INTERMEDIATE FINANCIAL MANAGEMENT
(Brigham & Daves, 11th edition)
ANSWERS TO SELECTED END-OF-CHAPTER QUESTIONS

4-8 With your financial calculator, enter the following to find YTM:

N = 10 × 2 = 20; PV = -1100; PMT = 0.08/2 × 1,000 = 40; FV = 1000; I/YR = ?
YTM = 3.31% × 2 = 6.62%.

With your financial calculator, enter the following to find YTC:

N = 5 × 2 = 10; PV = -1100; PMT = 0.08/2 × 1,000 = 40; FV = 1050; I/YR = ?
YTC = 3.24% × 2 = 6.49%.

4-9 a. 1. 5%: Bond L: Input N = 15, I/YR = 5, PMT = 100, FV = 1000, PV = ?, PV = -$1,518.98.
Bond S: Change N = 1, PV = ? PV = -$1,047.62.

2. 8%: Bond L: From Bond S inputs, change N = 15 and I/YR = 8, PV = ?, PV = -$1,171.19.
Bond S: Change N = 1, PV = ? PV = -$1,018.52.

3. 12%: Bond L: From Bond S inputs, change N = 15 and I/YR = 12, PV = ? PV = -$863.78.
Bond S: Change N = 1, PV = ? PV = -$982.14.

b. **(Following is the answer given by the solution manual. Use your own words to explain the idea.)**
Think about a bond that matures in one month. Its present value is influenced primarily by the maturity value, which will be received in only one month. Even if interest rates double, the price of the bond will still be close to $1,000. A one-year bond's value would fluctuate more than the one-month bond's value because of the difference in the timing of receipts. However, its value would still be fairly close to $1,000 even if interest rates doubled. A long-term bond paying semiannual coupons, on the other hand, will be dominated by distant receipts, receipts which are multiplied by $1/(1 + r_d/2)^t$, and if r_d increases, these multipliers will decrease significantly. Another way to view this problem is from an opportunity point of view. A one-month bond can be reinvested at the new rate very quickly, and hence the opportunity to invest at this new rate is not lost; however, the long-term bond locks in subnormal returns for a long period of time.

4-10 a. 1. Input N = 5, PV = -829, PMT = 90, FV = 1000, I/YR = ? I/YR = 13.98%.
2. Change PV = -1104, I/YR = ? I/YR = 6.50%.

b. Yes. At a price of $829, the yield to maturity, 13.98 percent, is greater than your required rate of return of 12 percent. If your required rate of return were 12 percent, you should be willing to buy the bond at any price below $891.86. **(N = 5, I/YR = 12, PMT = 90, FV = 1000, PV = ? PV = -891.86)**

4-11 N = 7; PV = -1000; PMT = 140; FV = 1090; I/YR = ? Solve for I/YR = 14.82%.

4-12 a. Using a financial calculator, input the following:
N = 20, PV = -1100, PMT = 60, FV = 1000, and solve for I/YR = 5.1849%.

However, this is a periodic rate. The nominal annual rate = 5.1849%(2) = 10.3699% ≈ 10.37%.

b. The current yield = $120/$1,100 = 10.91%.

c. YTM = Current Yield + Capital Gains (Loss) Yield
10.37% = 10.91% + Capital Loss Yield
-0.54% = Capital Loss Yield.

d. Using a financial calculator, input the following:
N = 8, PV = -1100, PMT = 60, FV = 1060, and solve for I/YR = 5.0748%.

However, this is a periodic rate. The nominal annual rate = 5.0748%(2) = 10.1495% ≈ 10.15%.

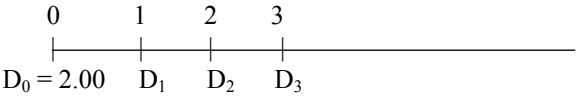
4-16 **(You should be able to rank the interest-rate sensitivity of these bonds without doing any calculation.)**

	Price at 8%	Price at 7%	Pctge. change
10-year, 10% annual coupon	$1,134.20	$1,210.71	6.75%
10-year zero	463.19	508.35	9.75
5-year zero	680.58	712.99	4.76
30-year zero	99.38	131.37	32.19
$100 perpetuity	1,250.00	1,428.57	14.29

5-2 $D_1 = \$1.50$; $g = 6\%$; $r_s = 13\%$; $\hat{P}_0 = ?$

$$\hat{P}_0 = \frac{D_1}{r_s - g} = \frac{\$1.50}{0.13 - 0.06} = \$21.43.$$

5-5



Step 1: Calculate the required rate of return on the stock:

$r_s = r_{RF} + (r_M - r_{RF})b = 7.5\% + (4\%)1.2 = 12.3\%.$

Step 2: Calculate the expected dividends:

