CHAPTER OBJECTIVES

After careful study of this chapter, you will be able to:

1. Understand the lower of cost or market method.
2. Explain the conceptual issues regarding the lower of cost or market method.
3. Understand purchase obligations and product financing arrangements.
4. Explain the valuation of inventory above cost.
5. Use the gross profit method.
6. Understand the retail inventory method.
7. Explain the conceptual issues regarding the retail inventory method.
8. Understand the dollar-value LIFO retail method.
9. Understand the effects of inventory errors on the financial statements.
SYNOPSIS

Lower of Cost or Market

1. The lower of cost or market (LCM) rule requires that a company recognize a decline in its inventory’s utility as a loss of the period, and that the company write down its ending inventory to the lower market value. This rule is consistent with the conservatism convention.

2. Market value is defined as the current replacement cost of inventory (not the current selling price) by purchase or manufacture, with upper and lower constraints imposed. Market value cannot be higher than the ceiling constraint or lower than the floor constraint. Ceiling constraint: The market value cannot be greater than the net realizable value (estimated selling price in the ordinary course of business, less reasonably predictable costs of completion and disposal). Floor constraint: The market value cannot be less than the net realizable value reduced by a normal profit margin (normal markup). The ceiling ensures that a write-down will cover all expected losses currently and prevents the recognition of further losses in the future. The floor prevents the recognition of excessive losses currently, and excessive profits in the future.

3. A company may apply the LCM rule to individual inventory items, categories of inventory, or total inventory. The method that most clearly reflects periodic income should be used. Applying LCM to each individual item is the most common inventory method because it is required for income taxes and results in the most conservative inventory values. Once a company writes down its inventory to market, it does not write the inventory back up to cost, even if there is a subsequent recovery in the value of the inventory.

4. Two alternative accounting methods are acceptable for recording a write-down of inventory to market value. The direct method records the write-down directly in the inventory and cost of goods sold accounts. The allowance method uses a separate inventory valuation account and a loss account. Although these methods produce the same net results, the allowance method is more desirable because it clearly identifies the effects of the write-down on the company’s cost of goods sold.

5. According to APB Opinion No. 28, an interim period market decline that appears unlikely to reverse should be recognized in the period of decline. If the decline does reverse in a later interim period, a company should recognize a loss recovery and increase the inventory value by the amount of the recovery up to the original cost. However, a temporary market decline that is expected to reverse by the end of the annual period should be ignored for interim statements.

Conceptual Evaluation of Lower of Cost or Market

6. The theoretical criticisms of LCM include the following: (a) A holding loss due to a decline in the utility of the inventory is recognized; however, a comparable holding gain due to an increase in the utility of the inventory is not recognized, and (b) the revenue recognition principle is violated because a loss is recognized before the earning process is complete and before an exchange transaction has occurred. However, it can be argued that modification of the revenue recognition principle is justified because an economic event that results in a reduction of the company’s stockholders’ equity has occurred.

7. When a company recognizes an inventory loss in the period of market decline, its income in a future period will be higher than if the inventory value had remained at cost. That is, the loss is transferred from the period of sale to the period of decline.
Purchase Obligations and Product Financing Arrangements

8. Normally, a company does not record purchase obligations in its accounts because neither an asset nor a liability is created by placing an order. However, a company discloses unconditional (noncancelable) purchase obligations made at a definite price in a note to its financial statements. A company records a loss on an unconditional purchase obligation made at a fixed price if the current market price (replacement cost) is lower than the fixed price. Recognition of the loss is in accordance with the conservatism convention and with FASB Statement No. 5, which requires that a company record a contingent loss if the loss is probable and can be reasonably estimated.

Valuation Above Cost

9. According to Accounting Research Bulletin No. 43, a company may value its inventory above cost in certain circumstances. The inventory (such as precious metals, or agricultural or mineral products) must be made up of interchangeable units and must be saleable at the quoted market price. Valuation above cost violates the conservatism convention and the usual application of revenue recognition principles.

Gross Profit Method

10. A company uses the gross profit method to estimate the cost of its inventory by applying a gross profit rate based on its income statements of previous periods to the net sales of the current period. The gross profit method may be used, for example, for internal financial statements, for published interim financial statements when the method is disclosed, for estimation by auditors, to estimate casualty losses, or to estimate the cost of inventory from incomplete records.

11. The relevance of estimates computed using the gross profit method depends on the accuracy of the gross profit percentage. That accuracy may be enhanced by adjustments for (a) known changes in the relationship between gross profit and net sales; (b) varying gross profit rates in different types of inventory; or (c) period-to-period fluctuations in the gross profit rate.

Retail Inventory Method

12. A company using the retail inventory method determines the cost of its ending inventory by applying current-period estimates of the profit percentage. The retail inventory method enables ending inventory to be determined without a physical inventory, simplifies recordkeeping procedures, and facilitates computation of the ending inventory because reference to actual purchase documents is not required. The method is acceptable for income tax purposes as well as under generally accepted accounting principles.

13. The retail method requires that the company value inventory items at cost and retail in order to determine the cost-to-retail ratio. The company then uses the cost-to-retail ratio to convert the retail value of ending inventory to approximate cost. A company may use the retail inventory method with the FIFO, average, and LIFO cost flow assumptions, and the company can use the lower of cost or market rule with each.

Conceptual Evaluation of the Retail Inventory Method

14. Two assumptions underlie the retail inventory method. The first assumption is that a company’s markup is uniform for all inventory items, or that the proportions of items with different markups are the same in ending inventory and goods available for sale. The second assumption is that the company’s cost-to-retail ratio is constant over the period or that changes in retail prices parallel changes in purchases.
15. The lower of cost or market method of the retail inventory method usually produces an inventory value that is less than cost but only approximates the lower of cost or market. The method is completely accurate only if markups and markdowns do not exist at the same time or if all of the marked down items have been sold.

