Chapter 1

The Role of Working Capital

Contents

Answers to Questions:

1. Inventory is purchased on credit creating an accounts payable. The inventory is sold for cash or on credit generating an accounts receivable. Receivables are collected for cash. Payables are paid out of cash from sales, by drawing down liquid reserves, or by borrowing.

2. Noncash charges such as depreciation and amortization and changes in working capital are the primary causes for cash flow to diverge from profit. They will be the same when depreciation is zero and/or when there are no changes in the working capital accounts.

   Note that changes in balance sheet accounts do not always directly reflect changes in cash flows. Consider, for instance an increase in receivables of $1,000 with a GPM of 45%. The cost of (cash flows associated with) adding $1,000 to receivables is effecivly the cost of replacing the items in inventory = (Inc. Inv) * COGS% = $1,000 * 0.65 = $650.00.

3. Managing the cost strucuture to ensure a profitable operation and management of working capital to obtain a proper level of liquidity.

4. The five C's of credit help the credit manager in determing who to give credit to and how much credit to give.

5. Collection float involves the time from when a payment is sent until the recipient of the payment medium finally receives cash. Collection float slows down the receipt of cash. For example, a check mailed from Seattle to Miami involves a long delay due to transit time and a delay in getting the check cleared, once deposited.

6. Take finished goods inventory as an example. These inventory items are ready for sale and a firm may have a policy for determing the amount of inventory based on forecasted sales. Having an extra stock of inventory can allow the firm to draw down inventory if sales are underforecasted until production can catch up to the higher than expected sales level.

7. Disbursement float works in favor of the payor. A payor mailing a check from Seattle, and drawn on a Seattle bank,to Miami will not have to expend actual cash until the check arrives in Miami, is deposited by the payee, and the check is routed back to the bank in Seattle on which it is drawn **(until, in other words, actual *value* is transferred)**. Only on the day that the check is presented to the Seattle bank does the payor actually have to have cash in the bank account to cover the check. So, the payor could have kept the cash invested until it is needed to cover the check.

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8. First, the financial manager might have arranged for a credit line so funds could be borrowed to meet the disbursement need. Second, the financial manager might have accumulated a pool of short-term investments that could be liquidated to cover the disbursement.

9. Firms have held inventory as a "shock absorber" for inefficiencies in the production areas as well as for an inability to forecast. Receivables are held to make it convenient for customers to purchase products. Payables exist for the same reason as receivables since a receivable on one balance sheet matches a payables on the purchasers balance sheet.

10. A profitable firm can go bankrupt by not maintaining enough liquidity. It is possible for a profitable firm to have a deficit cash flow due to a mis-managed working capital cycle. Thus cash resources are not available in a timely manner to cover necessary disbursements.

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Solutions to Problems: Chapter 1

1. Calculating cash received.

	Sales	less	Change in Accounts Receivable	equals	Cash Received
a.	$25,000	-	$ 51,000	=	$14,5000
b.	$510,000	-	$ 61,300	=	$48,4700
c.	$215,5000	-	– ($ (21,1050)	=	$216,71500

2. Cash paid to suppliers.

	Beginning Accounts Payable	Ending Accounts Payable	Beginning Inventory	Ending Inventory	Cost of Goods Sold	
Data:	BAP	EAP	BI	EI	COGS	
a.	$0	$61,000	$0	$1,2500		$25,000
b.	$0	$61,000	$3500	$12,5000		$37,000
c.	$500	$3200	$81,000	$5600		$5,000

Calculation of Purchases: (PUR = EI - BI + COGS)

	EI	BI	COGS	PUR
a.	$1,2500	$0	$25,000	$36,2500
b.	$1,52,000	$3500	$37,000	$48,2500

c.	$5600	$81,000	$5,000	$4,7600

Cash payment to suppliers: (COGS + (EI - BI) - (EAP - BAP))
or (PUR - (EAP - BAP))

	PUR	EAP	BAP	Cash Paid
a.	$3,26,500	$61,000	$0	$25,6500
b.	$4,28,500	$61,000	$0	$37,6500
c.	$4,7600	$3200	$500	$4,900

3. Rockwall Enterprises, Inc. - developing a cash flow statement.

Balance Sheet	12/31/031	12/31/042
Cash	$500	$500
Accounts Receivable	$750	$2,000
Inventory	$400	$600
Fixed assets	$1,000	$1,000
Accumulated Depreciation	($400)	($700)
Total Assets	$2,250	$3,400
Accounts Payable	$200	$950
Operating Accruals	$300	$275
Debt	$1,000	$1,000
Common Stock	$500	$500
Retained Earnings	$250	$675
Total Liabilities	$2,250	$3,400

a.)

Income Statement 1/01/041 - 12/31/042		Cash Flow Adjustment	Change	Cash Flow
Sales	$9,000	- Δ A/R	$1,250	$7,750
- Cost of goods sold	$4,500	- Δ A/P	$750	
		+Δ Inv	$200	$3,950
= Gross profit	$4,500		Gross cash margin =	$3,800
- Operating expenses (includes depreciation)	$3,800	- Δ Op Acc	($25)	
		- Δ Dep	$300	$3,525
= Operating profit	$700		Cash operating margin =	$275
- Interest	$100	- Δ Acc Interest	$0	$100
- Taxes	$175	- Δ Acc Taxes	$0	$175
		- Δ Def Taxes	$0	
= Net profit	$425			$0

b.) Discussion: Profit does not equal cash for several reasons. First, the company's revenue was $9,000, but it only collected $7,750 from its customers. Then it expensed COGS of $4,500 but only paid out cash of $3,950 due primarily to an increase in accounts payable. Finally, it expensed $3,800 for operations but paid out only $3,525 due to $300 of the expenses being for depreciation and operating accruals falling by $25.

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4. Landmark International, Inc. - developing a cash flow statement.

Balance Sheet 12/31/031		Balance Sheet 12/31/042
Cash	$200	$550
Accounts receivable	$800	$700
Inventory	$250	$150
Fixed assets	$1,000	$1,000
(Accumulated depreciation)	($400)	($600)
Total Assets	$1,850	$1,800
Accounts payable	$200	$250
Operating accruals	$300	$150
Debt	$750	$395
Common stock	$400	$400
Retained earnings	$200	$605
	$1,850	$1,800

a.) Developing a cash flow statement.

