EM401 Midterm #2 Review Answers

Q1. Answer:

- For most young people, value creation is expressed by salary. As one gets older, significant pension savings accumulate, and these become a less obvious element of value creation. Pension plans often send out statements to working participants to tell them how much the current value of the pension has increased.
- Families sometimes look at a savings versus a spending rate.
- Families look at what they have, i.e., their net worth or total assets. At a personal level, it is usually easy to track liabilities, or where the money came from to acquire the assets, because often, there are only two significant liabilities: a house mortgage and a car loan. The rest comes from the person.
- Families often talk about where they spend their money; this is a major focus of discussion for couples.

Q2. Answer

This problem illustrates some important concepts. First, if you have a specialized product, such as an automobile, you can sell its features and benefits rather than discounting to find new customers. Then, you can develop a new model or develop a big advertising campaign. This kind of approach is much harder to achieve with a commodity, since its features are often standardized. Therefore, managers often build sales or diversify a customer base in a commodity business by temporary discounts that lure new customers to try the company as a supplier.

If your plant is running at less than capacity, you can discount down to the marginal cost (COGS) and not have a negative impact on the profitability of the business. In the case of Polymerco, which is running at 84% of capacity, you could discount up to 11% and still have a small, positive impact on the company's overall profitability. In this case, you can aggressively discount the product in order to satisfy the request of the president to diversify the customer base. You would have two concerns. First, do not let your existing customer base know how much you are prepared to discount to a new customer; otherwise, they will want the same discount. Second, do not get caught in a dumping action, which is the name given to heavily discounted international sales. Discounts in this kind of case are best given as "temporary" adjustments off list price so that the customer has some expectation that the low price will not be sustained. In a real business situation, you would have some additional knowledge of the market that would tell you how much of a discount would likely be required to build sales, but you could recommend to the president that you be authorized to give up to an 11% temporary discount for new customers.

If your plant is running at full capacity, the situation is very different: every discounted sale reduces the profitability of the company because you have no extra capacity with which to fill the sale and you must reduce sales to a high-paying customer in order to have product to sell to a new customer. You should clarify with the president that the plant is fully sold out and that any aggressive marketing plan that includes discounts will reduce the net income of the company. Conveying this message in writing before meeting with the president would be prudent so that you do not become the scapegoat for a drop in net income.

One key lesson here is that the concept of marginal pricing to get marginal sales is only effective if a plant is operating at less than capacity.

Q3. Answer:

The given scenarios might affect COGS as follows:

- If your friend is the administrator, seller, and driver, it would be very difficult to attribute a portion of his salary to COGS. However, vehicle expenses such as gas, oil, lease charges, and maintenance could be charged to COGS to demonstrate to a purchaser the ample over-coverage from revenue of direct vehicle operating costs.

- If your friend runs the office and hires the driver on a per-trip basis, the driver would be chargeable to COGS.

- If a third party supplies the truck and the driver, then all of these charges would simply flow into COGS with no need for a maintenance reserve.

- If your friend has a per-mile component to his price formula, then COGS will be steady. If, for some reason, your friend has an inconsistent price per mile, then COGS and margin will vary widely. For overnight trips, travel expenses of the driver could be charged to COGS, since this will normally be passed through to the customer in the price. If driver travel expense is left outside of COGS but captured in the price of the service, then margin will again vary with trip length. (Note that professional service firms such as law and engineering companies recover expenses separate from their service price for just this reason.)

Maintenance costs are "lumpy," meaning they occur in large chunks at infrequent intervals. One could create a maintenance reserve and charge transfers to this reserve to COGS to smooth out COGS but accurately measure the true cost of goods sold.

Q4. Answer:

These kinds of questions do not have a single answer that is guaranteed to be correct, since many factors can cause a given problem in business. However, dealing with problems in business is like being a detective: you form a tentative hypothesis and check it out by asking questions. You need to keep an open mind when testing your hypotheses.

