-\$21.93	\$39.16	\$1,678.30
Value today =	\$1,695.53		

$Terminal\ value = 150 (1.03)/ (.10-.03) = 2207.14$

5. **d. \$23.50.** You have valued the operating assets of the firm, because you discounted FCFF (which is based on operating income) at the cost of capital. You need to add cash (since the income from cash is not part of your FCFF), subtract debt (since you are valuing just the equity stake) and add the value of the cross holdings (since they are minority holdings, and the income is not part of operating income).
 $Value\ per\ share = (2500+300-600+150)/100 = \2350