Income Statement 1/01/042 - 12/31/042		Cash Flow Adjustment	Change	Cash Flow
Sales	$4,500	- Δ A/R	($100)	$4,600
- Cost of goods sold	$2,200	- Δ A/P	$50	
		+ Δ Inv	($100)	$2,050
= Gross profit	$2,300	Gross cash margin =		$2,550
- Operating expenses (includes depreciation)	$1,500	- Δ Op Acc	($150)	
		- Δ Dep	$200	$1,450
= Operating profit	$800	Cash operating margin =		$1,100
- Interest	$75	- Δ Acc Interest	$0	$75
- Taxes	$320	- Δ Acc Taxes	$0	$320
	$0	- Δ Def Taxes	$0	$0
= Net profit	$405			$705

Profit does not equal cash for several reasons. First, Landmark generated revenues of $4,500, yet it collected cash of $4,600 by drawing down its

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balance of receivables by $100. Second, it expensed $2,200 for COGS but only paid out cash of $2,050 by increasing accounts payable $50 and by accumulating inventory of $100. It then expensed $1,500 for operations but only paid out $1,450 due to depreciation of $200 and a decrease of accruals of $150. This resulted in $705 of operating cash flow. Out of this, $355 of debt was paid off, leaving $350 excess cash to add to the beginning cash balance of $200 resulting in an ending balance of $550.

5. Brothers, Inc. - developing a cash flow statement.

	Balance Sheet 12/31/03~~1~~	Balance Sheet 12/31/04~~2~~
Cash	$1,000	($100)
Accounts receivable	$1,500	$1,850
Inventory	$1,750	$2,100
Fixed assets	$3,000	$3,500
(Accumulated depreciation)	($800)	($900)
Total Assets	$6,450	$6,450
Accounts payable	$1,250	$800
Operating accruals	$450	$500
Accrued Interest	$0	$50
Deferred Taxes	$0	$100
Debt	$2,750	$2,000
Common stock	$1,000	$1,000
Retained earnings	$1,000	$2,000
	$6,450	$6,450

a.) Developing the cash flow statement

Income Statement 1/01/042 - 12/31/042		Cash Flow Adjustment	Change	Cash Flow
Sales	$9,000	- Δ A/R	$350	$8,650
- Cost of goods sold	$4,000	- Δ A/P	($450)	
		+ Δ Inv	$350	$4,800
= Gross profit	$5,000	Gross cash margin =		$3,850
- Operating expenses (includes depreciation)	$3,000	- Δ Op Acc	$50	
		- Δ Dep	$100	$2,850
= Operating profit	$2,000	Cash operating margin =		$1,000
- Interest	$200	- Δ Acc Interest	$50	$150
- Taxes	$800	- Δ Def Taxes	$100	$700
= Net profit	$1,000			$150

b.) ~~**b.)**~~ Brothers, Inc. generated revenues of $9,000 but only collected $8,650. It expensed $4,000 for cost of sales, but paid out $4,800 in cash payments. It expensed $3,000 for operations but only paid out $2,850 in cash due to an increase in accruals and depreciation. It expensed $1,000 for interest and taxes but only paid out $850 due to accruals and deferrals resulting in an operating cash flow of $150. The company then paid down debt by $750 and bought fixed assets of $500. Thus net cash flow was a deficit of $1,100. This added to the beginning cash balance of $1,000 resulting in an ending cash balance of ($100).

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~~-Karl Borden~~
~~Professor of Financial Economics~~
~~University of Nebraska~~
~~Kearney, NE~~

Solution to Just For Feet, Inc.: Chapter 2

Just For Feet, Inc. Financials and Financial Ratios

ASSETS	30-Jan-99	31-Jan-98
Cash and equivalents	$12,412	$82,490
Accounts receivable	18,875	15,840
Merchandise inventory	399,901	206,128
Other	18,302	6,709
Total Current Assets	449,490	311,167
Property and Equipment, net	160,592	94,529
Goodwill, net	71,084	36,106
Other	8,230	6,550
Total Fixed Assets	239,906	137,185
Total Assets	689,396	448,352
LIABILITIES AND EQUITY		
Short-term borrowings		90,667
Accounts payable	100,322	51,162
Accrued expenses	24,829	9,292
Income taxes		1,363
Short-Term Deferred income taxes	902	
Current maturities	6,639	3,222
Total Current Liabilities	132,692	155,706
Long-term obligations	216,203	16,646
Deferred lease rentals	13,162	7,212
Long-Term Deferred income taxes	1,633	704
Total Long Term Liabilities	230,998	24,562
Common stock	3	3
Paid-in capital	249,590	218,616
Retained earnings	76,113	49,465
Total Shareholders' Equity	325,706	269,084
Total Liabilities	689,396	448,352

STATEMENT OF EARNINGS	Fiscal 1998	Fiscal 1997
Net sales	774,863	478,638
Cost of sales	452,330	279,816
Gross profit	322,533	198,822
Franchise fees, royalties, etc	1,299	1,101
Operating expenses		
Store operating	232,505	139,659
Store opening costs	13,669	6,728
Amortization of intangibles	2,072	1,200
General and administrative	24,341	18,040
Total operating	272,587	165,627
Operating income	51,245	34,296
Interest expense	-8,059	-1,446
Interest income	143	1,370
Earnings before income taxes	43,329	34,220
Provision of income tax	16,681	12,817
Net earnings	26,648	21,403
Shares outstanding	30,737	29,615
Diluted	31,852	30,410

STATEMENT OF CASH FLOWS	Fiscal 1998	Fiscal 1997
Net earnings	26,648	21,403
Adjustments to reconcile net earnings to net cash used by operating activities		
Depreciation and amortization	16,129	8,783
Deferred income taxes	12,100	2,194
Deferred lease rentals	2,655	2,111
Change in assets and liabilities		
Accounts receivable	-2,795	-8,918
Merchandise inventory	-170,169	-56,616
Other assets	-8,228	-5,643
Accounts payable	34,638	7,495
Accrued expenses	7,133	2,264
Income taxes	-181	543
Net cash used by operating activities	-82,070	-26,384
Net cash used for investing activities	-79,183	-32,067
Net cash provided by financing activities	91,175	2,156
Net (decrease) increase in cash and cash equivalents	-70,078	-56,295