- If margin is dropping and bad debt is the main cause, the first person to talk to is your Chief Financial Officer (CFO), since finance is responsible for doing credit checks. The first question should be "Why is our bad debt rising so much; has something gone wrong with our credit checking process?" If the answer is no and it is convincing, then see if the bad debt is because of product quality problems, i.e., are customers withholding money because of complaints about the product? Either the Marketing VP or the General Manager of Production should

know this; the Marketing VP would have heard complaints and know of returns, and the GM of Production would have received the defective items.

- If unit sales are rising but margin is falling, then price relative to cost must be dropping. The first person to discuss this with is the VP of Marketing, and the question to ask is "Is there some problem with holding price on our products? We seem to have falling margin despite rising unit sales." There can be many reasons for a drop in prices: a new competitor, an excessive drive to increase unit sales, or a sales force that has lost its edge.
- If sales and margin are falling and bad debt is rising, it is normally the consequence of an economic downturn. No company can immunize itself from a major downturn. Some people feel it is best to manage for constant market share in a downturn rather than to try to hold constant revenue and sales. Constant market share means that if you sold 25% of all units before the downturn, you continue to sell that percentage (of a smaller market) through the downturn. The problem with trying to hold constant revenue through any downturn is that the only way to achieve this is by such heavy discounting that you erode contribution margin, which is the driver of profit.
- If margin is falling and warranty claims are the main cause, you have a manufacturing problem, and you should talk to your GM of Production to ask what has changed. If you have a separate quality control department, you should definitely talk to them as well.
- Falling margin and rising COGS means one of two things: marketing is failing to pass on cost increases by raising prices, or manufacturing is buying at too high a cost. Usually, failure to raise price is the reason, but on occasion, buying departments lose their edge and fail to get the best possible price on raw materials. If price is the problem, talk to the VP of Marketing; if cost is the problem, talk to the senior manager through whom the buying function reports, either the CFO or the GM of Production.

Q5. Answer:

Your friend's annual income statement will depend on the assumptions that you make about depreciation period for assets. With a three-year depreciation period on all assets, the statement would look something like this:

Rent-a-Classic Income Statement ($)

Revenue	154,840
General Manager	36,000
Other staff costs (includes payroll prep, WCB, vacation, staff party)	53,055
Rent and cleaning	43,600
Utilities (phone, gas, power, water)	6,266
Promotions and advertising	1,364
Subscriptions	120
Office supplies	396
Memberships	400
Business tax	425
Depreciation	39,079
Total fixed expense	180,705

Operating income	(25,865)	
Other income	500	
Net income	(25,365)	
Operating cash flow (oper. income plus depr.)	13,214	
Net cash flow (Net inc. plus depr.)	13,714	
For Calculating Depreciation		
Asset original purchase cost	117,237	
Depreciation period (all assets), years	3	
Sales Trend by Quarter		
1	24,478	15.8%
2	36,221	23.4%
3	42,875	27.7%
4	51,266	33.1%
	154,840	

There are some important observations to make here:

- Since the fixtures in the store are an asset, not an expense, only depreciation shows up on the income statement, not the full purchase price. Picking depreciation period is a matter of judgment. A depreciation period of three years on the fixtures was chosen since small retail operations often do not have a long life. The software, computers, and cash register are also assets, not expenses. A depreciation period of three years is used for these assets as well; computer systems are evolving so quickly that it is likely the business will want or need a better system (and the equipment to run it) at the end of three years. The videos themselves are an asset, not an expense. Videos typically last more than three years, but a three-year period was chosen for the same reason as the fixtures. However, other depreciation periods could certainly be justified and used.
- With the assumption of a three-year depreciation period, your friend has a negative annual operating income, but a positive cash flow from operations. Hence, her business is not paying its own way, but it is not a crisis either (if it had negative cash flow from operations, it would be a very serious situation in that she would need a monthly injection of money into the business to keep it going; in essence, she would be paying her customers to take her service).
- In this case, the depreciation on store fixtures was chosen not based on the durability of the asset itself but rather on the risky nature of the business. At the end of three years, if your friend is still in business, she will likely need new computers, but not new store fixtures. Hence, the test of positive operating income in this case is conservative.
- The sale of the six chairs and table left in the store by the previous owner is not a normal business activity of a video rental business, so it falls under other income, not revenue from the business.

