Session 15A: Post class test solutions

1. **a. Young companies with long life R&D.** For a company's return on capital to change a lot, its operating income has to change dramatically more, on a proportional basis, than its invested capital. The operating income change is the difference between the current year's R&D and the amortization of prior year's R&D. That change is likely to be highest for young firms with growing R&D. Since these firms have not been around for long, the change in invested capital is also likely to be small (since you are capitalizing R&D for the company's life).
2. **c. $1.33 billion**. To estimate this value, you first have to estimate the normalized operating income using the operating margin over the economic cycle and current revenues:
    - Normalized after-tax operating income = 0.05* 2000 = $100 million
    - Normalized return on invested capital = 100/1000 = 10%
    - Normalized reinvestment rate = 2%/10% = 20%
    - Value = 100 (1- .20)/ (.08-.02) = $1.33 billion
3. **$1,250 million**. To estimate this value, you first have to adjust the after-tax operating income for lower oil prices:
    - Normalized after-tax operating income = 150 – (100-60)*1.25 = $100 million
    - Since the firm earns its cost of capital (8%), you can estimate its reinvestment rate and value
    - Reinvestment rate = 2% / 8% = 25%
    - Value = 100 (1-.25) (.08-.02) = $1,250 million
4. **b. Facebook.** The margin of safety on Facebook is 50% and it is only 20% on 3M.
    - Facebook margin of safety = (37.50-25)/25 = 50%
    - 3M margin of safety = (120-100)/100 = 20%

    I would be concerned about going with Facebook still for two reasons: (a) I may be (and probably am) more uncertain about my value of Facebook than I of my value of 3M and (b) the price gap may close faster at 3M because their stockholders tend to be more focused on earnings and cash flows than Facebook stockholders.