RATIOS	1998	1997	
Current ratio	3.39	2.00	
Quick ratio	0.37	0.67	
Net working capital, NWC	316,798	155,461	
Net liquid balance, NLB	5,773	-11,399	
Working capital requirements, WCR	311,025	166,860	
WCR/Sales	0.40	0.35	(similar
Cash flow from operations	-82,070	-26,384	to W.T.
Cash conversion period	250.63	214.22	Grant
Days inventory held, DIH	322.69	268.88	CCP in
Days sales outstanding, DSO	8.89	12.08	the early
Days payables outstanding, DPO	80.95	66.74	70's)
Current liquidity index	0.0045		
Total assets / total sales, A/S	0.8897	0.9367	
After-tax profit ratio, m	0.0344	0.0447	
Dividend payout ratio, d	0	0	
Debt to equity ratio, D/E	0.7092	0.0913	
Sustainable growth rate, g*	7.07%	5.50%	
Actual sales growth rate, g	61.89%		

a.) Current ratio versus quick ratio
The current ratio increased primarily due to the significant increase in inventory. The quick ratio fell because current assets other than inventory fell relative to the slight decline in current liabilities.

b.) Discussion of working capital cycle
Days inventory held increased from 268 days in fiscal 1997 to 322 days in 1998. Days sales outstanding decreased from 12 days to 9 days. Days payables outstanding increased from 67 days to 81 days. Thus the cash conversion period increased from 214 days to 250 days.

c.) Ability to pay current obligations
The company's operations generated a deficit cash flow each of the two years which explains the dwindling cash balance.

d.) Solvency and liquidity positions
While the current ratio increased from 2 to 3.39, this increase can be attributed to the increased inventory and not to increased liquidity. The current liquidity index is approximately zero which indicates that the company has no liquid resources to cover currently maturing debt.

e.) The sustainable growth rate
From 1997 to 1998, sales grew almost 62%. However the sustainable growth rate calculated using year-end 1997 figures was only 8.66%. To finance this excess growth, the company's debt-to-equity ratio increased in 1998 to 1.11 from a level of .67 in 1997.

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f.) Conclusions

While earnings increased and the company's current ratio increased from 1997 to 1998, the company's operations generated an increasing deficit cash flow level; and the company's current liquidity index shows a lack of any liquid resources relative to the current level of debt due. The company is in a significant liquidity crisis.

Chapter 2

Analysis of Solvency, Liquidity, and Financial Flexibility

Contents

Answers to Questions:

1. Solvency exists when the value of a firm's assets exceeds the value of its liabilities. Liquidity is impacted by the time an asset takes to be converted into cash and at what cost.

   TEACHING NOTE: It may be helpful to observe the difference between "book value" solvency based on historical values reflected in accounting systems and "market value" solvency reflecing a combination of mark-to-market values and opportunity costs.

2. Liquidity may also be viewed as the ability of the firm to augment its future cash flows to cover any unforeseen needs or to take advantage of any unforeseen opportunities. This concept of liquidity is referred to as financial flexibility.

3. Sustainable growth rate refers to the growth in sales that can occur given a target profit margin, asset turnover, dividend policy, and debt ratio, such that the firm is not forced to issue new common stock. Thus the sustainable growth is that growth rate at which the firm can grow without raising additional external capital or having to change financial policies.

4. By comparing the balance sheet stock account, such as accounts receivable, to a related income statement flow variable, such as sales which results in a turnover ratio.

5. Lambda includes information about the volatility of expected cash flows. Thus lambda allows the analyst to assess the probability of running out of cash.

6. Perhaps the most important and useful piece of information is the dollar amount of cash provided or used by the firm's operating activities.

7. A current ratio of 2.00 indicates that the firm has $2.00 of current assets for each dollar of current liabilities. A current liquidity index of 2.00 indicates that the firm has $2.00 of cash resources available through cash flow and cash balances to cover each dollar of currently maturing debt. Liquidity focuses more on the ability to actually pay obligations from on-going operations while solvency is more general and is focused more on the coverage relationship between assets and liabilities.

8. Because it is focused on the conversion of asset and liability accounts into cash flow rather than just just being concerned about the relative sizes of the stocks of these accounts.

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9. These two measures have a coverage component similar to the current ratio but they also have a time or flow dimension as a result of including a measure of cash flow which relates to the concept of liquidity.

10. A firm can have a high current ratio, for example, by having a large balance of uncollectible receivables and obsolete inventory that is financed by long-term funds. Liquidity measures would then be relatively low if these assets are not generating cash flow.

11. This is an open ended response but one can refer back to the answer to question 3.

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Solutions to Problems: Chapter 2

1. Calculating Lambda.

ASSUMPTIONS

Year	Forecasted Cash Flow	End of Year Cash Assets		Lambda
1994	15	100		
1995	90			
1996	-18	350		
1997	295	40	(350+295) / (1620/6) = *	
1.875	43.500			
1998	4100	520	(40+4100) / (315/6) = **	
8.056	.000			
1999	8105	210	(520+8105) / (520/6) =	(etc.)
15.637	.500			
2000	1997	130	015	(2+0) / (6/6) =
2.084	.000			
2001	1998	290	25	(0+2) / (8/6) =
1.521	.000			
2002	1999	-175	430	(5+(-1)) / (8/6) =
3.0	15.000			
2003	2000	-25	140	(4+5) / (3/6) =
0.545	18.0***			
2004	2001	580		(1+8) / (6/6) =
4.696	9.0			

*Note: Dividing the range by 6 is a simple approximation to the standard deviation.

**Note: From 1995 to 1997, the *largest difference* is between 820 and -1 = 3.95.

***Note: This implies about a 30% chance of running out of cash.

$$\text{Lambda} = \frac{\text{Initial Liquid Reserve} + \text{Total anticipated net cash flow during the analysis horizon}}{\text{Uncertainty about the net cash flow during the analysis horizon}} = \text{Cash flow per deviation}$$

The firm generally has excessive liquidity except for the year 1999 where its lambda value less than 1. Remember that a lambda of 3 implies about a 1/1000

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chance that the firm will run out of cash. A lambda of 2~~1.645~~ gives a 2.25% probability of running out of cash.

