

UNDERSTANDING FINANCIAL STATEMENTS: PROB'S & DETAILED SOLUTIONS
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This problem set covers a range of financial statement issues, with a general increase in degree of difficulty as we progress. Be sure that you have mastered the easier problems before moving ahead, because the more difficult examples tend to expand on the ideas presented in the easier ones.

Very Basic/Review

1. Ms. Braden thinks she can better understand her financial situation by completing a personal balance sheet. She owns a house worth \$160,000 (she originally paid \$154,000 for it), but still owes a mortgage company \$120,000 of the money she borrowed toward paying for the house. She has a car worth \$12,000 (originally paid \$15,000), but still owes the car manufacturer's financing division \$9,000 that she borrowed toward the purchase. She has a \$3,300 balance in her ISU Credit Union savings account; \$2,750 in her First State Bank of Normal checking account; and a \$4,000 balance in her Roth IRA account at Redbird Mutual Funds (she has invested a total of \$4,300, but some bonds the fund managers bought have recently gone down in value). She also owes \$1,100 on a MasterCard credit card, \$730 on a Visa credit card, and \$420 on a Target Stores charge card. She recently filed her state and federal income tax returns for the previous year, and is expecting to get refunds totaling \$515 in the next several weeks. At the same time, she owes \$2,500 in property tax, based on her home's value, to her local government (always billed and paid in Illinois several months after local public services have been provided). If these items constitute her major personal assets and liabilities, what should her personal balance sheet look like?

1. A balance sheet is a financial snapshot, taken at a specific point in time and relevant only to that moment (a balance sheet produced a day later could, conceivably, look much different, if the person's or company's financial commitments were to change). While a personal balance sheet differs a bit in a philosophical sense from a company's balance sheet, the general structure is the same. And because beginning finance students often can relate better to personal financial situations than to business situations, it can be helpful to begin our coverage of financial statements with a personal balance sheet example. Here the balance sheet should appear as follows:

Checking Account	\$ 2,750	MasterCard Debt	\$ 1,100
Savings Account	\$ 3,300	Visa Debt	\$ 730
Roth IRA	\$ 4,000	Target Debt	\$ 420
Inc. Tax Refund	\$ 515	Prop. Tax Owed	\$ 2,500
Total Current Assets	\$ 10,565	Total Current Liabilities	\$ 4,750
Car	\$ 12,000	Car Loan	\$ 9,000
House	\$160,000	Home Mtg. Loan	\$120,000
Fixed Assets	\$ <u>172,000</u>	Total Long Term Debt	\$129,000
		Net Worth	\$ <u>48,815</u>
Total Assets	\$ <u>182,565</u>	Total Claims	\$ <u>182,565</u>

In every balance sheet we start with a listing of assets, the things an individual or business owns and makes use of in conducting routine activities. That listing is presented on the left-hand side of the sheet (or at the top, if the presentation is in "report form"). We list assets in order of liquidity: how quickly and conveniently we could generate cash with each item in a transaction. Checking, savings, and retirement accounts consist of cash balances, and thus are very liquid (checking is the most liquid, since we can write checks or use debit cards to transact directly; retirement savings

is not quite as liquid because the money is committed for a longer period and there can be penalties for taking some out prior to a specified date). The expected income tax refund (a personal account receivable) is also fairly liquid; our friend should receive a check for the full amount after a brief wait. These reasonably liquid assets are classified as short term, or "current," because we could use them to get cash into our hands fairly quickly and easily. Here the current assets sum to \$10,565, as shown above.

We could generate cash through transactions involving illiquid assets only by enduring more time, effort, and headaches. Illiquid assets are expected to remain in their present form (not converted to cash) for a fairly long time, and thus are called long term or "fixed." Here the fixed assets are the car and the house; most people plan to keep their cars and houses for a long time, and if they decided to sell they could get an amount of cash that approximates the items' objective values only by spending time and money (e.g., for advertising) to find a buyer. The values we show for fixed assets on a personal balance sheet should be the market values, or what the items could be sold for today. Here we know the house is worth \$160,000 today (more than the \$154,000 originally paid); while the car's market value is \$12,000 (less than the \$15,000 originally paid). [Today's market value is not the standard we use for showing a long term asset's value on a business balance sheet.]

An individual would be likely to own things other than those mentioned, but in many cases such items would have little or no measurable financial value (think used clothing, books, games, other personal effects), and thus typically they would not be listed as balance sheet assets. But if the person had valuable computers, stereo equipment, or other personal effects, and could expect to get reasonable sums of money by selling them, then we would want to include our best estimates of those assets' market values on the left-hand side of the personal balance sheet.

The right-hand side of every balance sheet (or the bottom in "report form") lists claims on assets: how the money would be allocated if all assets were to be sold. On a personal balance sheet financial claims are held by lenders, who have lent money that the individual used in paying for assets or meeting living costs; and by the individual herself, who paid for part of her asset total with money she earned or got as gifts. Lenders are supposed to be repaid in full before the owner receives financial benefits from the assets. (For example, if the individual sells her house, she is supposed to pay the mortgage company the \$120,000 it is owed before she goes on a personal spending spree.)

As with assets, we list claims in order of liquidity: how quickly we must settle with a party that provided money. Credit card bills are very liquid (short term or "current") liabilities, in that amounts owed are supposed to be repaid in a very short time. (We show the amount of principal owed on the debt, as if it were to be repaid in full on the day the balance sheet "snapshot" is prepared. Interest may accumulate over time if the borrower makes only partial payments each month, and if we were to prepare a new balance sheet at a later date we might have to add some interest and show a greater total owed for settling the debt in full.) The property tax bill is also a current liability, in that the money clearly is owed and must be paid some time in the next several months. Total current liabilities, as shown above, sum to \$4,750. We might take some comfort in seeing that the current asset total (values she could fairly quickly turn into cash form) exceeds the current liability total (cash values she must fairly quickly pay) by several thousand dollars.

Next we show the long term debt or liabilities, amounts owed that are not expected to be paid, at least not in full, for more than one year. As with short term, or current, liabilities we show the

amount that would be paid if the debts were to be settled in full today, with no additional interest paid, but normally it is expected that payments will be made over time, and that the total paid will include a lot of interest on top of the principal shown as owed on the balance sheet.

The final balance sheet category is net worth, the financial wealth of the party for whom the balance sheet is prepared. If all assets were immediately to be sold for their market values, and then the money generated through the sales transactions were immediately to be used to pay any debts owed, how much would the assets' owner walk away with? Here the asset values total \$182,565, so it follows that \$182,565 could be claimed by parties that have provided money (the balance sheet must balance). If all assets and debts were to be liquidated - assets sold, and the money used to pay all debts in full - the owner would walk away with \$182,565 received minus \$4,750 paid to short term lenders minus \$129,000 (car & home loans) paid to long term lenders, leaving $\$182,565 - \$133,750 = \underline{\$48,815}$ as the asset owner's net worth. (With \$4,750 + \$129,000 = \$133,750 in debt, \$48,815 is simply the plug figure that brings right-hand side total to \$182,565.)