$D_0 = \$2.00$
$D_1 = \$2.00(1.20) = \$2.40$
$D_2 = \$2.00(1.20)^2 = \$2.88$
$D_3 = \$2.88(1.07) = \$3.08$

Step 3: Calculate $\hat{P}_2$:

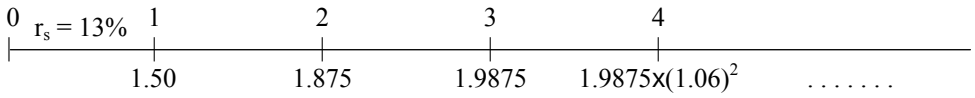
$\hat{P}_2 = D_3/(r_s - g) = \$3.08/(0.123 - 0.07) = \$58.11.$

Using a financial calculator, input the following:
$CF_0 = 0$, $CF_1 = 2.40$, and $CF_2 = 60.99$ (2.88 + 58.11) and then enter I/YR = 12.3 to solve for NPV = $50.50.

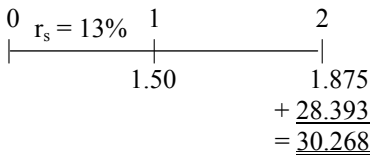
5-6 The problem asks you to determine the constant growth rate, given the following facts: $P_0 = \$80$, $D_1 = \$4$, and $r_s = 14\%$. Use the constant growth rate formula to calculate g:

$$\hat{r}_s = \frac{D_1}{P_0} + g \quad \Longrightarrow \quad 0.14 = \frac{\$4}{\$80} + g \quad \Longrightarrow \quad g = 0.09 = 9\%.$$

5-11 $r_S = 7\% + 6\% = 13\%$; $g_1 = 50\%$, $g_2 = 25\%$, $g_n = 6\%$.
$D_0 = \$1.00$
$D_1 = \$1.00$x(1+50%)=$1.50
$D_2 = \$1.50$x(1+25%)=$1.875
$D_3 = \$1.875$x(1+6%)=$1.9875
etc.



$$\hat{P}_2 = \frac{D_3}{r_s - g} = \frac{\$1.9875}{0.13 - 0.06} = \$28.393.$$

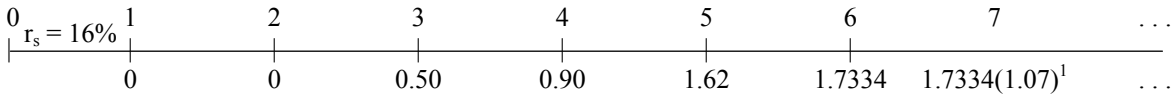


Financial calculator entries: CF0=0, CO1=1.50, CO2=30.268, I=13 ==> NPV= $\hat{P}_0$ =25.03

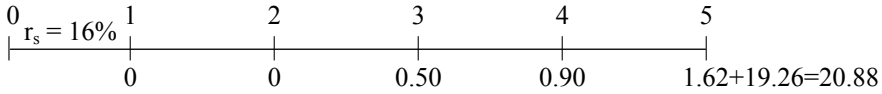
5-12 Calculate the dividend stream and place them on a time line. Also, calculate the horizon of the stock at the end of the supernormal growth period, and include it, along with the dividend to be paid at t = 5, as CF_5. Then, enter the cash flows as shown on the time line into the cash flow register, enter the required rate of return as I = 15, and then find the value of the stock using the NPV calculation. Be sure to enter $CF_0 = 0$, or else your answer will be incorrect.

$D_0 = 0$; $D_1 = 0$, $D_2 = 0$, $D_3 = 0.50$, $D_4 = 0.50(1.8) = 0.90$; $D_5 = 0.90(1.8) = 1.62$; $D_6 = 1.62(1.07) = \$1.7334$.

$\hat{P}_0 = ?$



$\hat{P}_5 = D_6/(r_s - g) = 1.7334/(0.16 - 0.07) = 19.26$. This is the intrinsic value of the stock at the end of Year 5.



$CF_0 = 0$; $CO_1 = 0$; $CO_2 = 0$; $CO_3 = 0.50$; $CO_4 = 0.90$; $CO_5 = 20.88$; I = 16. ==> NPV= $\hat{P}_0 = 10.76$.

5-14 a. $g = \dfrac{\$1.1449}{\$1.07} - 1 = 7\%$

b. $\dfrac{\$1.07}{\$21.4} = 5\%$

c. $\hat{r}_s = D_1/P_0 + g = \$1.07/\$21.40 + 7\% = 5\% + 7\% = 12\%$.

7-12 a. NOPAT = EBIT(1 - Tax rate)
= \$1,260(0.6)
= \$756.

b.