2.

$$\text{Lambda} = \frac{\text{Initial Liquid Reserve} + \text{Total anticipated net cash flow during the analysis horizon}}{\text{Uncertainty about the net cash flow during the analysis horizon}}$$

a. Lambda = ($500 + $3,000)/$2,127 = 1.646; Probability of cashout = 5%
b. Lambda = ($1,000 + $200)/$729 = 1.646; Probability of cashout = 5%
c. Lambda = ($100 + $1,500)/$972 = 1.646; Probability of cashout = 5%

Explanation: Although it is counterintuitive, all three scenarios have the same probability of a "cashout" due to illiquidity. Scenario "a" has the largest anticipated net cash flow for the coming period but low initial reserves and high cash flow uncertainty (variability); scenario "b" has high initial reserves but low net cash flow and low uncertainty; scenario "c" has moderate anticipated cash flow, low reserves, but relatively low uncertainty. The three competing factors equally and exactly offset each other to produce identical liquidity positions.

3~~2~~. **Calculating and interpreting ratios (shaded areas used in calculations).**
ASSUMPTIONS:
Balance Sheets
(*current assets shaded*)

	2000~~1998~~	2001~~1999~~	2002~~2000~~	2003~~1~~	2004~~2~~
Cash & Equivalents	$75	$75	$90	$100	$100
Accounts Receivable	300	400	600	550	500
Inventory	150	250	350	250	250
Gross Fixed Assets	7~~6~~00	8~~7~~00	9~~8~~00	9~~8~~00	9~~8~~00
(Accumulated Depr)	(75)	(125)	(190)	(260)	(335)
Total Assets	$1,10~~9~~50	$1,43~~0~~0	$1,76~~5~~0	$1,54~~4~~0	$1,43~~1~~5

(*current liabilities shaded*)

Accounts Payable	$125	$175	$250	$225	$200
Notes Payable	165	162	178	136	99
Accrued Operating Exp.	10	63	65	49	36
Current Maturities	50	98	100	40	40
Long-Term Debt	6500	5400	4300	2100	150
Shareholders Equity	200	402	757.2	890.2	890.2
Total Liabilities & NW	$1,1050	$1,4300	$1,7650	$1,5440	$1,4315

Income Statements

Revenues (Sales)	$1,500	$2,250	$3,000	$2,000	$1,500
Cost of Goods Sold	600	900	1,200	800	600
Operating Expenses	600	797	895	750	725
Depreciation	35	50	65	70	75
Interest	30	33	28	25	10
Taxes	94	188	325	142	36
Net Profit	141	282	487.2	213	54
Dividends	40	80	132	80	54

a.) SOLVENCY RATIOS **20001998** **20011999** **20020** **20031** **20042**

Current Ratio	1.50	1.46	1.75	2.00	2.27
Quick Ratio	1.07	0.95	1.16	1.44	1.60
NWC	175	227	447	450	475
WCR	315	412	635	526	514
NLB	-140	-185	-188	-76	-39
WCR/S	21.00%	18.31%	21.17%	26.30%	34.27%

Example of calculations for 20001998:

Current Ratio = CA / CL = (CASH + A/R + INV) / (A/P + NP + ACC + CMLTD)
= (75 + 300 + 150) / (125 + 165 + 10 + 50) = 1.50

Quick Ratio = (CA - INV) / CL = (75 + 300) / (125 + 165 + 10 + 50) = 1.07

NWC = CA - CL = (75 + 300 + 150) - (125 + 165 + 10 + 50) = $175

WCR = AR + INV + PP + OTHER CA - AP - ACC - OTHER CL
= 300 + 150 + 0 + 0 - 125 - 10 - 0 = $315

NLB = CASH + MS - NP - CMLTD = 75 + 0 - 165 - 50 = - $140

WCR/S = WCR in relative terms (% of sales) = 315 / 1500 = 21%

Discuss and interpret: As the numbers for the ratios indicate, the company's level of solvency is increasing each year (with the single exception of 20011999 showing a slight downturn). The coverage of short- term creditors, as evidenced by the current ratio, for example, increases from $1.50 of current assets per dollar of current liabilities in 20001998 to $2.27 of current assets for every dollar of current liabilities in 20042002.

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b.) Calculating operating cash flows. 20011999 20020 20031 20042

Net Income	$282	$487	$213	$54
Depreciation	50	65	70	75
(Increase) decrease in AR	-100	-200	50	50
(Increase) decrease in INV.	-100	-100	100	0
Increase (decrease) in AP	50	75	-25	-25
Increase (decrease) in Accruals	53	2	-16	-13
Net Cash Flow From Operations	$235	$329	$392	$141

Example of calculations for 20011999:
Net Cash Flow = 282 + 50 - 100 –100 + 50 + 53 = $235

Interpret the 4-year trend: While solvency generally increased with over a 10 percent increase in the current ratio from 20031 to 20042, the level of cash flow generated from operations declined significantly in 20042 from a level of $392 for 20031 to $141 for 20042.

c.) Calculating the cash conversion period.
Days Sales Outstanding = Receivables / (Sales / 365)
Days Inventory Held = Inventory / (COGS / 365)
Days Payable Outstanding = Payables / (COGS / 365) *
Purchases = Ending inventory - Beginning inventory + Cost of Goods Sold
Operating Cycle = Days Sales Outstanding + Days Inventory Held
Cash Conversion Period = Operating Cycle - Days Payable Outstanding

***Note:** As an approximation, and for reasons outlined in footnote 7 in the text, COGS will be used instead of Purchases in the calculations below.

Example of Calculations for 20001998
DSO = Receivables / (Sales / 365) = 300 / (1500 / 365) = 73.00
DIH = Inventory / (COGS / 365) = 150 / (600 / 365) = 91.25
DPO = Payables / (COGS / 365) = (125 / 600) * 365 = 76.04
Operating Cycle (OC) = DSO + DIH = 73.00 + 91.25 = 164.25
CCP = OC - DPO = 164.25 - 76.04 = 88.21

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	20001998	20011999	2020	2031	2042	
Days Sales Outstanding	73.00	64.89	73.00	100.38	121.67	
Days Inventory Held	91.25	101.39	106.46	114.06	152.08	
Days Payables Out	76.04	70.97	76.04	102.66	121.67	
Operating Cycle	164.25	166.28	179.46	214.44	273.75	
Cash Conversion Period	NA	88.21	95.31	103.42	111.78	152.08

Interpret the 4-year trend: The cash conversion period showsed a steadily worsening trend over the five year period. It reaches its somewhat erratic trend, increasing and decreasing over the five year period. However, it reached its highest level in 2042, consistent with the lowest level of cash flow generated for the five years.

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d.) Calculating the current liquidity index.