2. The Managers of Bone Bottle Brushes, Inc. think they can better understand their firm's financial situation by completing a balance sheet. The company originally paid \$16,930,000 for the building and manufacturing machinery it owns. (Even though it could all be sold today for \$17,500,000, it is treated for "book" purposes as having lost \$3,010,000 of its value through being used.) In addition, Bone holds a \$415,000 inventory of handles and bristles to put into the machines. The company owes long term lenders \$7,970,000, and it has built up obligations to pay taxes totaling \$691,000 to various levels of government over the next few months. It has a \$1,245,000 balance in its corporate checking account, and holds interest-earning marketable securities worth \$2,190,000. The common stockholders who own Bone have directly given the managers \$6,750,000 to support the company's activities, and the managers have also kept \$2,418,000 in earnings (which belong to the owners) over the years to buy additional assets. Bone owes \$875,000 to other firms from which it has purchased goods and services, while other firms owe \$1,962,000 for brushes purchased from Bone. \$600,000 is owed to a local bank; and \$428,000 is owed to employees for work they have done since the most recent pay date. If these items constitute Bone's major assets and claims, what should the company's balance sheet look like?

2. A balance sheet is a financial snapshot, taken at a specific point in time and relevant only to that moment (a balance sheet produced a day later could, conceivably, look much different if the party's financial obligations have changed). Here the balance sheet should appear as follows:

Cash	\$ 1,245,000	Accrued Wages	\$ 428,000
Marketable Securities	\$ 2,190,000	Accrued Taxes	\$ 691,000
Accounts Receivable	\$ 1,962,000	Accounts Payable	\$ 875,000
Inventory	\$ <u>415,000</u>	Notes Payable	\$ <u>600,000</u>
Total Current Assets	\$ 5,812,000	Total Current Liabilities	\$ 2,594,000
Plant and Equipment	\$16,930,000	Long Term Debt	\$ 7,970,000
Minus Accumulated Deprec.	(\$ <u>3,010,000</u>)	Paid-In Capital	\$ 6,750,000
Net Plant and Equipment	\$13,920,000	Retained Earnings	\$ <u>2,418,000</u>
		Total Stockholders' Equity	\$ 9,168,000
Total Assets	\$ <u>19,732,000</u>	Total Claims	\$ <u>19,732,000</u>

In every business balance sheet we start with a listing of assets, the things the business owns and makes use of in conducting its activities. That listing is presented on the left-hand side of the sheet (or at the top, if the presentation is in "report form"). We list assets in order of liquidity:

how quickly and conveniently we could generate cash with each asset in a transaction. A checking account consists of an immediately spendable cash balance, and thus is the most liquid business asset (in fact, we refer to it as "cash" on the balance sheet). Marketable securities are essentially a company's savings account; if a firm has some money that it does not expect to need right away but also does not want to tie up for a long period, then it might buy short term bonds so it can earn a higher interest rate than the checking account provides. Here the checking balance is given as \$1,245,000 and we are told that the marketable securities are worth \$2,190,000.

Other assets we treat as short term, or "current," are accounts receivable (the right to collect money from others, here \$1,962,000) and inventory (\$415,000), since we typically expect to collect money owed to us from credit sales and to use up/sell off the inventory in a fairly short time. In this example the current assets sum to \$5,812,000, as shown above.

We could generate cash through transactions involving illiquid assets only by enduring more time, effort, and headaches. Illiquid assets are expected to remain in their present form (not converted to cash) for a fairly long time, and thus are called "fixed." Here the fixed assets are the building and machinery; if the company decided to sell these items it could get cash only by spending time and money (e.g., for advertising) to find a buyer. The value we show for a fixed asset on a business balance sheet should be the price originally paid, minus the total loss in value (depreciation) that has been recognized since the purchase. One reason for using original price rather than market value for long term business assets is that their actual value could be difficult to estimate. We show a book value net of depreciation to reflect income tax benefits ("writeoffs") the company has claimed through owning the assets.

Here the company originally paid \$16,930,000 for its building ("plant") and equipment, but we assign a \$3,010,000 loss in value due to age and use, for a net of \$13,920,000. It would be surprising if a company's buildings and equipment could actually be sold today for the net book value shown on its balance sheet. (Indeed, here we know the items could be sold for \$17,500,000.) The depreciation amount shown is based on a formula, perhaps one approved by the government for income tax purposes, by which we guess before-the-fact how quickly various assets lose value with use. The \$5,812,000 in short term ("current") assets and \$13,920,000 book value of long term ("fixed") assets sum to total assets of \$19,732,000. Who are the parties that have provided value to the company (in the form of money, goods, or labor) so that it could purchase the assets, and therefore should be able to claim something of value in return?

On the right-hand side of every balance sheet (or at the bottom in "report form") we list claims on assets: how the money would be allocated if the assets were to be sold. On a business balance sheet financial claims are held by lenders, who have lent money (or something else of value, such as labor) that the company used in paying for assets or meeting operating expenses; and by owners, who claim whatever value remains after lenders have been repaid. If a company has to be liquidated, with all assets sold, then lenders are to be paid what they are owed (principal plus any applicable interest), in full, before the owners receive anything. As with assets, we list claims in order of liquidity: how quickly we must settle with a party that provided money used in buying assets.

Money owed to workers (accrued wages), governmental units (accrued taxes), and suppliers of goods or services (accounts payable), constitute very liquid (short term or "current") liabilities, in that the amounts owed are supposed to be paid in a very short time. An interesting feature of these liability categories is that they typically do not carry an explicit interest cost (although in theory we know

that anything provided in a business setting has a cost, and we will see later in our coverage that accounts payable generally have a cost that we can actually compute). Another short term liability is money that is owed to banks and must be repaid within a year (notes payable). Notes payable are accompanied by an explicit interest cost. (We show only the amount of principal owed on the debt, as if it were to be repaid in full on the day the balance sheet "snapshot" is prepared. But interest may accumulate over time if the borrower makes only partial payments each month, and if we were to prepare a new balance sheet at a later date we might have to show a greater total owed for settling the debt in full.) Total current liabilities, as shown above, sum to \$2,594,000. We might take some comfort in seeing that the current asset total (values we could fairly quickly turn into cash form) exceeds the current liability total (cash values we must fairly quickly pay) by more than three million dollars.

Next we show the long term debt or liabilities, amounts owed that are not expected to be paid, at least not in full, for more than one year. As with current liabilities we show the amount that would be paid if the debts were to be settled in full today, with no additional interest paid, but it is expected that payments will be made over time, and that the total paid will include a lot of interest on top of the principal shown as owed on the balance sheet. In a business setting, long term lenders often are called "bondholders" (a bond is a piece of paper that provides documentation that money was borrowed and is supposed to be repaid). Here long term lenders are owed \$7,970,000 as of the moment when the balance sheet "snapshot" is taken.

The final balance sheet category is most generally known as net worth: the financial wealth of the party for whom the balance sheet is prepared. In a business setting the net worth is called owners' equity (more specifically stockholders' equity if the business is a corporation). Here the owners have contributed value in two ways. First, they have given the company's managers \$6,750,000 that they earned, saved, or received as gifts (paid-in capital, which we could also call common stock in a corporate setting). Then, over time, the managers have held on to, or retained, \$2,418,000 in net income that belonged to the stockholders (retained earnings), and used that money to buy more assets. So the owners have, directly or indirectly, contributed $\$6,750,000 + \$2,418,000 = \$9,168,000$, and thus have a \$9,168,000 claim on asset values. (Note that we could also compute net worth by starting with the \$19,732,000 in total claims, which must equal the total asset value, and subtracting the \$2,594,000 in short term debt and the \$7,970,000 in long term debt.)