	2012	2011
Cash	\$550	\$500
+ Accounts receivable	2,750	2,500
+ Inventories	1,650	1,500
Operating current assets	\$4,950	\$4,500
Accounts payable	\$1,100	\$1,000
+ Accruals	550	500
Operating current liabilities	\$1,650	\$1,500
Operating current assets	\$4,950	\$4,500
- Operating current liabilities	1,650	1,500
Net operating working capital (NOWC)	\$3,300	\$3,000

Note that the financial statements used in this homework question are simplified for instructional purposes. There are other items that may appear on the statements and considered operating CA, operating CL, or operating LT assets. Use your judgment in the quizzes and the final exam.

c.

	2012	2011
Net operating working capital (NOWC)	\$3,300	\$3,000
+ Net plant and equipment	3,850	3,500
Total net operating capital	\$7,150	\$6,500

d. FCF = NOPAT - Net investment in operating capital
= $756 - ($7,150 - $6,500)
= $756 - $650
= $106

e. ROIC = NOPAT / Total net operating capital
= $756 / $7,150
= 10.57%

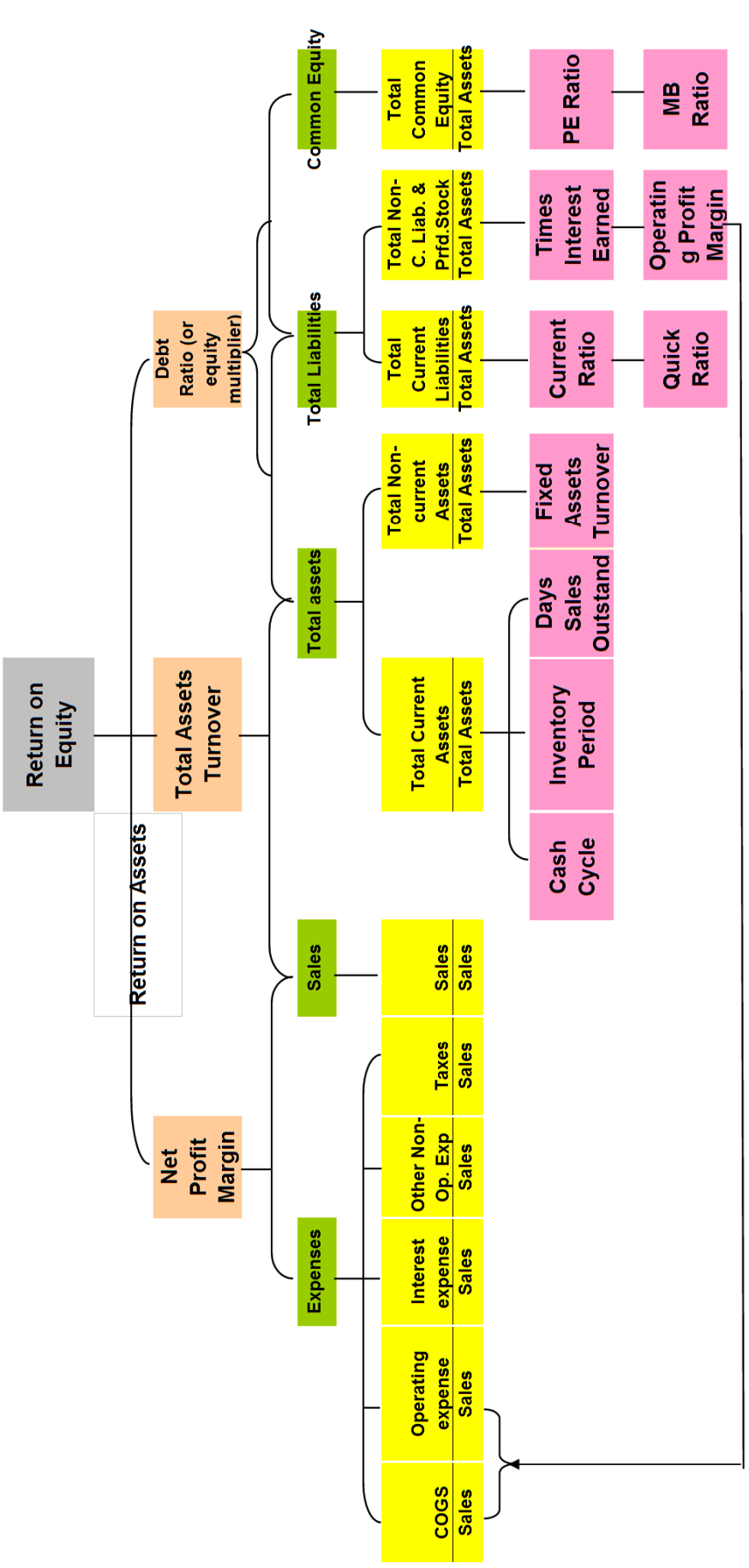
f.