Use assumptions below plus Balance Sheet above

ASSUMPTIONS (**Note:** the cash flows in this section are intentionally different from the actual cash flows calculated from the financial statement so that the correct cash flow numbers are not given away to the student.)

Year	**Cash Flow**	**Liquidity Index**
20011999	$250	1.51
2020	$400	1.83
2031	$350425	1.5885
2042	$130	1.31

$$\text{Liquidity Index} = \frac{\text{Cash Assets (t - 1) + Cash Flow From Operations (t)}}{\text{Notes Payable (t - 1) + Current Maturing Debt (t - 1)}}$$

Example calculation for 20011999: LI = (75 + 250) / (165 + 50) = 1.51

Interpret the 4-year trend: Notice the departure of trend in 2002. The current ratio increased while the liquidity index decreased.

e.) Current ratio versus liquidity index.

	20011999	**2020**	**2031**	**2042**
Liquidity Index	1.51	1.83	1.85	1.31
Current Ratio	1.46	1.75	2.00	2.27

Interpretation: Notice the departure of trend in 2042. The comparison between cash flow, or liquidity measures (such as the liquidity index) and solvency measures (such as the current ratio) do indeed measure different aspects of the company's financial condition. In this case, the increasing balances in

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receivables and inventory add to the numerator of the current ratio which adds to the solvency measure, but on the other hand reduces the liquidity of the organization as more and more resources are tied up in slower moving receivables and inventory.

f.) Interpretation of the firm's liquidity position.

Although solvency (as shown by the current ratio) has increased, the company's liquidity position (as shown by the liquidity index, as well as by the level of operating cash flow and the cash conversion period) indicate a tightening of liquidity as the company's sales fall. The level of liquidity peaked in 20031 and fell in 20042 while the level of solvency continued to rise in 20042.

43. Sustainable sales growth versus actual sales growth.

ASSUMPTIONS	12000998	20011999	20020	20031	20042
(*current assets shaded*)					
Cash & Equivalents	$75	$75	$90	$100	$100
Accounts Receivable	300	400	600	550	500
Inventory	150	250	350	250	250
Gross Fixed Assets	7600	8700	9800	9800	9800
(Accumulated Depr)	(75)	(125)	(190)	(260)	(335)
Total Assets	$1,1050	$1,4300	$1,7650	$1,5440	$1,4315
(*current liabilities shaded*)					
Accounts Payable	$125	$175	$250	$225	$200
Notes Payable	165	162	178	136	99
Accrued Operating Exp.	10	63	65	49	36
Current Maturities	50	98	100	40	40
Long-Term Debt	6500	5400	4300	2100	1-50
Shareholders Equity	200	402	757.2	890.2	890.2
Total Liabilities & NW	$1,1050	$1,4300	$1,7650	$1,5440	$1,4315

Revenues (Sales)	$1,500	$2,250	$3,000	$2,000	$1,500
Cost of Goods Sold	600	900	1,200	800	600
Operating Expenses	600	797	895	750	725
Depreciation	35	50	65	70	75
Interest	30	33	28	25	10
Taxes	94	188	325	142	36
Net Profit	141	282	487	213	54
Dividends	40	80	132	80	54

$$m * (1 - d) * [1 + (D / E)]$$

$$g^* = \text{sustainable growth rate} = \frac{}{A/S - \{m * (1 - d) * [1 + (D / E)]\}}$$

S = prior year sales
gS = change in sales during the planning year, where g is the sales growth rate
A / S = target ratio of total assets to total sales
m = projected after-tax profit ratio
d = target dividend payout ratio (ratio of dividends to earnings)
D / E = target debt-to-equity ratio

Example of calculation for 20011999 (using 20001998 parameters):

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$$g^* = \frac{0.0940 * (1 - 0.2837) * (1 + 4.725)}{0.76670 - 0.0940 * (1 - 0.2837) * (1 + 4.725)} = 102.02\%$$

	20001998	**20011999**	**20020**	**20031**	**20042**
S =	1,500.00	2,250.00	3,000.00	2,000.00	1,500.00
gS =	-------	0.5000	0.3333	(0.3333)	(0.2500)
A/S =	0.7667000	0.62225778	0.5833500	0.7200	0.94338767
m =	0.0940	0.1253	0.1624	0.1065	0.0360
d =	0.2837	0.2837	0.2709	0.3756	1.0000
D/E =	4.7200	2.48262338	1.31141793	0.73026178	0.58984774

Note: Numbers in the table have been carried to 4 decimal places due to the sensitivity of the g* calculation.

Sustainable Growth Rate (g*)	102.02%	101.00%	88.38%	17.57%
(Based on prior year ratios)				
Actual Sales Growth Rate	50.00%	33.33%	-33.33%	-25.00%

Interpretation: To calculate the sustainable growth rate for a particular year, we use the numbers for the previous year. In other words, the financial numbers, for example, for 20001998 determine the rate of sustainable growth for 20011999. The calculated sustainable growth rate for 20011999 is then compared to the actual growth rate for 20011999. For example, the company's sales grew 50 percent from 1998 to 1999 while the sustainable growth rate was calculated to be 102.02 percent. Based on the financial policies of the firm at the end of 20001998, the company actually had the ability to grow at a higher rate than it did without straining the company's financial resources. Since the company grew at a

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slower rate, it was able to pay down some of its debt and lower its debt to equity ratio.

54. Calculating and interpreting short-term financial ratios:

ASSUMPTIONS	20001998	20011999	2020	2031	2042
(current assets shaded)					
Cash & Equivalents	$25	$75	$100	$50	$25
Accounts Receivable	450	700	1,200	2,000	3,000
Inventory	400	500	800	1,400	2,500
Gross Fixed Assets	1,000	1,000	1,500	1,500	2,500
(Accumulated Depr)	(200)	(250)	(350)	(400)	(550)
Total Assets	$1,675	$2,025	$3,250	$4,550	$7,475

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(current liabilities shaded)