Average Level

3. What total stockholders' equity value should appear on Cook Cartography Corporation's most recent balance sheet if the total asset figure shown is \$13,650,000 and the amount shown as owed to lenders is \$8,250,000? Where would the stockholders stand if the company were liquidated (all assets are sold, company goes out of business) and the assets could be sold for only \$7,900,000?

3. If the value of total assets (left-hand side of the balance sheet) equals - as, by definition, it must - the total value of the claims of investors (lenders and owners shown on the balance sheet's right-hand side), then with \$13,650,000 in assets and \$8,250,000 in lenders' claims the owners' (stockholders') equity claim is worth the remaining $\$13,650,000 - \$8,250,000 = \underline{\$5,400,000}$. But if the assets could be sold for only \$7,900,000 in value, then after the \$8,250,000 in lenders' claims were subtracted owners' equity would be negative: $\$7,900,000 - \$8,250,000 = \underline{\$-350,000}$.

Here we see that the owners of a company hold a *residual* claim, meaning that they receive no financial returns until all other parties (workers, material suppliers, money lenders) have been paid

in full. But then the owners get to keep everything that remains after these other parties have been paid in full. So as long as asset values exceed the claims of lenders (including workers and material suppliers who have not yet been paid, shown on the balance sheet as accrued wages and accounts payable), any increase in those asset values increases the value of the owners' equity claim, and any decrease in those values decreases the value of the owners' equity claim. For example, if the assets rose in value to \$14,000,000 (perhaps valuable minerals are found on the company's land), the owners' equity would be worth $\$14,000,000 - \$8,250,000 = \$5,750,000$.

But if the assets are worth less than the lenders' claims, then any additional decrease in their value further hurts the lenders (the owners' claims have already been driven to a \$0 value at that point), while any increase in asset value increases the value of the lenders' claims. For example, with assets sold for only \$7,900,000, the lenders' alleged \$8,250,000 claim is actually worth only \$7,900,000 (since in a corporation the owners are not required to make up the \$350,000 value deficit out of their pockets, and thus it could be argued that owners' equity in a corporation never has a true economic (market) value less than \$0). If the assets were to rise in value by \$200,000 the lenders' claims would rise in value to \$8,100,000; if they fell in value by another \$200,000 the lenders' claims would fall in value to \$7,700,000. If the asset values rose to \$8,700,000, then the assets would show as being worth enough money to fully meet the lenders' claims; the lenders' claims would be worth \$8,250,000, and the owners' equity value would be the extra (residual) \$450,000.

4. The current asset total on DeGarmo Daycare, Inc.'s most recent year's balance sheet was \$2,420,000; the prior year's current asset total was \$2,190,000. The most recent year's and previous year's current liability totals were \$1,876,000 and \$1,430,000, respectively. What was the change in net working capital during the most recent year?

4. Net working capital (total current assets - total current liabilities) at the end of the previous year was $\$2,190,000 - \$1,430,000 = \$760,000$. Net working capital at the end of the most recent year was $\$2,420,000 - \$1,876,000 = \$544,000$. Since the figure fell from \$760,000 to \$544,000, the change in net working capital was $\$544,000 - \$760,000 = -\$216,000$. Because net working capital tells us how much of the short term asset base was paid for with long term financing sources, a decline in net working capital means that the company is using short term debt to a greater extent - and thus could face a liquidity crisis if it does not have ready access to cash as those larger short term debts become due.

5. The most recent balance sheet computed for Edwards Engineering Enterprises shows \$4,750,000 in current assets; \$3,535,000 in current liabilities; \$6,400,000 in long term debt; and \$9,225,000 in net fixed assets. Why do we know that the missing account total that causes the balance sheet to "balance" has to be stockholders' equity? How much is this stockholders' equity total? What is the value of Edwards's net working capital?

5. Here we are constructing a very basic, non-detailed balance sheet. Let's plug the figures we know into the proper spots and see whether anything seems to be missing:

Current Assets	\$ 4,750,000	Current Liabilities	\$ 3,535,000
Net Fixed Assets	\$ <u>9,225,000</u>	Long Term Debt	\$ <u>6,400,000</u>
Total Assets	\$ <u>13,975,000</u>	Total Claims	\$ <u>9,935,000</u> ???

The left-hand side of a balance sheet lists assets, the things the company managers make use of in generating sales and supporting the company's business activity. The two general asset categories are Current Assets (short term: money in checking and savings instruments, documents conveying

the right to collect money from others, inventory items that can be sold) and Net Fixed Assets (long term: buildings, equipment, "intellectual property" like patents and copyrights). Both the short term and long term asset figures are specified here, so since nothing seems to be missing we can state that the left-hand side total must be $\$4,750,000 + \$9,225,000 = \$13,975,000$.

The right-hand side of a balance sheet lists the financial claims held by those who have provided money for the company managers to pay for the assets: lenders and owners. Some lenders may expect to be repaid, perhaps with interest, fairly quickly (they hold short term, or current, debt/liability claims); others agree to wait more than a year before being repaid with interest (they hold long term debt claims). Here we know both; short term (current) and long term debt totals $\$3,535,000 + \$6,400,000 = \$9,935,000$. But a balance sheet must balance (financial claims held by those who paid for the assets are defined as being equal to the reported total value of those assets), so here the right-hand side total must also be $\$13,975,000$. Something has to be missing on the right-hand side.

Current Assets	\$ 4,750,000	Current Liabilities	\$ 3,535,000
Net Fixed Assets	\$ <u>9,225,000</u>	Long Term Debt	\$ 6,400,000
		Missing Category	<u>(unknown)</u>
Total Assets	<u>\$13,975,000</u>	Total Claims	<u>\$13,975,000</u>

What is missing? Recall that lenders generally will not lend unless owners (who control the decision process by electing the board of directors) are willing to put their money at risk as well - therefore we always expect to see an owners' equity account on a balance sheet. (Owners do not expect to be paid back quickly; owners' equity is always a long term claim - in fact, it is the longest term claim against a company's asset values.) In a corporation the owners are called common stockholders, so here we expect to see a stockholders' equity account. The owners' claim is residual in nature; value for the owners is what remains from asset values after the lenders' claim has been settled in full (think of our mental picture of a line of money providers, in which lenders stand at the front and are repaid in full before the owners, at the back of the line, receive anything). With assets worth $\$13,975,000$ and a total lenders' claim of $\$9,935,000$, the residual remaining for the owners, the stockholders' equity value, is $\$13,975,000 - \$9,935,000 = \$4,040,000$ (the "plug" figure that brings the right-hand side's total up to $\$13,975,000$). The balance sheet therefore should appear as:

Current Assets	\$ 4,750,000	Current Liabilities	\$ 3,535,000
Net Fixed Assets	\$ <u>9,225,000</u>	Long Term Debt	\$ 6,400,000
		Stockholders' Equity	\$ <u>4,040,000</u>
Total Assets	<u>\$13,975,000</u>	Total Claims	<u>\$13,975,000</u>

Finally, net working capital is the difference between total current assets and total current liabilities. It is the portion of short term assets not paid for with short term money, and thus is short term (current, or "working") assets paid for with long term ("capital") sources of money. Here that difference is $\$4,750,000 - \$3,535,000 = \$1,215,000$. We might think of net working capital as telling us a couple of things. First, it is a measure of liquidity. From a liquidity standpoint, it is reassuring to see that, over the coming year (based on all commitments made up to the point when the most recent balance sheet "snapshot" was taken), the firm stands to collect, if all goes well, $\$1,215,000$ more than it has committed to paying out. Thus the managers should still be able to meet the firm's short term obligations even if some (up to $\$1,215,000$) of what they expect to realize in cash in the short term does not materialize. But net working capital also has

profitability implications; the company gains that liquidity benefit by financing low-earning short term assets with high-cost long term money.

