Gordon Growth Model:
Shares in "The Home Despot" (supplies for the tyrannical do-it-yourselfer) sell for $80/share. Dividends have been growing at a steady rate of 8% per year, and are expected to continue to grow at this rate. The next dividend will be $5, and earnings-per-share (EPS) are $40. The risk-free rate is 5%, and that the expected return on the market is 12%.

a) What are The Home Despot's market capitalization rate, plowback, and return-on-equity?
b) What would happen to the share price of The Home Despot if it decreased its plowback? Why does this happen? (Calculate an example and explain, or give a reasoned explanation in words)

Solution:
a) plowback = 1 - DIV/EPS = 1 - 5/40 = .875
   g = plowback × ROE ⇒ ROE = g/plowback = .08/.875 = .0914
   P = DIV/(r-g) ⇒ r-g = DIV/P ⇒ r = g + DIV/P = .08 + 5/80 = .1425
b) Since The Home Despot's ROE is less than its market capitalization rate, it is losing value (decreasing its share price) by investing so much. Suppose plowback decreased to 75%:
   DIV = (1-plowback) × EPS = .25 × 40 = $10
   g = plowback × ROE = .75 × .0914 = .06855
   P = DIV/(r-g) = 10/(.1425 - .06855) = $135.23
   So, the share price rises when plowback is decreased.

Capital Budgeting and Timing
The PP ("Pure Petroleum") Textile Mills specializes in producing polyester fabrics. PP is considering expanding into the plastic wrap business. PP projects that whenever it enters the plastic wrap business, its after-tax cash flows from the new division will be $5 million in year 1, $7.5 million in year 2, $10 million in year 3, with 5% annual growth thereafter (so year 4 cash flows are 10.5 million, and so on). The new division would require an initial (year zero) $50 million capital investment, plus $5 million in working capital that would be returned to the firm in year 3. (The depreciation allowances associated with the capital investment are already included in the after-tax cash flows given above.)

"Happy Wrap", a similar, and publicly traded, plastic wrap company, offers an annual return of 11%.

a) What is the NPV of PP's proposed plastic wrap division? Should AP undertake this new operation, and if so, when?
b) A market analyst for the plastic wrap business consults for PP and finds out that "Happy Wrap" is undertaking a major expansion. If PP enters the plastic wrap business now, it will have the cash flows given above. If it waits one period to enter,
it will have a better product (and faster sales growth) but it will start from a smaller market share. Specifically, PP's new division will have the same capital and working capital expenditures described above (though incurred in year 1 if they wait to enter), but its cash flows will be only $2 million in year 2, and then grow at 8% annually. What should PP do in light of this new information?

Solution:
a) Cash Flow table:

<table>
<thead>
<tr>
<th>Year 0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 and on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash flows</td>
<td>-50</td>
<td>5</td>
<td>7.5</td>
<td>10</td>
<td>10(1.05)</td>
</tr>
<tr>
<td>Working Capital</td>
<td>-5</td>
<td>5</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NPV = -55 + 5/(1+r) + 7.5/(1+r)^2 + 10/(1+r)^3 + (10/(1-r))/(1+r)^2 = 94.52 >0,
So yes, undertake the new operation, and since waiting just delays obtaining the value, enter immediately.

b) If wait one period to undertake the project,

NPV(wait one year) = -55/(1+r) + 2/(r-.08)(1+r) + 5/(1+r)^4 = -49.55 + 60.06 + 3.29 = 13.8 < 94.52
so it's better to enter the market immediately.

Worker Turnover and Training
Your firm currently spends $30,000 (up-front) to train a newly-hired analyst and pays such analysts $110,000 per-year. Typically analysts leave the firm after three years and move on to other companies, so your firm has to hire and train new people. Your boss has been concerned about the training costs this turnover imposes on the firm, and has proposed offering analysts a bonus of $15,000 after 4 years with the firm. He expects that with the bonus program, analysts would stay 5 years before leaving the firm. Is this plan cost-effective? The appropriate discount rate is 12%.

Solution:
Compute the NPV of compensation and EAC of an analyst under each compensation plan:
NPV(3 yr turnover) = 30 + 110 × P/A(12%,3) = 294.2
EAC(3 year turnover) solves : 294.2 = EAC × P/A(12%,3), so EAC = 122.5
NPV(5 yr turnover) = 30 + 110 × P/A(12%,5) + 15/(1.12)^4 = 436.1
EAC(5 year turnover) solves : 436.1 = EAC × P/A(12%,5), so EAC = 121.0

So, even though the "5-year-turnover", high salary scheme has a higher NPV of compensation over the salary period, it amortizes the training cost over a longer period, and thus is slightly lower cost in the long run.