Accounts Payable	$100	$200	$400	$700	$1,226
Notes Payable	50	275	1,092	598	1,550
Accrued Operating Exp.	60	55	60	70	80
Current Maturities	50	50	50	50	200
Long-Term Debt	400	382	330	1,508	2,315
Shareholders Equity	1,015	1,063	1,318	1,624	2,104
Total Liabilities & NW	$1,675	$2,025	$3,250	$4,550	$7,475
Revenues (Sales)	$1,500	$2,250	$3,750	$5,500	$9,000
Cost of Goods Sold	750	1,125	1,875	2,750	4,500
Operating Expenses	700	750	900	1,600	2,500
Depreciation	100	50	100	50	150
Interest	40	45	100	200	400
Taxes	(36)	112	310	360	580
Net Profit	(54)	168	465	540	870
Dividends	45	120	210	234	390

a.) SOLVENCY RATIOS **2000** **2001** **2002** **2003** **2004**~~1998 1999 2000 2001 2001~~

Current Ratio	3.37	2.20	1.31	2.43	1.81
Quick Ratio	1.83	1.34	0.81	1.45	0.99
NWC	615	695	498	2032	2469
WCR	690	945	1540	2630	4194
NLB	-75	-250	-1042	-598	-1725
WCR / S	46.00%	42.00%	41.07%	47.82%	46.60%

Example of calculations for 2000~~1998~~ (see definitions in problem 3~~2~~):

Current Ratio = (25 + 450 + 400) / (100 + 50 + 60 + 50) = 3.365
Quick Ratio = (25 + 450) / (100 + 50 + 60 + 50) = 1.827
NWC = (25 + 450 + 400) - (100 + 50 + 60 + 50) = $615
WCR = (450 + 400 + 0 + 0) - (100 + 60 + 0) = $690
NLB = 25 + 0 - 50 - 50 = - $75
WCR / S = (690 / 1500) * 100 = 46.0%

Discuss and interpret the trends: As the numbers for the current and quick ratios indicate, company's level of solvency first declined from 2000~~1998~~ to 2002~~0~~, then increased for two years, and then declined during the last year. The level of net working capital and working capital requirements rose and fell also, but they ended the five-year period at a substantially higher level than they began with in 2000~~1998~~ because of the general growth of the company.

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b.) Calculating operating cash flows. 2001 2002 2003 2004~~1999 2000 2001 2002~~

Net Income	$168	$465	$540	$870
Depreciation	50	100	50	150
(Increase) decrease in AR	(250)	(500)	(800)	(1,000)
(Increase) decrease in INV.	(100)	(300)	(600)	(1,100)
Increase (decrease) in AP	100	200	300	526
Increase (decrease) in Accruals	(5)	5	10	10
Net Cash Flow From Operations	($37)	($30)	($500)	($544)

Example of calculations for 2001~~1999~~:
Net Cash Flow = 168+50-250-100+100-5 = (37)

Interpret the 4-year trend: The level of cash flow from operations shows a decidedly bleak picture with the company running an increasing deficit cash flow position.

c.) Calculating the cash conversion period.
Days Sales Outstanding = Receivables / (Sales / 365)
Days Inventory Held = Inventory / (COGS / 365)
Days Payable Outstanding = Payables / (COGS / 365)
Purchases = Ending inventory - Beginning inventory + Cost of Goods Sold
Operating Cycle = Days Sales Outstanding + Days Inventory Held
Cash Conversion Period = Operating Cycle - Days Payable Outstanding

Example of calculations for 2000~~1998~~:
***Note:** As an approximation, and for reasons outlined in footnote 7 in the text, COGS will be used instead of Purchases in the calculations below.

DSO = Receivables / (Sales / 365) = 450 / (1500 / 365) = 109.50
DIH = Inventory / (COGS / 365) = 400 / (750 / 365) = 194.67
DPO (using COGS in denominator vs. Purchases) = (100 / 750) * 365 = 48.67
Operating Cycle (OC) = DSO + DIH = 304.17
CCP = Operating Cycle (OC) - DPO = 304.17 - 48.67 = 255.50

	2000	2001	2002	2003	2004~~1998 1999 2000 2001 2002~~
Days Sales Outstanding	109.50	113.56	116.80	132.73	121.67
Days Inventory Held	194.67	162.22	155.73	185.82	202.78
Days Payable Outstanding	NA	48.67	64.89	77.87	92.91	99.44
Operating Cycle	304.17	275.78	272.53	318.55	324.44
Cash Conversion Period	NA	255.50	210.89	194.67	225.64	225.00

Interpret the 5-year trend: The cash conversion period shows a general decline,

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falling from 255 days to over 225 days. This increase of cash conversion is due to a slowing in the payout to the company's suppliers even though days sales outstanding increased as did the number of days inventory is held.

d.) **Use assumptions below plus Balance Sheet above:**
ASSUMPTIONS (**Note:** the cash flows in this section are intentionally different from the actual cash flows calculated from the financial statement so that the correct cash flow numbers are not given away to the student.)

Year	**Cash Flow**	**Liquidity Index**
2001~~1999~~	40	0.65
200~~20~~	-75	0.00
200~~31~~	-550	-0.39
200~~42~~	-650	-0.93

$$\text{Liquidity Index} = \frac{\text{Cash Assets (t - 1) + Cash Flow From Operations (t)}}{\text{Notes Payable (t - 1) + Current Maturing Debt (t - 1)}}$$

Example of calculation for 2001~~1999~~: LI = (25 + 40) / (50 + 50) = 0.65
Interpret the 4-year trend: Based on the cash flow numbers provided for this section, the current liquidity index also indicates a very illiquid position with a negative balance the last two years.

e.)

	2001	**2002**	**2003**	**2004**~~**1999**~~	~~**2000**~~ ~~**2001**~~ ~~**2002**~~
Liquidity Index	0.65	0.00	-0.39	-0.93	
Current Ratio	2.20	1.31	2.43	1.81	

Comparison of current ratio and liquidity index: Comparison of the current ratio with the current liquidity index indicates that the two ratios must indeed be measuring different aspects of the company's financial position. The current liquidity index indicates that the company does not have enough internal liquid resources to cover its maturing debt obligations while the level of the current ratio paints a less bleak picture of its ability to pay maturing obligations and maintain operations.

f.) **Interpretation of the firm's liquidity position:** The company is in a very illiquid position and is unable to cover its currently maturing obligations with internal cash resources. Therefore it must refinance those obligations as evidenced by the increasing level of debt on the balance sheet.

6~~5~~. Sustainable sales growth versus actual sales growth.