It is sometimes suggested that net working capital represents the dollar amount of short term assets paid for with money that requires a rate of return, based on the view that all long term money providers require explicit rates of return, while such short term liabilities as accruals and accounts payable do not carry explicit financing costs. (In fact some analysts, at least in some applications, compute a "net working capital" figure that does not include notes payable, which carry an explicit interest rate, as a short term liability.) However, logic tells us that no money is free; every money provider must be compensated for the risk and delay of being paid at a later date, though sometimes the cost of that compensation is, admittedly, difficult to measure.

6. On June 30 of the most recent year, Fairchild Furnace and Flue, Inc. had \$2,928,000 in accounts receivable; \$3,750,000 in notes payable; \$2,102,000 in accounts payable; \$6,224,000 in inventory; \$5,640,000 in long term debt; \$3,351,000 in cash and marketable securities; \$1,285,000 in intellectual property (manufacturing patents); and \$10,330,000 in tangible net fixed assets. Since Fairchild's founding, the managers have also retained a total of \$8,490,000 in earnings (which otherwise could have been given to the owners as dividends) to pay for assets. Prepare a balance sheet for Fairchild as of the end of its most recent fiscal year.

6. A balance sheet can be thought of as a "snapshot" taken at a specific point in time. We can infer that this company treats its accounting year as ending on June 30, so that becomes the "as of" date for creating annual balance sheets. Here we might start by plugging known figures into a basic balance sheet "skeleton" that shows a more detailed breakdown than was presented in problem 5:

Cash & Mkt. Securities	\$ 3,351,000	Accounts Payable	\$ 2,102,000
Accounts Receivable	2,928,000	Notes Payable	3,750,000
Inventory	6,224,000	Long Term Debt	5,640,000
Tang. Net Fixed Assets	10,330,000	Retained Earnings	8,490,000
Patents	<u>1,285,000</u>	Missing Category	<u>(unknown)</u>
Total Assets	<u>\$24,118,000</u>	Total Claims	<u>\$19,982,000 ???</u>

We seem to be given a pretty complete set of assets (there are no obviously missing categories, as would be the case if there were no inventory or no fixed assets, for example), so we can add the asset figures to get a seemingly correct \$24,118,000 left-hand side total. But on the right-hand side only \$2,102,000 + \$3,750,000 + \$5,640,000 + \$8,490,000 = \$19,982,000 are accounted for, while \$24,118,000 also must be the right-hand side total if the balance sheet is to balance. So something is missing on the right-hand side; there must be at least one other right-hand side category, and logic tells us that it must be "paid-in capital" (it might be called more specifically common stock if the business is a corporation).

Why is this the missing account? Because the company never could have been established if the owners had not been willing to contribute some money out of their own pockets initially (retained earnings represents money contributed by the owners after the business was up and running). Lenders will not make loans of labor, materials, or money if they will not be protected by an equity cushion (lenders get paid in full before the owners get anything; thus lenders absorb financial losses only after the owners' entire investment has been wiped out - so the lenders want to see that the owners have made a sizable investment). Paid-in capital is simply the plug figure that brings the right-hand side total up to \$24,118,000: $\$24,118,000 - \$19,982,000 = \underline{\$4,136,000}$.

Cash & Mkt. Securities	\$ 3,351,000	Accounts Payable	\$ 2,102,000
Accounts Receivable	2,928,000	Notes Payable	3,750,000
Inventory	6,224,000	Long Term Debt	5,640,000
Tang. Net Fixed Assets	10,330,000	Paid-In Capital	4,136,000
Patents	<u>1,285,000</u>	Retained Earnings	<u>8,490,000</u>
Total Assets	<u>\$24,118,000</u>	Total Claims	<u>\$24,118,000</u>

7. The current liabilities total shown on the most recent balance sheet for Fell Flax Farms is \$1,360,000. The net fixed asset value shows as \$7,800,000, while long term debt is \$4,000,000 and total stockholders' equity (or net worth) is \$6,250,000. If net working capital, other than cash, is \$920,000, what is Fell's cash balance? What is the current asset total?

7. Think of a balance sheet's most basic premise: total assets = total claims. Giving some detail to the right-hand side, we can say that

$$\text{total assets} = \text{total liabilities} + \text{net worth}$$

or, with even more right-hand side detail,

$$\text{total assets} = \text{total current liabilities} + \text{long term liabilities} + \text{net worth.}$$

Adding more detail to the left-hand side, we can say that:

$$\text{total current assets} + \text{net fixed assets} = \text{total current liabilities} + \text{long term liabilities} + \text{net worth.}$$

Then, recalling that net working capital is defined as total current assets minus total current liabilities, we can subtract total current liabilities from each side to compute:

$$\text{net working capital} + \text{net fixed assets} = \text{long term liabilities} + \text{net worth.}$$

Finally, because cash is a net working capital item of special concern here, we can say that:

$$\text{cash} + \text{other net working capital items} + \text{net fixed assets} = \text{long term liabilities} + \text{net worth.}$$

We can solve for cash and total current assets after plugging in:

$$\begin{aligned} \text{cash} + \$920,000 + \$7,800,000 &= \$4,000,000 + \$6,250,000 \\ \text{cash} + \$8,720,000 &= \$10,250,000 \Rightarrow \text{cash} = \underline{\$1,530,000}. \end{aligned}$$

Finally,

$$\begin{aligned} \text{net working capital other than cash} &= \$920,000 \\ \text{current assets other than cash} - \text{current liabilities} &= \$920,000 \\ \text{current assets other than cash} - \$1,360,000 &= \$920,000 \\ \text{current assets other than cash} &= \$920,000 + \$1,360,000 = \$2,280,000 \end{aligned}$$

So total current assets must be \$1,530,000 cash + \$2,280,000 current assets other than cash = \$3,810,000.

8. During the most recent year Felmley Fence Corporation paid \$963,000 in interest to parties that had lent it money. It also paid income tax at a 24% average combined state-plus-federal rate. Ownership in Felmley was represented by 210,000 outstanding shares of common stock. The company sold \$7,625,000 worth of goods to its customers during the year, but also wrote checks for \$3,340,000 to pay for labor, materials, and other costs of producing and distributing the goods sold. In addition, Felmley recognized a \$2,395,000 loss in the value of its long-lived buildings and equipment (depreciation). Compute the year's net income. If \$392,000 in cash dividends was paid to Felmley's common stockholders, how much net income was retained for the company's internal use? What were the earnings per share (EPS) and dividends per share (DPS) figures?

8. Here we are dealing with a company's income statement. Let's proceed by plugging the given numbers into the skeleton of a basic income statement and solving for the unknown values.