Businesses that generate cash but have negative income can survive for a long time as long as they do not need significant capital investment. Your friend's business does not need significant

investment, since her store focuses on classic movies. Hence, the right choice for her is to stay in business, which pays her salary and generates some cash above that, just not enough to fully depreciate the assets in three years. (Accounting has developed a more complex and thorough analysis of cash flow in a business with the statement of cash flow.) Your friend would not be able to franchise her business, i.e., convince others to duplicate it, based on this financial statement: who would want to invest in a business that does not create value? Hence, in business, people make long-term investment decisions based on earnings, but short-term decisions about whether to stay in business based on cash flow.

To help your friend think about her business, you can also forecast what might occur next year, which of course would depend on sales level. You note that sales have increased steadily over the course of the year. While this might reflect seasonality, e.g., people rent fewer movies in some seasons than in others, it might also reflect a natural and permanent growth in the market. The income statement above is based on average sales for the year. You might make a somewhat conservative assumption that your friend can simply maintain her rate of sales at the last quarter, i.e., $51,266 per quarter. You can use this to forecast next year's income statement (forecast statements are called pro forma statements):

The Video Store Income Statement

	Actual 1st Year ($)	**Pro Forma at 4th Quarter Sales Rate ($)**
Revenue	154,840	205,064
General manager	36,000	36,000
Other staff costs	53,055	53,055
(includes payroll prep, WCB, vacation, staff party)		
Rent and cleaning	43,600	43,600
Utilities (phone, gas, power, water)	6,266	6,266
Promotions and advertising	1,364	1,364
Subscriptions	120	120
Office supplies	396	396
Memberships	400	400
Business tax	425	425
Depreciation	39,079	39,079
Total Fixed Expense	180,705	180,705
Operating income	(25,865)	24,359
Other income	500	0
Net income	(25,365)	24,359
Operating cash flow (oper. inc. plus depr.)	13,214	63,438
Net cash flow (net inc. plus depr.)	13,714	63,438
For Calculating Depreciation		
Asset original purchase cost	117,237	

Depreciation period (all assets), years	3	

Sales Trend by Quarter

1	24,478	15.8%
2	36,221	23.4%
3	42,875	27.7%
4	51,266	33.1%
	154,840	

This presents a very interesting picture of the potential of your friend's business. If she can maintain sales at the level of the most recent quarter, her business will generate a handsome profit: she gets her salary and cash from depreciation, which is sufficient to recover the cost of her assets in three years. As well, she can expect a profit of $24,359. If she can achieve this, she might indeed have a business model that others would try to imitate. If the pro forma is realized, her business is creating value, and investment decisions are based on that. If her sales keep growing above $51,266 per quarter, she will do even better.

As a financial management advisor to your friend, it is entirely appropriate for you to prepare pro formas to help her think about her business. However, it is not hard to imagine that unscrupulous stock promoters could invent wildly exaggerated forecasts of future sales to lure unsophisticated investors into buying shares in new companies. For this reason, promoting stocks for sales to the general public by using forecast (pro forma) financial statements is prohibited in many jurisdictions, including all of Canada and the United States. The use of pro formas to promote a stock is limited to offerings to sophisticated investors, and there is a legal definition of such an investor that restricts such offerings to large amounts, in order to exclude "mom and pop" investors from being cheated.

The video store case illustrates the power of financial accounting. In less than an hour, a person can take a shoebox of transactions and turn it into a powerful financial and management analysis of a business.

Q6. Answer

a) Depreciation is a charge to income to reflect the fact that a business must recover the cost of equipment that is wearing out. If depreciation were not deducted from income, then a business might be fooled into thinking it was making money when in fact it was not making enough to replace its own assets on an ongoing basis.

b) The calculation is as follows:

$$\text{Number of years}\left(\frac{\text{original value} - \text{salvage value}}{\text{depreciation period, years}}\right)$$

Original value is $13.45 million, estimated salvage value is $250,000, and the depreciation period is 12 years. At the end of five years, the cumulative value of depreciation is $5.5 million.