ASSUMPTIONS	**2000**	**2001**	**2002**	**2003**	**2004**~~**1998**~~ ~~**1999**~~ ~~**2000**~~ ~~**2001**~~ ~~**2002**~~
(current assets shaded)					
Cash &Equivalents	$25	$75	$100	$50	$25
Accounts Receivable	450	700	1,200	2,000	3,000
Inventory	400	500	800	1,400	2,500
Gross Fixed Assets	1,000	1,000	1,500	1,500	2,500

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(Accumulated Depr)	(200)	(250)	(350)	(400)	(550)
Total Assets	$1,675	$2,025	$3,250	$4,550	$7,475
(current liabilities shaded)					
Accounts Payable	$100	$200	$400	$700	$1,226
Notes Payable	50	275	1,092	598	1,550
Accrued Operating Exp.	60	55	60	70	80
Current Maturities	50	50	50	50	200
Long-Term Debt	400	382	330	1,508	2,315
Shareholders Equity	1,015	1,063	1,318	1,624	2,104
Total Liabilities & NW	$1,675	$2,025	$3,250	$4,550	$7,475
Revenues (Sales)	$1,500	$2,250	$3,750	$5,500	$9,000
Cost of Goods Sold	750	1,125	1,875	2,750	4,500
Operating Expenses	700	750	900	1,600	2,500
Depreciation	100	50	100	50	150
Interest	40	45	100	200	400
Taxes	(36)	112	310	360	580
Net Profit	(54)	168	465	540	870
Dividends	45	120	210	234	390

$$g^* = \text{sustainable growth rate} = \frac{m * (1 - d) * [1 + (D / E)]}{A / S - \{m * (1 - d) * [1 + (D / E)]\}}$$

	2000	2001	2002	2003	2004~~1998~~
~~1999~~ ~~2000~~ ~~2001~~ ~~2002~~					
S =	$1,500	$2,250	$3,750	$5,500	$9,000
gS =	-----	0.5000	0.6667	0.4667	0.6364
A/S =	1.1167	0.9000	0.8667	0.8273	0.8306
m =	(0.0360)	0.0747	0.1240	0.0982	0.0967
d =	(0.8333)	0.7143	0.4516	0.4333	0.4483
D/E =	0.6502	0.9050	1.4659	1.8017	2.5528

Note: numbers in table have been carried to 4 decimal places due to sensitivity of g* calculation. See definitions in problem ~~43~~.

Example of calculation for 2001~~1999~~ (using 2001~~1998~~ parameters):

$$g^* = \frac{[-0.0360 * (1 + 0.8333) * (1 + 0.6502)}{1.1167 - (-0.0360) * (1+ 0.8333) * (1 + 0.6502)} = -8.886\%$$

Sustainable Growth Rate -	8.89%	4.73%	23.99%	23.22%

(Based on prior year ratios)

Actual Sales Growth Rate	50.00%	66.67%	46.67%	63.64%

Interpretation: In all years, the firm's actual growth rate exceed its sustainable growth rate. As a result, the company had to substantially increase its reliance of debt financing as evidenced by the significantly rising D/E ratio.

7. Calculating and interpreting short-term financial ratios:

ASSUMPTIONS	2000	2001	2002	2003	2004
(current assets shaded)					
Cash & Equivalents	$25	$75	$100	$50	$25
Accounts Receivable	750	534	416	312	243
Inventory	125	157	160	138	121
Gross Fixed Assets	1,000	1,000	1,000	1,000	1,000
(Accumulated Depr)	(200)	(300)	(400)	(500)	(600)
Total Assets	$1,700	$1,466	$1,276	$1,000	$ 789
(current liabilities shaded)					
Accounts Payable	$125	$163	$160	$138	$121
Notes Payable	850	300	141	47	0
Accrued Operating Exp.	100	75	50	40	30
Current Maturities	50	50	50	50	50
Long-Term Debt	0	303	300	150	88
Shareholders Equity	575	575	575	575	500
Total Liabilities & NW	$1,700	$1,466	$1,276	$1,000	$789
Revenues (Sales)	$9,000	$5,500	$3,750	$2,500	$1,750
Cost of Goods Sold	4,500	2,750	1,875	1,250	875
Operating Expenses	3,000	1,600	1,065	925	888
Depreciation	100	100	100	100	100
Interest	40	45	35	25	12
Taxes	544	402	270	80	(50)
Net Profit	816	603	405	120	(75)
Dividends	816	603	405	120	0

a.) SOLVENCY RATIOS	2000	2001	2002	2003	2004
Current Ratio	0.80	1.30	1.69	1.82	1.94
Quick Ratio	0.69	1.04	1.29	1.32	1.33
NWC	(225)	178	275	225	188
WCR	650	453	366	272	213
NLB	(875)	(275)	(91)	(47)	(25)
WCR / S	7.22%	8.24%	9.76%	10.88%	12.17%

Example of calculations for 2000 (see definitions in problem 3):

Current Ratio = (25 + 750 + 125) / (125 + 850 + 100 + 50) = 0.80

Quick Ratio = (25 + 750) / (125 + 850 + 100 + 50) = 0.69

NWC = (25 + 750 + 125) - (125 + 850 + 100 + 50) = ($225)

WCR = (750 + 125 + 0 + 0) - (125 + 100 + 0) = $650
NLB = 25 + 0 - 850 - 50 = ($875)
WCR / S = (650 / 9,000) * 100 = 7.22%

Discuss and interpret the trends: As the numbers for the current and quick ratios indicate, company's level of solvency is continually improving from 2000 to 2002 – but that is a very misleading picture. Liquidity as measured by NLB is likewise improving during that same time, but remains in poor condition. Note that revenue is declining substantially, and assets are shrinking to match. Working capital required is up slightly, but total working capital is down – indicating a slight time lag as the company pares asset levels in response to declining sales. This appears to be a company that is facing a severe market contraction. Management is trying to shrink assets in response and return capital

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b.) Calculating operating cash flows.

	2001	2002	2003	2004
Net Income	$603	$405	$120	($75)
Depreciation	100	100	100	100
(Increase) decrease in AR	216	118	104	69
(Increase) decrease in INV.	(32)	(3)	22	17
Increase (decrease) in AP	38	(3)	(22)	(17)
Increase (decrease) in Accruals	(25)	(25)	(10)	(10)
Net Cash Flow From Operations	$900	$592	$314	$84

Example of calculations for 2001:
Net Cash Flow = 603+100+216-32+38-25 = 900

Interpret the 4-year trend: Cash flows from operations decline as revenue declines..