Sales	\$7,625,000
- Cash paid in producing/distributing goods	3,340,000
- Depreciation (measure of lost equipment value)	<u>2,395,000</u>
Operating Income (EBIT)	\$1,890,000
- Interest	<u>963,000</u>
Taxable Income, or Earnings Before Taxes (EBT)	\$ 927,000
- Income Tax (24% of EBT)	<u>222,480</u>
Net Income	\$ <u>704,520</u>

That \$704,520 is the accrual-based income (not necessarily the amount of cash) that was created for the company's owners by the most recent year's operations. One big reason why net income is not a cash measure is that, in computing net income, we subtract out a depreciation "expense" that does not involve a cash payout in the measured year; it is merely a recognition that assets have lost value through wear and tear during the year - a cost of being in business, but not a cash outlay.

The company's managers would have made the decision on how much of that net income to give the owners as dividends, and how much to retain for the company's internal use (paying for more assets, or perhaps paying off some debt). If \$392,000 was paid in dividends, then the remaining \$704,520 - \$392,000 = \$312,520 was retained. The retained earnings balance shown on the most recent year's balance sheet should be \$312,520 greater than the retained earnings balance shown on the previous year's balance sheet.

Finally, if we divide the company's earnings and dividends over the 210,000 outstanding shares of common stock, then we find earnings per share (EPS) of $\$704,520 \div 210,000 = \underline{\$3.35}$; and dividends per share (DPS) of $\$392,000 \div 210,000 = \underline{\$1.87}$.

9. Horton Holographic Corporation's total sales revenue was \$215,000,000 in the most recent year. The company paid \$17,250,000 in interest during the year and incurred \$133,000,000 in cash-based costs of producing and distributing its goods. It paid income tax at a 27% average (state plus federal combined) rate, and paid \$4,500,000 in dividends to its common stockholders after retaining \$5,537,500 in earnings to finance the purchase of additional assets. What depreciation expense figure should have been shown on the company's income statement for the year?

9. Here we want to compute an income statement figure, so we might want to start by plugging known figures into the income statement "skeleton":

Sales	\$215,000,000
- Cash paid in producing/distributing goods	133,000,000
- Depreciation (measure of lost equipment value)	<u>(unknown)</u>
Operating Income (EBIT)	<u>(unknown)</u>

- Interest	<u>17,250,000</u>
Taxable Income, or Earnings Before Taxes (EBT)	(unknown)
- Income Tax (27% of EBT)	<u>(unknown)</u>
Net Income	<u>\$ 10,037,500</u>

(Because net income can be either paid in dividends or retained for the company's internal use, we know that net income must be the sum of dividends plus the earnings that were retained, here \$4,500,000 + \$5,537,500 = \$10,037,500.) So how can we fill in the "unknown" spots and eventually solve for depreciation? First, note that EBT (all of EBT, which we can represent as 1 EBT) minus 27% of EBT is \$10,037,500. Solving algebraically, we find:

$$\begin{aligned}
 1 \text{ EBT} - .27 \text{ EBT} &= \$10,037,500 \\
 \text{EBT} (1 - .27) &= \$10,037,500 \\
 \text{EBT} (.73) &= \$10,037,500 \\
 \text{EBT} &= \$10,037,500 \div .73 = \underline{\underline{\$13,750,000}}
 \end{aligned}$$

(and tax is 27% of that amount, or \$3,712,500). So now our income statement skeleton shows

Sales	\$215,000,000
- Cash paid in producing/distributing goods	133,000,000
- Depreciation (measure of lost equipment value)	<u>(unknown)</u>
Operating Income (EBIT)	(unknown)
- Interest	<u>17,250,000</u>
Taxable Income, or Earnings Before Taxes (EBT)	\$ 13,750,000
- Income Tax (27% of EBT)	<u>3,712,500</u>
Net Income	<u>\$ 10,037,500</u>

Now we can fill in the last unknown other than depreciation. The only way we can subtract \$17,250,000 in interest from EBIT and end up with \$13,750,000 in EBT is if EBIT is \$13,750,000 + \$17,250,000 = \$31,000,000. So now our income statement skeleton shows

Sales	\$215,000,000
- Cash paid in producing/distributing goods	133,000,000
- Depreciation (measure of lost equipment value)	<u>(unknown)</u>
Operating Income (EBIT)	\$ 31,000,000
- Interest	<u>17,250,000</u>
Taxable Income, or Earnings Before Taxes (EBT)	\$ 13,750,000
- Income Tax (27% of EBT)	<u>3,712,500</u>
Net Income	<u>\$ 10,037,500</u>

Finally, the only way we can start with \$215,000,000 in total sales revenue, subtract out \$133,000,000 in cash costs and \$Depr in depreciation, and end up with EBIT of \$31,000,000 is if depreciation is

$$\begin{aligned}
 \$215,000,000 - \$133,000,000 - \$\text{Depr} &= \$31,000,000. \\
 \$215,000,000 - \$133,000,000 - \$31,000,000 &= \$\text{Depr} = \underline{\underline{\$51,000,000}}.
 \end{aligned}$$

10. Managers at Hovey Hovercraft, Ltd. are making some financial projections. In the coming year they expect net income to be 6% of the \$105 million in sales. If the accumulated retained earnings total shown on the balance sheet for the year just ended was \$18 million, and if Hovey continues with its historical practice of paying 45% of each year's net income to the company's common stockholders as cash dividends, what accumulated retained earnings total should we expect to see on the balance sheet that will be completed at the end of the current year?

10. This problem helps us understand the concept of retained earnings. In fact, what we are doing here is essentially creating a projected statement of retained earnings for the coming year. The retained earnings figure shown on the most recent *balance sheet* indicates how much of the company's asset total the managers have paid for by hanging on to owners' profits, or net income (rather than paying these profits out to the owners as cash dividends), in bits and pieces over time since the company was created. The figure shown at the bottom of the most recent *income statement* as retained earnings indicates how much of the most recent year's income has been retained (rather than paid as dividends).

So the retained earnings total shown on the balance sheet at the end of the coming year should be the total shown on the balance sheet at the end of the most recent year, plus the added amount that we expect will be retained during the coming year. Note that if the stockholders receive 45% of the coming year's net income as dividends, then the managers will be retaining the other 55% of net income to pay for additional asset purchases.

Here we have

Balance sheet retained earnings total, end of prior year	\$18,000,000
Add: Coming year's expected net income (6% of \$105,000,000 in sales)	\$6,300,000
Minus: Dividends expected to be paid (45% of \$6,300,000 net income)	<u>\$2,835,000</u>
Addition to Retained Earnings (55% of \$6,300,000 net income)	<u>\$ 3,465,000</u>
Expected balance sheet retained earnings total, end of coming year	<u>\$21,465,000</u>

11. Accountants at Julian Jewelers just completed a balance sheet that shows \$975,000 in net fixed assets. The net fixed asset total on the balance sheet they completed a year ago was \$932,000. If the company claimed \$78,000 in depreciation expense on its income statement for the most recent year, how much did it spend on new fixed assets, or capital equipment, during the most recent year?

11. This problem helps us understand the concept of net fixed assets - the book value, net of depreciation expense claimed since purchase, of assets expected to provide benefits to the company for the long term (more than a year). While the intent of showing this "net" fixed asset value is to acknowledge that things like buildings and machines lose value with age, we must recognize that the balance sheet net book value of fixed assets is not likely to be a good estimate of the prices for which these assets could actually be sold in the used goods market.