c) The depreciation is $2 million per year; after four years of operation, the remaining undepreciated value is $4 million ($12 million original cost minus $8 million accumulated depreciation). A salvage value of $6 million would trigger an other income gain of $2 million. A salvage value of $4 million requires no entry in other income since salvage value exactly equals remaining value. A salvage value of $2 million requires an other income loss (negative income) of $2 million, and a salvage value of zero requires an other income loss of $4 million.

d) The depreciation is $1 million per year. After three years of operation, the remaining undepreciated value is $2 million, so if only $1 million is recovered in salvage after three years, there is a requirement to enter a loss of $1 million as other income; hence, the statement is true. The loss would be entered as a negative number under other income. For the three years that the machine was operating, operating income was overstated by $1 million, i.e., in hindsight, the depreciation should have been $4 million, not $3 million, and the operating income should have been $1 million less over the three-year period.

Q7. Answer:

A detailed analysis of the information on Oilpatchco follows. First, look at the overall company figures:

Oilpatchco Income Statements ($000)

	Year 1	Year 2	Year 3	Year 4	Year 5
Total gross revenue	13,804	15,078	16,546	18,219	19,955
Growth in sales revenue (%)		**9.2**	**9.7**	**10.1**	**9.5**
Total warranty and bad debt	149.6	159.9	173.5	182.7	206.9
W/bad debt as % of sales	**1.08**	**1.06**	**1.05**	**1.00**	**1.04**
Total net revenue	13,655	14,918	16,372	18,036	19,748
Total cost of goods sold	6,946	7,608	8,393	9,344	10,240
COGS as a % of sales	**50.3**	**50.5**	**50.7**	**51.3**	**51.3**
Total contribution margin	6,709	7,310	7,979	8,692	9,507
CM as a % of sales	48.6	48.5	48.2	47.7	47.6
SG&A Expense					
All expenses less depreciation	2,457	2,555	2,657	2,764	2,874
Depreciation	3,125	3,301	3,456	3,701	3,812
Total SG&A	5,582	5,856	6,113	6,464	6,687
Growth in SG&A		**4.9**	**4.4**	**5.7**	**3.4**
SG&A as a % of sales	**40.4**	**38.8**	**36.9**	**35.5**	**33.5**
Operating income	1,126	1,454	1,866	2,227	2,821
Growth in operating income (%)		**29.1**	**28.3**	**19.4**	**26.6**

Note that the bolded numbers indicate that the analysis has been done on the raw data.

This looks like a very healthy business, and at the overall level, it is. Sales are growing nicely above inflation, and bad debt and warranty cost are under control. Contribution margin (or margin) is virtually constant (so your pricing is keeping up with the cost of making your products), and SG&A growth is near inflation and much less than sales so that operating income is growing at a very healthy rate. This is a business that would win accolades from an owner when looked at from a company-wide perspective.

However, when each business line is looked at, some serious problems emerge in one business, masked by truly outstanding performance in the other two business segments. The next set of figures shows an analysis of each business line. The rod and service businesses are very healthy,

with slow but steady growth in sales above the inflation rate and improving margin (meaning the customers are paying more for the product than inflation is eating away). Bad debt and warranty costs are dropping.
The pump business is deteriorating at a rate that is alarming. If one looks only at sales revenue, the picture is bright, since pumps show the highest growth rate in gross sales revenue of any business line. This is not surprising given that the new pump the company is selling is replacing existing models. However, look at the problems:

- Not only is the price per pump not keeping up with inflation or supplier costs, it is actually dropping per unit.
- Bad debt and warranty cost is increasing at a time when the oil patch is stable and growing.
- COGS is going up every year in absolute terms, but not alarmingly so since the year-to-year increase in COGS is consistent with inflation; however, it is a sign that the suppliers want price increases and are getting them.
- Margin is dropping, which is a sign that prices are not keeping up with the cost of making the pumps.
- Each pump sale used to contribute nearly $1,600 of margin to the company. After five years, this has dropped below $900.

Specifically, this business has a problem; the pump division is disintegrating to a low-value business. Some possible causes are as follows:

- A business manager (the VP of Marketing) that cannot say no to price increases by suppliers and cannot get a price increase from customers.
- Fierce competition from other suppliers is driving the margin out of the business.
- Out-of-control manufacturing costs.