FCF 2012	**$106**
Pay interest (after-tax) :	-72
Pay down debt:	-0
Pay dividends:	-220
Repurchase stock:	-88
Shortfall =	-$274
Raise fund through debt:	+284
Raise fund through stock:	+0
Surplus cash =	$ 10
Credit short-term investment:	-10
Balance =	$ 0

Uses of FCF	**2012**
After-tax interest payment =	$72
Reduction (increase) in debt =	-$284
Payment of dividends =	$220
Repurchase (Issue) stock =	$88
Purchase (Sale) of short-term investments =	$10
Total uses of FCF =	$106

The table on the left shows how the answer on the right is derived. If you know what you are doing, you can skip the first step.

DUPONT TREE


Return on Equity
Return on Assets
Net Profit Margin
Total Assets Turnover
Debt Ratio (or equity multiplier)
Sales
Expenses
Total assets
Total Liabilities
Common Equity
COGS
Sales
Operating expense
Sales
Interest expense
Sales
Other Non-Op. Exp
Sales
Taxes
Sales
Sales
Sales
Total Current Assets
Total Assets
Total Non-current Assets
Total Assets
Cash Cycle
Inventory Period
Days Sales Outstand
Total Current Liabilities
Total Assets
Total Non-C. Liab. & Prfd.Stock
Total Assets
Total Common Equity
Total Assets
Current Ratio
Quick Ratio
Fixed Assets Turnover
Times Interest Earned
Operating Profit Margin
PE Ratio
MB Ratio

Financial ratios in the DuPont tree

The "crown"part	
Return on common equity (ROE)	**=NetIncome/CommonEquity**
Return on total assets (ROA)	**=NetIncome/TotalAssets**
Profit margin on sales (NPM)	**=NetIncome/Sales**
Total assets turnover (TAT)	**=Sales/TotalAssets**
Debt ratio	**=TotalDebt/TotalAssets**
Equity multiplier	**=TotalAssets/CommonEquity**
Operating or cost efficiency	
Profit margin on sales (NPM)	**=NetIncome/Sales**
Common-sized COGS	**=COGS/Sales**
Common-sized operating expsense	**=TotalOperatingExpense/Sales**
Asset utilization	
Total assets turnover (TAT)	**=Sales/TotalAssets**
Cash cycle	**=InventoryPeriod+DSO-AccountsPayablePeriod**
Inventory turnover	**=COGS/Inventories**
Inventory period	**=365/InventoryTurnover**
Inventory period (alternative formula)	**=Inventories/(COGS/365)**
Accounts receivable turnover	**=Sales/AccountsReceivable**
Days sales outstanding (DSO)	**=365/AccountsReceivableTurnover**
DSO (alternative formula)	**=AccountsReceivable/(Sales/365)**
Fixed assets turnover (FAT)	**=Sales/TotalNetFixedAssets**
FAT (alternative formula)	**=Sales/(TotalAssets-CurrentAssets)**
Use of financial leverage	
Debt ratio	**=TotalDebt/TotalAssets**
Equity multiplier	**=TotalAssets/CommonEquity**
indicators of short-term solvency	
Current ratio	**=CurrentAssets/CurrentLiabilities**
Quick ratio (acid-test ratio)	**=(CurrentAssets-Inventories)/CurrentLiabilities**
Times-interest-earned (TIE)	**=EBIT/Interest**
Operating profit margin (OPM)	**=EBIT/Sales**
indicators of long-term prospect	
Price/earnings ratio (P/E)	**=MVPS/EPS**
Market-to-Book Ratio (M/B ratio)	**=MVPS/BVPS**

9S-1 The question and solution will be posted online as an Excel file. Wait for instruction in class.

10-4 $r_{ps} = \dfrac{\$60(0.06)}{\$70.00(1-0.05)} = \dfrac{\$3.60}{\$66.50} = 5.41\%.$

10-7 30% Debt; 5% Preferred Stock; 65% Equity; $r_d = 6\%$; T = 40%; $r_{ps} = 5.8\%$; $r_s = 12\%$.

$WACC = (w_d)(r_d)(1 - T) + (w_{ps})(r_{ps}) + (w_{ce})(r_s)$

$WACC = 0.30(0.06)(1\text{-}0.40) + 0.05(0.058) + 0.65(0.12) = 9.17\%.$

10-13 $P_0 = \$30$; $D_1 = \$3.00$; $g = 5\%$; $F = 10\%$; $r_s = ?$
$r_s = [D_1/(1\text{-}F)\ P_0] + g = [3/(1\text{-}0.10)(30)] + 0.05 = 16.1\%$.