Here the net fixed assets total rose from \$932,000 a year ago to \$975,000 today. So it might seem, at first glance, that the company purchased \$43,000 of new fixed assets. But \$78,000 of fixed assets were depreciated, or "written off," during the past year. So to be up by a net \$43,000 when \$78,000 worth was used up (in an accounting sense, not necessarily an economic sense), new purchases of fixed assets ("net capital spending") had to total $\$43,000 + \$78,000 = \underline{\$121,000}$.

Let's look at it from the other direction to make sure we can see what has happened. The company started out with \$932,000 in net fixed assets. Then it bought another \$121,000 in fixed assets,

so if no further loss in long term asset value were recognized the newer balance sheet would show $\$932,000 + \$121,000 = \$1,053,000$ in net fixed assets. However, with the recognition of $\$78,000$ worth of lost value (depreciation), the newer balance sheet shows a net fixed asset figure of $\$1,053,000 - \$78,000 = \$975,000$.

12. McCormick Maintenance Services' assets consist of floor buffing machines (fixed assets), cleaning supplies (inventory), money the company is owed by customers (accounts receivable), and a checking account (cash). Earlier this week a used equipment dealer offered to pay $\$160,000$ for the floor buffing machines, which McCormick bought three years ago for $\$327,000$ and against which $\$200,000$ in total depreciation has been claimed. The company's most recent balance sheet shows $\$58,000$ in current liabilities, and the book value of net working capital is $\$23,000$. McCormick would receive $\$84,000$ if it were to liquidate all of its current assets today. Compute the book value and market value of McCormick's assets.

12. Market value is the easy part. Current (short term) assets could be liquidated/sold today for $\$84,000$, and the machines (fixed, or long term, assets) could be sold at the present time for $\$160,000$, so the total market value of the company's assets is $\$84,000 + \$160,000 = \underline{\$244,000}$.

Book values are a bit more difficult to compute (in a real world situation we typically would have a balance sheet to examine and thus would know the book values; here we must work backwards to find the book values). Let's start by recalling that net working capital is the book (balance sheet) value of current assets minus the book value of current liabilities. Here we know that the book value of current assets minus the $\$58,000$ book value of current liabilities is $\$23,000$, so the book value of the current assets must be $\$58,000 + \$23,000 = \underline{\$81,000}$. And the balance sheet ("book") value of the net fixed assets would be computed as the $\$327,000$ original purchase price minus the $\$200,000$ in total depreciation claimed during the three years the machines have been held, or $\underline{\$127,000}$. Thus the total book value of the assets is $\$81,000 + \$127,000 = \underline{\$208,000}$.

The market value of a company's assets could be greater than, equal to, or less than their book value. Here the market value exceeds the book value by a considerable margin. Because we should make business decisions based on economic (market) values, while standard financial statements present book values, we have to be careful in interpreting balance sheet figures if the book values shown differ greatly from the true market values. (We also must use care in interpreting income statement figures if the net income measured with accrual accounting principles is considerably different from the amount of cash the company generated for its owners.)

13. The most recent year's income statement for Milner Millworks, Inc. showed $\$497,000$ in total sales revenue; $\$262,000$ in cash-based cost of goods sold; $\$82,500$ in depreciation expense; and $\$68,250$ in interest paid. The company's average income tax rate was 26% (state plus federal combined). Compute Milner's net income and operating cash flow for the year.

13. An accrual-based income statement for the company shows:

Sales	\$497,000
- Cash paid in producing/distributing goods	262,000
- Depreciation (measure of lost equipment value)	<u>82,500</u>
Operating Income (EBIT)	\$152,500
- Interest	<u>68,250</u>
Taxable Income, or Earnings Before Taxes (EBT)	\$ 84,250
- Income Tax (26% of EBT)	<u>21,905</u>
Net Income	\$ <u>62,345</u>

Net income for a given year (or other accounting period) is the accrual accounting-based measure of value remaining for the company's owners after all accrual-based operating (including depreciation) and financing (including interest) costs were met. Operating cash flow (OCF) is the amount of cash that remained for all money providers (owners and lenders alike) after all cash-based costs of running the company's operations were met. Cash-based operating costs include payments for labor and materials, but not depreciation (which is not cash-based; it is simply a way to recognize that long-lived assets lose some value through wear & tear and obsolescence each year) and not interest (a financing cost, not an operating cost). Cash-based operating costs also include income tax payments attributable to operations, which depreciation does affect. (Interest also has an impact on total income tax, but that impact relates to financing rather than operating decisions, so while textbooks sometimes include total income tax in the computation of OCF, in this OCF computation we will ignore the income tax impact of interest payments.) From an operating cash flow standpoint we might want to recast the income statement to show

Sales	\$497,000
- Cash paid in producing/distributing goods	262,000
- Depreciation (measure of lost equipment value)	<u>82,500</u>
Operating Income (EBIT)	\$152,500
- Income Tax on Operations (26% of EBIT)	<u>39,650</u>
Net Operating Profit after Taxes (NOPAT)	\$112,850
- Interest	<u>68,250</u>
Earnings Before Income Tax Savings on Interest	\$ 44,600
+ Income Tax Savings on Interest (26% of Interest)	<u>17,745</u>
Net Income	\$ <u>62,345</u>

Then we compute operating cash flow as EBIT- income tax on operations + depreciation, which here is $\$152,500 - \$39,650 + \$82,500 = \underline{\$195,350}$. (Whew!!) Fortunately, an abbreviated approach to finding OCF, when we treat the income tax impact of interest as irrelevant to operating cash flow, is

$$\begin{aligned} \text{OCF} &= \text{NOPAT} + \text{Depreciation} = \text{EBIT} (1 - t) + \text{Depreciation} \\ &= \$152,500 (1 - .26) + \$82,500 = \$112,850 + \$82,500 = \underline{\$195,350}. \end{aligned}$$

14. What types of transactions involving other balance sheet accounts would cause the cash figure shown on Moulton Molding & Manufacturing, Inc.'s balance sheet to increase? To decrease? To remain unchanged?

14. Transactions that cause cash, as shown on the balance sheet, to increase involve decreases in assets (selling off things the company has) or increases in liabilities or owners' equity (bringing in more money from lenders or owners). Examples would include selling marketable securities, collecting on accounts receivable, selling inventory or machinery, and issuing new bonds or shares of stock - and then immediately putting the proceeds into the company checking (cash) account.

Balance sheet transactions that cause cash to decrease involve increases in assets (paying for things the company needs) or decreases in liabilities or owners' equity (paying money to lenders or owners). Examples would include writing checks to pay wages, material bills, or cleaning bills; writing a check to repay principal owed to a lender; or writing checks to pay interest or dividends to investors.

But there is no immediate net change in the balance sheet cash position if no cash immediately changes hands, or if transactions that would otherwise increase and decrease cash offset each other. For example, if sales are made on credit, such that inventory is decreased but the related cash will not be collected until a later date, or if assets are purchased not with cash but rather with a promise to pay cash later, then the company's cash position remains unchanged for purposes of the balance sheet "snapshot." There would also be no change in the balance sheet cash figure if the company issued new shares of common stock, collecting cash from the new stockholders in the process, but then immediately used the money received to repay some debt.