Based on the dismal performance in bad debt and warranty costs, the most likely cause is the manager's style and approach to the business, not the competition or manufacturing. Competition would not cause the bad debt and warranty cost to go up, but a product manager who could not stand up to customers could cause this. The pump business involves assembly of components, and this normally has a low manufacturing cost relative to materials. If you agreed to manage this business, you should tell your boss that your first objective is to restore the pump business to healthier margins if, on further analysis, this is possible. Your first month with the company, you would tell the manager of the rod business (the Manufacturing VP), the manager of the service business (the Service VP), and the manager of SG&A (the VP Finance and Admin) to keep doing what they are doing because the results are wonderful. You would work with the VP of Marketing to see whether competition or poor management style was the cause of the problem. If the latter, you would face the issue directly in discussion with the VP of Marketing and set some time frame for turning the pump business around (likely 12 to 18 months).

Oilpatchco Income Statements ($000)

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue					
Pumps					
Units sold	421	466	558	679	779
Growth in unit sales (%)		**10.7**	**19.7**	**21.7**	**14.7**
Revenue	2,515	2,759	3,175	3,782	4,300
Growth in sales revenue		**9.7**	**15.1**	**19.1**	**13.7**
Price per unit sold	**5.975**	**5.920**	**5.690**	**5.570**	**5.520**

Warranty and bad debt	35.2	42.8	59.7	75.3	103.2
W/bad debt as % of sales	**1.40**	**1.55**	**1.88**	**1.99**	**2.40**
Net revenue	2,480	2,716	3,115	3,707	4,197
Cost of goods sold	1,811	2,066	2,469	3,023	3,499
COGS as a % of sales	**72.0**	**74.9**	**77.8**	**79.9**	**81.4**
COGS per unit sold	**4.302**	**4.433**	**4.425**	**4.452**	**4.491**
Contribution margin	669	650	646	684	698
CM as a % of sales	**26.6**	**23.6**	**20.4**	**18.1**	**16.2**
CM per unit sold	**1.589**	**1.395**	**1.158**	**1.008**	**0.896**
Rod					
Km sold	312.0	327.6	334.2	357.5	379.0
Growth in unit sales (%)		**5.0**	**2.0**	**7.0**	**6.0**
Revenue	7,017	7,662	8,116	8,926	9,802
Growth in sales revenue (%)		**9.2**	**5.9**	**10.0**	**9.8**
Price per unit sold	**22.490**	**23.390**	**24.289**	**24.964**	**25.864**
Warranty and bad debt	63.2	65.9	66.6	63.4	62.7
W/bad debt as % of sales	**0.90**	**0.86**	**0.82**	**0.71**	**0.64**
Net revenue	6,954	7,597	8,050	8,862	9,739
Cost of goods sold	3,298	3,563	3,717	4,034	4,342
COGS as a % of sales	**47.0**	**46.5**	**45.8**	**45.2**	**44.3**
COGS per unit sold	**10.570**	**10.876**	**11.124**	**11.284**	**11.458**
Contribution margin	3,656	4,034	4,332	4,828	5,397
CM as a % of sales	**52.1**	**52.6**	**53.4**	**54.1**	**55.1**
CM per unit sold	**11.717**	**12.312**	**12.966**	**13.503**	**14.240**
Service					
Revenue	42,72	4,656	5,255	5,511	5,853
Growth in sales revenue (%)		**9.0**	**12.8**	**4.9**	**6.2**
Warranty and bad debt	51.3	51.2	47.3	44.1	41.0
W/bad debt as % of sales	**1.20**	**1.10**	**0.90**	**0.80**	**0.70**
Net revenue	4,221	4605	5207	5467	5,812
Cost of goods sold	1,837	1979	2207	2287	2,400
COGS as a % of sales	**43.0**	**42.5**	**42.0**	**41.5**	**41.0**
Contribution margin	2,384	2,626	3,000	3,180	3,412
CM as a % of sales	**55.8**	**56.4**	**57.1**	**57.7**	**58.3**

Detailed analysis of financial statements is called horizontal and vertical analysis. These names come from looking horizontally (year to year) and vertically (by cost sector). The next step in helping the VP of Marketing to improve the pump business would be to look at each cost component of his COGS expressed as a percentage of sales. From this, he could quickly identify what material costs had gone up relative to others. This would also be the way of convincing yourself that the manufacturing costs were not part of the problem. Expressing year-to-year costs as a percentage of sales and looking at them critically is also called common size analysis because all costs are expressed as a consistent percentage.