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c.) Calculating the cash conversion period.
Days Sales Outstanding = Receivables / (Sales / 365)
Days Inventory Held = Inventory / (COGS / 365)
Days Payable Outstanding = Payables / (COGS / 365)
Purchases = Ending inventory - Beginning inventory + Cost of Goods Sold
Operating Cycle = Days Sales Outstanding + Days Inventory Held
Cash Conversion Period = Operating Cycle - Days Payable Outstanding

Example of calculations for 2000:
***Note:** As an approximation, and for reasons outlined in footnote 7 in the text, COGS will be used instead of Purchases in the calculations below.

DSO = Receivables / (Sales / 365) = 450 / (1500 / 365) = 109.50
DIH = Inventory / (COGS / 365) = 400 / (750 / 365) = 194.67
DPO (using COGS in denominator vs. Purchases) = (100 / 750) * 365 = 48.67

Operating Cycle (OC) = DSO + DIH = 304.17
CCP = Operating Cycle (OC) - DPO = 304.17 - 48.67 = 255.50

	2000	2001	2002	2003	2004
Days Sales Outstanding	30.42	35.44	40.49	45.55	50.68
Days Inventory Held	10.14	20.84	31.15	40.30	50.47
Days Payable Outstanding	10.14	21.63	31.15	40.30	50.47
Operating Cycle	40.56	56.28	71.64	85.85	101.16
Cash Conversion Period	30.42	34.64	40.49	45.55	50.68

Interpret the 5-year trend: The cash conversion period shows a gradual increase over the five years, and it is apparent that this company is in severe financial difficulty. A careful reading of the numbers, however, suggests that the difficulty is more likely on the marketing side than poor financial management, as the firm appears to be making relatively rational financial decisions and is managing the severe decline with some financial grace. Revenues are declining, and the firm is attempting to make a graceful exit and return capital to shareholders. But the situation is gradually getting out of control, as DPO has increased by 500% over 5 years, masking an even more modest degradation in collections (DPO) and a severe increase in inventory holding periods (DIH). Inventory levels are approximately the same as they were when sales were 5 times as high. The chances are good that much of the excess inventory is not saleable.

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d.) Use assumptions below plus Balance Sheet above:

ASSUMPTIONS (**Note:** the cash flows in this section are intentionally different from the actual cash flows calculated from the financial statement so that the correct cash flow numbers are not given away to the student.)

Year	Cash Flow	Liquidity Index
2001	910	1.04
2002	600	1.93
2003	300	2.09
2004	100	1.55

$$\text{Liquidity Index} = \frac{\text{Cash Assets (t - 1) + Cash Flow From Operations (t)}}{\text{Notes Payable (t - 1) + Current Maturing Debt (t - 1)}}$$

Example of calculation for 2001: LI = (25 + 910) / (850 + 50) = 1.04

Interpret the 4-year trend: Based on the cash flow numbers provided for this section, the current liquidity index also indicates a very illiquid position with a negative balance the last two years.

e.)

	2001	2002	2003	2004

Liquidity Index	0.07	0.00	-2.36	-6.19
Current Ratio	1.30	1.69	1.82	1.94

Comparison of current ratio and liquidity index: Comparison of the current ratio with the current liquidity index indicates that the two ratios must indeed be measuring different aspects of the company's financial position. The current liquidity index indicates that the company does not have enough internal liquid resources to cover its maturing debt obligations while the level of the current ratio paints a positive picture of its ability to pay maturing obligations and maintain operations.

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f.) **Interpretation of the firm's liquidity position:** The company is in a very illiquid position and is unable to cover its currently maturing obligations with internal cash resources.

8. Sustainable sales growth versus actual sales growth.

ASSUMPTIONS	**2000**	**2001**	**2002**	**2003**	**2004**
(current assets shaded)					
Cash & Equivalents	$25	$75	$100	$50	$25
Accounts Receivable	750	534	416	312	243
Inventory	125	157	160	138	121
Gross Fixed Assets	1,000	1,000	1,000	1,000	1,000
(Accumulated Depr)	(200)	(300)	(400)	(500)	(600)
Total Assets	$1,700	$1,466	$1,276	$1,000	$ 789
(current liabilities shaded)					
Accounts Payable	$125	$163	$160	$138	$121
Notes Payable	850	300	141	47	0
Accrued Operating Exp.	100	75	50	40	30
Current Maturities	50	50	50	50	50
Long-Term Debt	0	303	300	150	88
Shareholders Equity	575	575	575	575	500
Total Liabilities & NW	$1,700	$1,466	$1,276	$1,000	$789
Revenues (Sales)	$9,000	$5,500	$3,750	$2,500	$1,750
Cost of Goods Sold	4,500	2,750	1,875	1,250	875
Operating Expenses	3,000	1,600	1,065	925	888
Depreciation	100	100	100	100	100
Interest	40	45	35	25	12
Taxes	544	402	270	80	(50)
Net Profit	816	603	405	120	(75)
Dividends	816	603	405	120	0

$$g^* = \text{sustainable growth rate} = \frac{m * (1 - d) * [1 + (D / E)]}{A / S - \{m * (1 - d) * [1 + (D / E)]\}}$$

	2000	2001	2002	2003	2004
S =	$9,000	$5,500	$3,750	$2,500	$1,750
gS =	-----	0.3889	0.3182	0.3333	0.3000
A/S =	0.1889	0.2665	0.3403	0.4000	0.4509
m =	(0.0907)	0.1096	0.1080	0.0480	0.0429
d =	1.000	1.000	1.000	1.000	1.000
D/E =	1.9565	1.5496	1.2191	0.7391	0.5780

Note: numbers in table have been carried to 4 decimal places due to sensitivity of g* calculation. See definitions in problem 4.

Example of calculation for 2001 (using 2001 parameters):

$$g^* = \frac{[0.0907 * (1 - 1.0) * (1 + 1.9565)}{0.1889 - (0.0907) * (1+ 1.0) * (1 + 1.9565)} = 0.0\%$$

Sustainable Growth Rate	0.0%	0.0 %	0.0%	0.0%
(Based on prior year ratios)				
Actual Sales Growth Rate	38.89%	31.82%	33.33%	30.30%

Interpretation: Because the firm is paying out all of its net income as dividends (100% payout ratio), the second term in the numerator is "0", thus the product o the calculation is 0. This is consistent with a conceptual review of the situation, wherein the firm is retaining no capital and thus has no fuel with which to grow.

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