10-14 (There are two ways to answer this question, and their answers are slightly different. Either way will be considered correct.)
N = 20, PV =1000(1-0.02) = 980, PMT = -90(1-.4)=-54, and FV = -1000,
==> I = 5.57%, which is the after-tax component cost of debt.

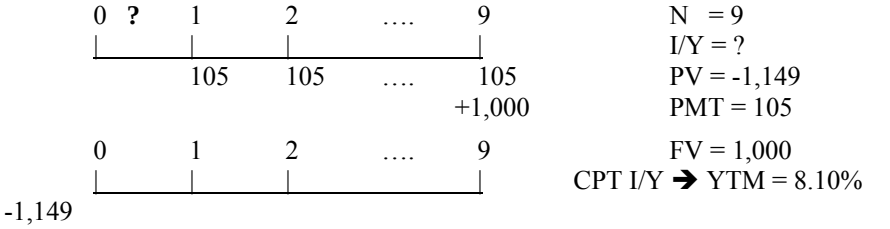
Or: N = 20, PV =1000(1-0.02) = 980, PMT = -90, and FV = -1000,
==> I = 9.22%. The after-tax component cost of debt = $r_d(1 - T) = 9.22\%(1\text{-}.4) = 5.53\%$.

10S-1

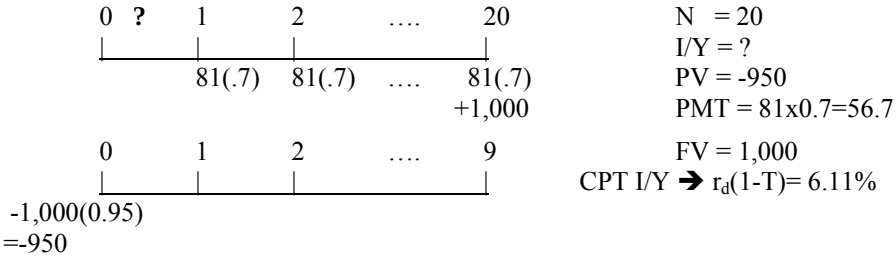
a. Additional common equity needed: $\frac{\$500{,}000}{\$750{,}000} \times \$60\,million = \$40\,million$

New issuance of common stock: $40 million - $16 million = $24 million

b. Cost of debt:



N = 9
I/Y = ?
PV = -1,149
PMT = 105
FV = 1,000
CPT I/Y ➔ YTM = 8.10%



N = 20
I/Y = ?
PV = -950
PMT = 81x0.7=56.7
FV = 1,000
CPT I/Y ➔ $r_d(1\text{-}T)$= 6.11%

c. Cost of preferred stock: $\frac{\$6}{\$80 - \$5} = 8\%$

d. Cost of retained earnings: $\frac{\$1.50(1.08)}{\$28} + 0.08 \cong 13.79\%$

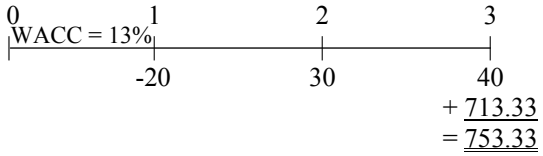
Cost of new issuance of common equity = $\frac{\$1.50(1.08)}{\$28(0.93)} + 0.08 \cong 14.22\%$

e.

	amount to be raised	Weight	×	Cost	=	Product
Debt	$60Mx(150/750) = $12M	12/60 = 0.200		6.11%		1.22%
Preferred stock	$60Mx(100/750) =$ 8M	8/60 = 0.133		8%		1.06%
Retained earnings	as given in question= $16M	16/60 = 0.267		13.79%		3.68%
New issuance of common equity	as answer from a. = $24M	24/60 = 0.400		14.22%		5.69%
Total	$60M			WACC	=	11.65%

11-7 a. $HV_3 = \frac{\$40\,(1.07)}{0.13 - 0.07} = \$713.33.$

b.



Financial calculator entries: CF0=0, CO1=-20, CO2=30, CO3=753.33, I=13 ==> NPV= V_{op}=527.89

c. Firm $value_{t=0}$ = \$527.89 + \$10.0 = \$537.89.

Value of common equity = \$537.89 - \$100 = \$437.89.

Intrinsic value per share = $\frac{\$437.89}{10.0}$ = \$43.79.

11-8 Total corporate value = Value of operations + Value of non-operating assets
= \$756 + \$77 = \$833 million.