Q8. Answer:

The best way to do this kind of problem is to use a spreadsheet and the function goal seek to find the correct answer. However, you can also do this algebraically, and this approach is illustrated here. If you do this problem by spreadsheet, you get slightly different values because the unrounded CM fraction is 0.5906 rather than 0.591. The precision of the estimate is less than this, so the difference is not material.

At breakeven, income (or cash) is zero. Book breakeven can be on operating income or net income; usually, the two numbers are so close that the accuracy of the estimate breakeven is less than the difference between operating income versus net income. In this problem, operating income and net income are identical because other income is zero.

At book breakeven, operating income is zero, so contribution margin = SG&A (including depreciation).

At cash breakeven, cash flow from operations is zero, so contribution margin = SG&A (excluding depreciation).

Case 1: SG&A is fixed.

- Operating income = –$802
- Cash from operations = operating income + depreciation
  = –$802 + $420
  = –$382
- SG&A including depreciation = $1,529 (excluding depreciation = $1,109)
- Each incremental dollar of sales contributes $0.591 of margin.

  For book breakeven, contribution margin = SG&A (including depreciation).

  Breakeven sales level (book) × CM (frac) = SG&A (including depreciation)

  BESL (Book) = SG&A (ID) CM (frac)

  BESL (Book) = $1,529 ÷ 0.591 = **$2,587**

  BESL (Cash) = $1,109 ÷ 0.591 = **$1,876**

In these equations, contribution margin (CM) is expressed as a fraction, 0.591. Also, the book breakeven sales level of $2,587 is a 110% increase in sales level. In many small startup companies, this kind of increase in sales can be accommodated without any increase in SG&A. In mature companies, this kind of increase in sales would likely have some impact on SG&A, since doing this much increased business with no increase in selling or admin costs would be unusual.

Case 2: SG&A excluding depreciation increases $0.30 for every $1 increase in sales.

- As in case 1, operating income is –$802, and cash from operations is –$382.

The math is only slightly more complex in that SG&A (excluding depreciation) is given by

SG&A (ED) = 1,109 + ((BESL – 1,231) × 0.30)

SG&A (ID) = SG&A (ED) + $420

For the cash breakeven case:

BESL (Cash) = SG&A (ED) ÷ CM (frac)

BESL (Cash) = ($1,109 + ((BESL (Cash) – $1,231)) × 0.30) ÷ CM(frac)

You can solve this to show the following:

BESL (Cash) = (1 ÷ (CM – 0.3)) × ($1,109 – (0.30 × $1,231))

BESL (Cash) = **$2,542**, at which sales level SG&A (ED) is $1,502.

BESL (Book) = (1 ÷ (CM – 0.3)) × ($1,529 – (0.30 × $1,231))

BESL (Book) = **$3,985**, at which sales level SG&A (ID) is $2,355.

Note that assuming that SG&A goes up at a fractional level of sales is handy when building a credible multiyear pro forma projection of income statements.

Q9. Answer:

Balanceco's end of this year balance sheet looks like this:

Balanceco Balance Sheet ($000)

Assets			**Liabilities**	
Current Assets			**Current Liabilities**	
Cash		15	Short-term credit line	252
Receivables		166	Accounts payable	89
Short-term investments		—	Accrued expenses	20
Inventory		132	Taxes payable	—
Prepaid expenses		26	Current portion of long-term debt	20
		339		381
Fixed Assets			**Long-Term Debt**	
Land, building, and equipment at cost	920		Repayable grants	—
Less accumulated depreciation	252		Long-term debt	120
		668		
			Shareholders' Equity	
Long-term investments		—	Capital shares	400
Goodwill		—	Retained earnings	106

Total assets	1,007	**Total liability and equity**	1,007

- Cash and prepaids are unchanged.
- Receivables, inventory, and payables went up by 35%.
- Accrued expenses went up by 25%.
- The cost of the fixed assets goes up by the cost of the new machinery ($120,000).
- The accumulated depreciation goes up by the amount of the depreciation on the old equipment ($80,000) and the new machinery (one year at 10%, or $12,000). Hence, the total additional depreciation is $92,000.
- The long-term debt drops by $20,000, which is one additional year of a ten-year retirement of a $200,000 loan.
- Original capital investment drops by $100,000, the amount that Balanceco pays the retiring shareholder for his shares.
- Retained earnings go up by $42,000, the difference between 1999 net income of $142,000 and the dividend payout of $100,000.