15. Ropp Refinishing Company held \$1,120,000 in cash at the beginning of the most recent year. Actions relating to cash payments or receipts during the year were as shown below. Complete a statement of cash flows that shows Cash Flow from Operating Activities, Cash Flow from Investment Activities, and Cash Flow from Financing Activities. Why do analysts find it helpful to classify cash flows into these three major categories? (Accounting rules allow for some different approaches to a statement of cash flows; we will use the "indirect method" procedures discussed in class.)

- Dividends of \$3,935,000 were paid to common stockholders
- Inventory increased by \$1,800,000
- A parcel of unneeded land was sold for \$845,000
- The company borrowed \$680,000 in new short term money from its local bank
- The company earned net income of \$5,750,000
- Accrued wages decreased by \$230,000
- Accounts receivable increased by \$360,000
- New machinery was purchased in the amount of \$4,150,000
- Accounts payable increased by \$400,000
- The company borrowed \$4,825,000 in new long term money from bondholders
- Depreciation expense claimed on long-lived assets was \$1,375,000

15. The cash flow statement breaks cash receipts or payments into three major categories: operating activities, investment activities, and financing activities. The cash flow statement based on the above information should be:

Cash Flows from Operating Activities:

Net Income	\$5,750,000
Depreciation	\$1,375,000
Increase in Accounts Payable	\$ 400,000
Increase in Accounts Receivable	(\$ 360,000)
Increase in Inventory	(\$1,800,000)
Decrease in Accrued Wages	(\$ 230,000)

Net Cash from Operating Activities \$5,135,000

Cash Flows from Investment Activities:

Purchase of Machinery	(\$4,150,000)
Sale of Land	\$ 845,000

Net Cash from Investment Activities (\$3,305,000)

Cash Flows from Financing Activities:

Increase in Notes Payable	\$ 680,000
Increase in Bonds Payable	\$4,825,000
Dividend Payments to Owners	(\$3,935,000)
Interest Payments to Lenders	(Hiding in Net Income above)

Net Cash from Financing Activities	<u>\$1,570,000</u>
Change in Cash Balance	\$3,400,000
Beginning Cash Balance	<u>\$1,120,000</u>
Ending Cash Balance	<u>\$4,520,000</u>

Cash Flow from Operating Activities includes items involving the measured period's net income, along with changes in most working capital (current asset and current liability) accounts. A decrease in a current asset account, or an increase in a current liability account, is sometimes called a "source of cash;" a company gets (or at least frees up) cash by collecting on/selling off current assets, or by borrowing more value from its workers (accrued wages) or material suppliers (accounts payable). An increase in a current asset account, or a decrease in a current liability account, is sometimes called a "use of cash;" a company spends (or at least no longer has available for other uses) cash when it buys current assets, or pays money to its workers or material suppliers. Thus we look at the changes in net working capital items (other than the impact of notes payable, seen below in financing activities) as components of cash flow from operations.

Note also that depreciation is treated as a "source" of cash from operations because depreciation was subtracted out in arriving at the net income figure, but depreciation did not involve a payment of cash during the measured period, so we adjust by adding it back.

Cash Flow from Investment Activities includes the purchase or sale of long term items that will affect more than one operating period. Buying long-lived assets brings about a negative addition to cash flow, whereas the selling off of buildings or equipment creates an inflow of cash.

Cash Flow from Financing Activities includes all money received from, or paid to, the company's owners, and also includes principal borrowed from or repaid to lenders. (In theory we should show interest paid to lenders as a negative cash flow from financing activities. But in practice, because interest is an expense subtracted in the computation of net income, and because we like to show net income as the primary driver of cash flow from operations, we end up treating interest payments as a negative cash flow from operating activities.) Even though notes payable is a working capital item in a general sense, in a cash flow statement we treat an increase (decrease) in notes payable as a positive (negative) cash flow from financing, rather than operating, activities. While doing so makes sense in that short term and long term debt might be substituted for each other, we can also see that there is an element of arbitrariness in how things are classified for accounting purposes.

These categories help us get a feel for whether a company's cash position relates to long term profitability. For example, a company with negative cash flows from operations might have cash available to pay its bills, but only because it is selling off assets or bringing in more money from bondholders or stockholders. Or a growing company with strong earnings might be short on cash because of its need to keep investing in new assets. Here we have a company that generated a good deal of cash, primarily through its positive net income (although it also added noticeably to its long term borrowings), and that spent a considerable amount on new long term assets.

16. Prior to 2018 U.S. corporate income was taxed according to the following partial graduated rate schedule.

<u>Taxable Income</u>	<u>Income Tax Rate</u>
Up to \$50,000	15%
\$ 50,001 – \$ 75,000	25%
\$ 75,001 – \$100,000	34%
\$100,001 – \$335,000	39%

(Higher income amounts were taxed at rates in the 35 – 39% range.) If Schroeder Shredders, Inc. had taxable income of \$289,000 for the year 2017, how much in income tax should it have paid? If it paid that amount of tax, what average and marginal income tax rates did the company pay?

16. Income tax laws are not based on logic; they reflect political compromise - not such a bad thing in a democratic society. Any feature of our income tax laws could change at any time (the rate listing shown above was eliminated at the end of 2017; corporations now pay a flat 21% rate on all taxable income). So whereas you should commit to memory things like the structure of a balance sheet and income statement, you should not memorize tax rates or other aspects of income tax computations. If you needed income or rate figures like those shown above for a homework or exam question, they would be given to you. But let's see how a graduated rate system causes average and marginal income tax rates to differ.

Here we apply the indicated federal corporate income tax rates to \$289,000 in taxable income. In a system of graduated tax rates we do not simply say "\$289,000 is in the \$100,001 - \$335,000 range with a 39% tax rate, so the total income tax is $.39 \times \$289,000 = \$112,710$." We instead break the \$289,000 into smaller amounts taxed at different rates. The first \$50,000 of income was taxed at a 15% rate; the next \$25,000 (up to \$75,000) at a 25% rate; the next \$25,000 (up to \$100,000) at a 34% rate; and any additional amount up to \$335,000 at a 39% rate. Here we have $\$289,000 - \$100,000 = \$189,000$ still to account for once we hit the \$100,000 mark. So the U.S. federal income tax on \$289,000 of corporate net income would have been computed as

$$\begin{aligned}
 & \$ 50,000 \times .15 = \$ 7,500 \\
 & \$ 25,000 \times .25 = \$ 6,250 \\
 & \$ 25,000 \times .34 = \$ 8,500 \\
 & \$189,000 \times .39 = \underline{\$73,710} \\
 & \text{Total} \quad \underline{\underline{\$95,960}}
 \end{aligned}$$

Here the company paid \$95,960 in income tax on \$289,000 in income, for an average income tax rate of $\$95,960 \div \$289,000 = \underline{33.2042\%}$. But because it would pay a 39% tax on any additional income it might have earned, its marginal income tax rate was 39%. Recall that average income tax rates (or other average figures) are useful tools for measuring what has happened to date. [In theory, to compute income tax a company owes on income earned to date we would multiply taxable income by the applicable average income tax rate (if we knew the average rate), here $\$289,000 \times .332042 = \$95,960$.] Marginal income tax rates (or other marginal figures) are useful tools for making decisions on how to proceed from where we are now. For example, if this company's managers and employees were to have worked harder and earned higher income, how much of each additional dollar earned would have gone to the federal government as income tax? Here the answer is 39%, not the lower 33.2042% average tax rate.