Value of equity = Firm value – ST debt – LT debt – Preferred stock
= \$833 – (\$151 + \$ 190) - \$76 = \$416 million.

11S-1 a. FCF_{2013}=\$34.96M
b. HV_{2017}= \$918.45M
c. $V_{op=}$ \$665.62M
d. V_{firm}= \$715.52M
e. V per share= \$46.98

NOPAT = EBIT(1 - Tax rate)
= \$108.6M (0.6)
= \$65.16M.

$NOWC_{12}$ = Operating CA – operating CL
= (\$5.3M +\$53M + \$106M) - (\$9.6M + \$27.5M)
= \$127.2M.

$NOWC_{13}$ = (\$5.6M +\$56.2M + \$112.4M) - (\$11.2M + \$28.1M)
= \$134.9M.

$$\text{Operating capital}_{12} = \begin{matrix}\text{Net operating} \\ \text{LT assets}\end{matrix} + \begin{matrix}\text{Net operating} \\ \text{working capital}\end{matrix}$$
= \$375M + \$127.2M
= \$502.2M.

Operating $capital_{13}$ = \$397.5M + \$134.9M
= \$532.4M.

FCF = NOPAT - Net investment in operating capital
= \$65.16M - (\$532.4M - \$502.2M)
= \$34.96M.

$$HV_{2017} = \frac{\$56.32M\ (1.06)}{0.125 - 0.06} = \$918.45M$$

Financial calculator entries:
CF0=0, CO1=34.96, CO2=39.87, CO3=45.62, CO4=48.18, CO5=974.77, I=12.5 ==> NPV= V_{op}=665.62

Firm value$_{2012}$ = $665.62M + $49.9M = $715.52M.

Value of common equity = $715.52M - $69.9M - $140.8M - $35M = $469.82M.

Intrinsic value per share = $\frac{\$469.82M}{10.0M}$ = $46.982.

12S-1 a.

Payback Period							
Project X				Project Y			
Year	CF	Cumulative CF	# of Years	Year	CF	Cumulative CF	# of Years
0	($5,000)	($5,000)		0	($5,000)	($5,000)	
1	$1,000	-5000+1000=-4000	1	1	$4,500	-5000+4500=-500	1
2	$1,500	-400+1500=-2500	1	2	$1,500	500/1500=	0.3333
3	$2,000	-2500+2000=-500	1	3	$1,000		
4	$4,000	500/4000=	0.1250	4	$500		
		PP_X=	3.1250			PP_Y=	1.3333

Discounted Payback Period								
Project X					Project Y			
Year	CF	DCF	Cumulative DCF	# of Years	Year	CF	DCF	Cumulative DCF	# of Years
0	($5,000)		($5,000)		0	($5,000)		(51,000)	
1	$1,000	1000/1.12=893	-5000+893=-4107	1	1	$4,500	4500/1.12=4018	-5000+4018=-982	1
2	$1,500	$1500/1.12^2$=1196	-4107+1196=-2911	1	2	$1,500	$1500/1.12^2$=1196	982/1196=	0.82
3	$2,000	$2000/1.12^3$=1424	-2911+1424=-1488	1	3	$1,000	$1000/1.12^3$=712		
4	$4,000	$4000/1.12^4$=2542	1488/2542=	0.59	4	$500	$500/1.12^4$=318		
			DPP_X=	3.59				DPP_Y=	1.82

X: I=12, CF0= -5000, CO1=1000, CO2=1500, CO3=2000, CO4=4000
Y: I=12, CF0= -5000, CO1=4500, CO2=1500, CO3=1000, CO4=500
NPV(I,CF0,{CO1,CO2,CO3,CO4}); IRR(CF0,{CO1,CO2,CO3,CO4})
==> NPV_X=$1,054.2808
NPV_Y=$1,243.1872
IRR_X=19.67%
IRR_Y=29.63%