At the end of this year, 30% of the assets of Balanceco are tied up in inventory and receivables.

Have a careful look at the two balance sheets for Balanceco. On the surface, the business is doing fine: it made $142,000, its sales are growing, it is buying new equipment, and it is paying down its long-term debt on schedule. In fact, the business would likely have been closed down during this year by its banker because the owners have made some key errors in judgment and crossed the line into negative working capital. This happened because the owners did too much: they took $100,000 out of the business as equity (by buying out the third owner from Balanceco) by taking out dividends of $100,000 and buying a new piece of equipment for $120,000. There just is not enough equity in Balanceco to do all this, and the negative working capital is a sign of this. The short-term lender would almost certainly shut down Balanceco because of its poor financial management.

The two remaining owners had a choice of how to buy out the retiring shareholder. They could either individually buy the shares by paying their own money to the shareholder and taking his share certificates, in which case the equity in Balanceco stays the same, or they could direct Balanceco to buy back and cancel the retiring shareholders' shares, which reduces the equity in Balanceco.

Q10. Answer

This problem illustrates that leverage up brings with it leverage down. Donald is highly leveraged, borrowing 90% of the project. If the project performs as expected (good times), the earning power of the project is 9.5%, which is above the 8% cost of debt. All three developers have enough cash flow to make the principal payment in year 1. By being highly leveraged, Donald gets a staggering 34% return on equity in the first year of the project compared to a 12.5% return for the

conservative John. Donald will have his initial investment back in less than 3 years compared to 8 years for John.

However, in a downturn (bad times), Donald quickly gets into a negative cash flow position, and unless he had substantial reserves (which is not likely for a "roll the dice" developer), his project would be foreclosed. Conservative John has lots of cushion; his return, at 4.8%, is disappointing but positive, a reflection that he has positive cash flow even in a downturn. Helen is just "at the edge" in a downturn and would probably sleep poorly at night, hoping that the market turns around quickly. As its name implies, leverage can make people rich quickly and bankrupt quickly.

Leverage in Good Times ($)

(First Year)	John	Helen	Donald
Number of units	56	56	56
Project cost	3,200,000	3,200,000	3,200,000
Capital cost per unit	57,143	57,143	57,143
Annual rent per unit	11,200	11,200	11,200
Income at full occupancy	627,200	627,200	627,200
Less vacancy factor (5%)	31,360	31,360	31,360
Adjusted gross income	595,840	595,840	595,840
Cash expenses	162,366	162,366	162,366
Depreciation	128,000	128,000	128,000
Income before debt service	305,474	305,474	305,474
Cash flow before debt service	433,474	433,474	433,474
Earning power of the project (%)	9.5	9.5	9.5
Leverage (%)	50	70	90
Equity	1,600,000	960,000	320,000
Debt	1,600,000	2,240,000	2,880,000
Interest cost	128,000	179,200	230,400
Pre-tax net income	177,474	126,274	75,074
Tax	70,989	50,509	30,029
After-tax net income	106,484	75,764	45,044
Cash flow before principal repayment	234,484	203,764	173,044
Principal repayment	34,964	48,949	62,934
Cash flow after principal repayment	199,521	154,815	110,110
Cash return on equity (%)	12.5	16.1	34.4

Leverage in Bad Times ($)