17. During the most recent year, Stevenson Steak Houses, Inc. paid \$14,000,000 in interest to parties that have lent the company money. If Stevenson paid income tax at a 23% average (state plus federal combined) rate, what income tax shield was provided by the interest payments?

17. Think of two companies, Stevenson Co. (which had some debt financing and paid \$14 million in interest over the past year) and physically identical Polonius Co. (which had no debt financing and thus paid no interest). If they are physically identical, then their operating incomes should have been equal (let's say it was \$114,000,000 for each; we could actually use any number greater than \$14 million to illustrate the point), and their income statements should have shown, in part:

	<u>Stevenson</u>	<u>Polonius</u>
Operating Income (EBIT)	\$114,000,000	\$114,000,000
Minus Interest	<u>14,000,000</u>	<u>000</u>
Earnings Before Taxes (EBT)	\$100,000,000	\$114,000,000
Minus Income Tax (23%)	23,000,000	26,220,000

Even though the companies' operations were identical, Polonius ended up paying \$26,220,000 - \$23,000,000 = \$3,220,000 more in income tax than Stevenson did. Thus Stevenson had an interest tax shield of \$3,220,000 (which we can compute more directly as the \$14,000,000 in interest, which is shielded from tax, multiplied by the 23% average income tax rate). [We use the average tax rate because we want to measure what happened previously; we would use marginal income tax rates in making decisions on what to do going forward, but those two rates would not differ by much following the 2017 federal income tax law changes.] A company that has only equity financing must provide payments to its money providers with no help from the government in the form of reduced income taxes. But if a company simply chooses instead to use some debt financing, then it provides payments to some of its money providers (the lenders) with help from the government in the form of reduced income taxes. Thus there is an income tax-based incentive for companies to finance their assets with some debt financing, rather than having all-equity capital structures.

Advanced Level

18. The most recent year's income statement for Watterson Wetsuit Company was as follows (in thousands of dollars):

Sales	\$5,750
Minus Cash-based Cost of Goods Sold	\$4,200
Minus Depreciation	\$ <u>810</u>
Operating Income (EBIT)	\$ 740
Minus Interest Expense	\$ <u>120</u>
Earnings Before Taxes (EBT)	\$ 620
Minus Income Taxes (35%)	\$ <u>217</u>
Net Income	\$ <u>403</u>

Watterson's balance sheets for the two most recent years showed (in thousands of dollars):

	<u>Most Recent Year</u>	<u>Previous Year</u>
Cash and Marketable Securities	\$ 2,800	\$ 2,170
Accounts Receivable	\$ 1,150	\$ 1,190
Inventory	\$ 1,750	\$ 1,830
Gross Fixed Assets	\$11,250	\$10,190
Minus Accumulated Depreciation	(\$ 1,900)	(\$ 1,090)
Net Fixed Assets	<u>\$ 9,350</u>	<u>\$ 9,100</u>
Total Assets	<u>\$15,050</u>	<u>\$14,290</u>

Accrued Wages and Taxes	\$ 700	\$ 930
Accounts Payable	\$ 2,340	\$ 1,790
Notes Payable	\$ 1,400	\$ 1,460
Long Term Debt	\$ 2,200	\$ 2,010
Paid-In Capital	\$ 5,000	\$ 5,000
Retained Earnings	\$ <u>3,410</u>	\$ <u>3,100</u>
Total Claims	\$ <u>15,050</u>	\$ <u>14,290</u>

Complete a statement of cash flows for the most recent year. Also compute Watterson's Net Operating Profit After Taxes (NOPAT), Operating Cash Flow (OCF), and Free Cash Flow (FCF).

18. The cash flow statement traces cash receipts or payments to three major categories of activity: operating activities, investment activities, and financing activities. The cash flow statement based on the above information should be:

Cash Flows from Operating Activities:

Net Income	\$ 403
Depreciation	\$ 810
Decrease in Accounts Receivable (\$1,190 - \$1,150)	\$ 40
Decrease in Inventory (\$1,830 - \$1,750)	\$ 80
Decrease in Accrued Wages & Taxes (\$700 - \$930)	(\$ 230)
Increase in Accounts Payable (\$2,340 - \$1,790)	\$ <u>550</u>

Net Cash from Operating Activities \$1,653

Cash Flows from Investment Activities:

Increase in Gross Fixed Assets (\$10,190 - \$11,250)	(\$ <u>1,060</u>)
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Net Cash from Investment Activities (\$1,060)

Cash Flows from Financing Activities:

Decrease in Notes Payable (\$1,400 - \$1,460)*	(\$ 60)
Increase in Long Term Debt (\$2,200 - \$2,010)	\$ 190
Dividend Payments to Owners**	(\$ <u>93</u>)
Interest Payments to Lenders	(Included in Net Inc. above)

Net Cash from Financing Activities \$ 37

Change in Cash Balance	\$ 630
Beginning Cash Balance	\$ <u>2,170</u>
Ending Cash Balance	\$ <u>2,800</u>

* Cash flows from operations generally include changes in working capital accounts, but not notes payable - changes in notes payable are treated as cash flows from financing activities, since they have an explicit cost. And it seems that interest paid to lenders (both short term and long term) should be included in cash flows from financing activities, but because we like to show net income as a cash flow from operating activities, and because interest is subtracted out in the computation of net income, interest payments show up indirectly as negative cash flows from operations. So there is, arguably, an element of arbitrariness in the activity categories to which we attribute the various cash flows.

** Dividends paid were computed as follows. The beginning Retained Earnings balance was \$3,100, and Net Income was \$403, so the ending Retained Earnings balance would have been \$3,100 + \$403 = \$3,503 if no dividends had been paid. But the ending Retained Earnings balance was only \$3,410, so \$3,503 - \$3,410 = \$93 had to be paid in Dividends. More briefly, \$3,100 beginning RE + \$403 NI - \$3,410 ending RE = \$93 Dividends.

Finally, we compute the NOPAT, OCF, and FCF figures as:

$$\text{NOPAT} = \text{EBIT} (1 - t) = \$740 (1 - .35) = \$481$$

$$\text{OCF} = \text{NOPAT} + \text{Depreciation} = \$481 + \$810 = \$1,291$$

Net working capital is normally defined as total current assets minus total current liabilities. But in computing free cash flow the general practice is to compute changes in net working capital without including changes in notes payable, because notes payable represent a formally negotiated claim by lenders, and free cash flow is the amount the company has available to pay lenders and owners (thus including notes payable would constitute a double-counting, in this view). Here this "net working capital" has risen from [(\$2,170 + \$1,190 + \$1,830) - (\$1,790 + \$930)] = \$5,190 - \$2,720 = \$2,470 in the previous year to [(\$2,800 + \$1,150 + \$1,750) - (\$2,340 + \$700)] = \$5,700 - \$3,040 = \$2,660 in the most recent year, for an increase of \$2,660 - \$2,470 = \$190. Therefore,

$$\begin{aligned} \text{FCF} &= \text{OCF} - \text{Increase in Gross Fixed Assets} - \text{Increase in "Net Working Capital"} \\ &= \$1,291 - \$1,060 - \$190 = \underline{\underline{\$41}}. \end{aligned}$$

In this case, the company had \$41,000 to compensate its lenders (including notes payable) and owners after making provision for investment in needed long term and short term assets.