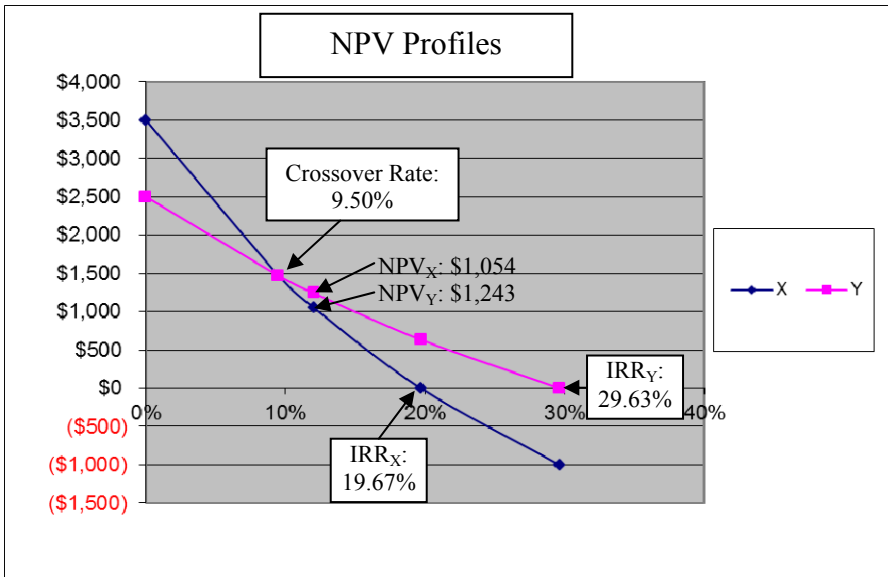
PI_X=(1,054.2808+5,000)/5,000=1.2109 X
PI_Y=(1,243.1872+5,000)/5,000=1.2486 X

$MIRR_X$: N=4, I/Y=12, PV=(1054.2808+5000), PMT=0 ==>FV=-9,526.5280
N=4, PV= -5000, PMT=0, FV=9526.5280 ==>I/Y=17.49 ==> $MIRR_X$=17.49%
$MIRR_Y$: N=4, I/Y=12, PV=(1243.1872+5000), PMT=0 ==>FV=-9,823.7759
N=4, PV=-5000, PMT=0, FV=9,823.7759 ==>I/Y=18.39 ==> $MIRR_Y$=18.39%

b.

	Project X	Project Y
PP	unclear: cutoff year not given	unclear: cutoff year not given
DPP	unclear: cutoff year not given	unclear: cutoff year not given
NPV	accept: $1,054.2808 is greater than 0	accept: $1,243.1872 is greater than 0
IRR	accept: 19.67% is greater than 12%	accept: 29.63% is greater than 12%
PI	accept: 1.2109 X is greater than 1 X	accept: 1.2486 X is greater than 1 X
MIRR	accept: 17.49% is greater than 12%	accept: 18.39% is greater than 12%

c.



Crossover rate:

CF0=(-5000) - (-5000)= 0
CO1=1000 - 4500= -3500
CO2=1500 - 1500= 0
CO3=2000 - 1000= 1000
CO4=4000 - 500= 3500

Use the IRR function of your calculator to get the crossover rate, 9.50%.

13-6.

a. The year 0 cashflow is $15,500+$1,102,500=$1,118,000

investment in NOWC
investment in Op. LT Cap.
(the depreciable basis)

Op. CA	$15,500
- Op. CL	- 0
NOWC	$15,500

Base price		$1,080,000
+ Shipping (freight)		
+ Installation	+	22,500
+ Modification		
+ Operator training		
the depreciable basis		$1,102,500

b. The FCFs in Year 1, Year 2, and Year 3 are $375,612.14, $418,521.44, and $304,148.09 respectively.

	Year 1	Year 2	Year3
Revenues or sales	$ 0.00	$ 0.00	$ 0.00
- Cost of goods sold			
- Operating expenses	+ 380,000.00	+ 380,000.00	+ 380,000.00
- Depreciation	- 367,463.25	- 490,061.25	- 163,280.25
Operating income	12,536.75	(110,061.25)	216,719.75
x (1 - T)	x 0.65	x 0.65	x 0.65
NOPAT	8,148.89	(71,539.81)	140,867.84
+ Depreciation	+ 367,463.25	+ 490,061.25	+ 163,280.25
Operating CF	375,612.14	418,521.44	304,148.09
- gross investment in NOWC	- 0.00	- 0.00	- 0.00
- gross investment in op. LT Capital	- 0.00	- 0.00	- 0.00
FCF	375,612.14	418,521.44	304,148.09

Depreciation and Salvage Book Value Calculation:

Dep. Year 1	$1,102,500x33.33%=	$367,463.25
Dep. Year 2	1,102,500x44.45%=	490,061.25
Dep. Year 3	1,102,500 x14.81%=	163,280.25
	1,102,500 x 7.41%=	81,695.25

c. Terminal year CF = FCF3 + recovery of NOWC + recovery of Op. LT Cap. (i.e. after-tax salvage value)
= $304,148.09 + $15,500.00 + $421,843.34
= $741,491.43

Resale price	$605,000.00	Resale price	$605,000.00
- Book salvage value	81,695.25		
Over-depreciation	523,304.75		
x Tax rate	x 0.35		
Taxes owed	183,156.66	- Taxes owed	- 183,156.66
		After-tax salvage value	$421,843.34

d.