(First Year)	John	Helen	Donald
Number of units	56	56	56
Project cost	3,200,000	3,200,000	3,200,000
Capital cost per unit	57,143	57,143	57,143
Annual rent per unit	8,960	8,960	8,960
Income at full occupancy	501,760	501,760	501,760
Less vacancy factor (20%)	100,352	100,352	100,352
Adjusted gross income	401,408	401,408	401,408
Cash expenses	162,366	162,366	162,366
Depreciation	128,000	128,000	128,000
Income before debt service	111,042	111,042	111,042
Cash flow before debt service	239,042	239,042	239,042
Earning power of the project (%)	3.5	3.5	3.5
Leverage (%)	50	70	90
Equity	1,600,000	960,000	320,000
Debt	1,600,000	2,240,000	2,880,000
Interest cost	128,000	179,200	230,400
Pre-tax net income	–16,958	–68,158	–119,358
Tax	—	—	—
After-tax net income	–16,958	–68,158	–119,358
Cash flow before principal repayment	111,042	59,842	8,642
Principal repayment	34,964	48,949	62,934
Cash flow after principal repayment	76,078	10,893	–54,293
Cash return on equity (%)	4.8	1.1	–17.0

Q11. Answer

To make the funds flow balance on each statement, pay careful attention to whether the balance sheet change is a source or use of funds. Sources of funds are positive on the SCFP, and uses of funds are negative. Balanceco's two statements are as follows:

Balanceco Balance Sheet ($000)

	1998	1999	Source	Use
Assets				
Current Assets				
Cash	15	15		—

Receivables		123		166	43
Short-term investments		—		—	—
Inventory		98		132	34
Prepaid expenses		26		26	—
		262		339	
Fixed Assets					
Land, building, and equipment at cost	800		920		120
Less accumulated depreciation	160		252		92
		640		668	
Long-term investments		—		—	—
Goodwill		—		—	—
Total Assets		902		1,007	
Liabilities					
Current Liabilities					
Short-term credit line		96		252	156
Accounts payable		66		89	23
Accrued expenses		16		20	4
Taxes payable		—		—	—
Current portion of long-term debt		20		20	—
		198		361	
Long-Term Debt					
Repayable grants		—		—	—
Long-term debt		140		120	20
Shareholders' Equity					
Capital shares		500		400	100
Retained earnings		64		106	42
Total liability and equity		902		1,007	
Sources/uses of funds				**Total**	317	317

Balanceco Statement of Cash Flow ($000)

	1999
Operating Activities	
Net earnings for the year	142
Depreciation	92
Changes in non-cash working capital	–50

Subtotal	184
Investing Activities	
Additions to fixed assets	–120
Additions to goodwill and intangibles	—
Subtotal	–120
Financing Activities	
Dividends	–100
Net new long-term borrowings	–20
Net new capital shares	–100
Subtotal	–220
Funds flow	–156
Net cash on hand (start of year)	–81
Net cash on hand (end of year)	–237
Change in cash position	–156

The cash flow from operations is healthy, even after the use of $50K for increased working capital. However, there are three major drains on cash: a substantial investment in new equipment, $120K, greater than depreciation, plus a dividend of $100K, plus the buyback of shares of $100K. Only $20K comes from net new borrowing, and there is a heavy draw, $156K, on the short term credit line which is now too high for a bank to accept. Balanceco would have been far sounder had the two remaining owners used their dividend to buy out the retiring shareholder and left the $100K of equity in the company. The bank would likely have shut down Balanceco or prohibited the dividend payout.

The statement of cash flow makes the information all available on a single page so you can reach your conclusions more confidently and quickly.

Q12. Answer:

The statement of cash flow clearly exposes management's judgment by showing what is done with funds. In years 1 and 2, the company is growing: investment in new assets is much higher than depreciation, meaning the net value of fixed assets on the balance sheet must be increasing. The investment program is so aggressive that it cannot be funded from cash available from operations: there is an increase in long-term debt in both years. Finally, the company pays no dividend: its owners are focused on growth of the company, not taking earnings out of the business.

There is a dramatic change in years 3 and 4. The new owners take a dividend out of the company. They reduce investment in new assets to a level lower than depreciation (and as a result, the net value of fixed assets on the balance sheet must be declining). Finally, they make healthy payments to reduce long-term debt.

Neither approach is better than the other. Management values should reflect the values of the owners, and the change in ownership of this company has led to different values.