CF0	-$1,118,000.00
CF1	375,612.14
CF2	418,521.44
CF3	741,491.43

WACC	12.00%
NPV	$78,789.66
IRR	15.6048%
PP	2.44 years
DPP	2.85 years
PI	1.0705 times
MIRR	14.5715%

According to the NPV criterion, the project should be accepted because the NPV is $78,789.66, which is greater than zero.

According to the IRR criterion, the project should be accepted because the IRR is 15.60%, which is greater than the WACC.

We don't know if the project should be adopted or rejected based on the PP criterion because we don't know what the cutoff is.

We don't know if the project should be adopted or rejected based on the DPP criterion because we don't know what the cutoff is.

According to the PI criterion, the project should be accepted because the PI is 1.0705 times, which is greater than 1.

According to the MIRR criterion, the project should be accepted because the MIRR is 14.57%, which is greater than the WACC.

15S-1 (1) Determine the variable cost per unit at present, V:

	Sales	($100,000)(50) = $5,000,000
-	Variable cost	v(50)
-	Fixed cost	$2,000,000
	EBIT	$ 500,000

➔ v = $50,000

(2) Construct the income statement for before and after the change:

		Before	After
	Sales	$5,000,000	$6,650,000
-	Variable cost	2,500,000	2,800,000
-	Fixed cost	2,000,000	2,500,000
	EBIT	500,000	1,350,000
-	Interest	240,000	432,000
	EBT	260,000	918,000
-	Taxes	0	0
	NI	$ 260,000	$ 918,000

		Before	After
a.	Q_{BE}	2M/(100,000-50,000)=40	2.5M/(95,000-40,000) ≈ 46
b.	DOL	5	2.85
	DFL	1.92	1.47
	DTL	9.62	4.19
	ROE	13%	25.5%

c. ????

15S-2:

wd	D/S	rd	Beta	rs	WACC	Vfirm (M)	D (M)	S (M)	P	# (M)	NI (M)	EPS
0.2	.25	8%	1	10%	8.96%	100	20	80	40	2	8	$4.00
0.4	.67	9%	1.22	10.88%	8.69%	103.11	41.244	61.866	51.56	1.20	6.73	$5.61
0.6	1.5	10%	1.65	12.6%	8.64%	103.70	62.22	41.48	51.85	0.8	5.23	$6.54
0.8	4	11%	2.96	17.84%	8.85%	101.24	80.992	20.248	50.62	0.4	3.61	$9.03

21-11 a. Cash conversion cycle = Inventory conversion period + Average collection period – Payables deferral period

= 50 + 35 – 25

= 60 days

b. Average sales per day = $4,380,000/365 = $12,000

Investment in receivables = $12,000 × 35 = $420,000.

c. COGS = 0.80 × Sales

= 0.80 × $4,380,000

= $3,504,000.

$$\text{Inv. conversion period} = \frac{\text{Inv.}}{\text{COGS}/365}$$

$$50 = \frac{\text{Inv.}}{\$3{,}504{,}000/365}$$

Inv. = $480,000.

Inventory turnover = Sales/Inventory

= $4,380,000/$480,000

= 9.13×.

21-12 a. Inventory turnover = Sales/Inventory

9.0 = $3,250,000/Inventory

Inventory = $361,111.

$$\text{Inventory conversion period} = \frac{\text{Inv.}}{\text{COGS}/365}$$

$$= \frac{\$361{,}111}{\$1{,}895{,}000/365}$$

Inventory conversion period = 69.6 days

Average collection period = DSO = 41.0 days.

Cash conversion cycle = Inventory conversion period + Average collection period – Payables deferral period

= 69.6 + 41 – 45

= 65.6 days

b. Total assets = Inventory + Receivables + Fixed assets
= \$361,111 + [(\$3,250,000/365) × 41] + \$535,000
= \$361,111 + \$365,068 + \$535,000 = \$1,261,180.

Note: Inventory was calculated in part a above.

Total assets turnover = Sales/Total assets
= \$3,250,000/\$1,261,180 = 2.5770×.

ROA = Profit margin × Total assets turnover
= 0.07 × 2.5770 = 0.1804 = 18.04%.

c. Sales/Inv. = 12
\$3,250,000/Inv. = 12
Inv. = \$270,833

$$\text{Inventory conversion period} = \frac{\$270,833}{\$1,895,000/365}$$
= 52.2 days.

Cash conversion cycle = 52.2 + 41 – 45 = 48.2 days.

Total assets = Inventory + Receivables + Fixed assets
= \$270,833 + \$365,068 + \$535,000
= \$1,170,901.

Note: Inventory was calculated from the inventory turnover ratio.

Total assets turnover = \$3,250,000/\$1,170,901 = 2.78×.

ROA = \$227,500/\$1,170,901 = 19.43%.