**Dollar-Value LIFO Retail Method**

16. The dollar-value LIFO retail method is a combination of the dollar-value LIFO method and the retail LIFO method. The cost-to-retail ratio is determined as in the LIFO retail method. That is, net markups and net markdowns are included in calculating the ratio and a separate ratio is used for beginning inventory.

**Effects of Inventory Errors**

17. Errors made by a company in the valuation of its inventory and the recording of its purchases can result in errors on the company's balance sheet and income statement for current and succeeding years. Each error must be analyzed carefully to determine the appropriate correction. Examples of common errors and their effects are given in the text. When a company discovers a material error from a prior period, it makes the correction as a prior period adjustment.

**Summary of Inventory Issues**

18. Exhibit 9-2 in the text provides a summary of the inventory issues discussed in Chapters 8 and 9.

**SELF-EVALUATION EXERCISES**

**True-False Questions**

Determine whether each of the following statements is true or false.

1. The term "market" in lower of cost or market is defined as the selling price at year-end.  
   
   **Answer: False**  
   The market price is not the selling price. The term “market” in lower of cost or market is the current replacement cost of the inventory.

2. The ceiling limit (net realizable value) under the LCM rule is the selling price in the normal course of business less predictable costs of completion and disposal.  
   
   **Answer: True**  
   The ceiling limit is the selling cost less any disposal costs or costs to complete the item.
3. Valuing inventory at a value lower than the floor would result in an excessive loss in the year of a write-down and an excessive profit in a subsequent period of sale.

Answer: True
Valuing inventory at less than the floor would cause a larger loss in the year of the write-down and a larger than normal profit in subsequent years. In general, the difference between the ceiling and floor is the normal profit that a business makes on an item. By using a basis of the cost that is lower than the floor, it sets up a condition whereby the future sale would create a larger than normal profit and reduce the credibility of the financial statements.

4. A temporary decline in the utility of inventory due to the lower of cost or market rule is ignored in interim-period financial statements if the decline is expected to reverse by the end of the annual period.

Answer: True
While we would write-down a permanent loss, if the decline is truly temporary, by the time the annual financial statements are prepared, the temporary condition would be corrected.

5. A company must recognize a loss in the financial statements when the year-end market price is below a fixed price for a cancelable purchase commitment.

Answer: False
This would be true if the purchase commitment were noncancelable. If the commitment is cancelable, then a prudent business decision would be to cancel the contract rather than take a loss on the commitment.

6. Disclosure in the notes to the financial statements, rather than the accrual of losses, is preferred for purchase commitment losses on noncancelable purchase commitments if the current market price is less than the fixed contract price.

Answer: False
If the purchase commitment is noncancelable and the current market price is below the fixed contract price, a loss is required to be recognized in the financial statements, not just a disclosure in the notes.

7. The retail inventory method is a generally accepted accounting principle for external financial statements but is not acceptable in applying the provisions of the Internal Revenue Code.

Answer: False
The retail inventory method is acceptable for estimation of the cost of inventory when a consistent pattern between cost and retail exists. This method is acceptable for both external financial statements prepared in accordance with generally accepted accounting principles and the Internal Revenue Code.

8. A company using the retail inventory method for interim financial statements subtracts employee discounts and estimated normal inventory shrinkage to compute ending inventory at retail.

Answer: True
Employee discounts and shrinkage (loss of inventory through either breakage or theft) must be accounted for on interim estimates because these items affect the amount of inventory on hand and can lead to an overstatement of the inventory account. These two items are deducted because they are normal costs of doing business and as such were used to help arrive at the appropriate retail price.
9. Applying the lower of cost or market value rule to the inventory on a category-by-category basis will usually result in the most conservative inventory valuation of the three acceptable methods.

**Answer: False**

The most conservative inventory valuation would be the use of lower of cost or market on individual inventory items. This makes sense because you would be counting the lowest value for every item. When done by categories, some items might be higher or lower using the three acceptable market methods.

10. If a market decline occurs in an interim period and is considered permanent, it should be ignored because the market price will normally increase in a subsequent annual period.

**Answer: False**

A permanent decline in market value means that it is likely not to reverse itself. In other words, permanent means always, so you would not expect it to reverse in a future period. That does not mean that it is impossible for it to reverse, just that it is not expected to reverse.

11. It is acceptable to write inventory up to original cost if a recovery in utility occurs in an annual period subsequent to the lower of cost or market write-down.

**Answer: False**

The write-down of inventory based on a loss of utility is a one-way street. We only will recognize a loss. This is consistent with accounting conservatism in that we do not recognize anticipated gains, only anticipated losses.

12. If ending inventory is understated (but purchases are recorded correctly), income will be overstated in the current year.

**Answer: False**

If ending inventory is understated (but purchases are recorded correctly), it will cause the cost of goods sold to be overstated. Because cost of goods sold is an expense, our income will be understated because it appears that our expenses are higher than they actually are.

13. A separate inventory valuation account and a loss account are used under the allowance method to record a write-down of inventory to market value.

**Answer: True**

In the allowance method, a separate valuation account and loss account are used so that the effects of the write-down can be clearly identified as opposed to the direct method where the write-down and loss are taken from the inventory account.

14. The gross profit method of estimating the cost of inventory is accepted for internal reporting and for interim reports when the method is disclosed.

**Answer: True**

The use of the gross profit method for estimating inventory costs is acceptable for interim reporting as long as it is disclosed. Its use is justified because the expense of a physical inventory for interim reporting will probably be too costly for most companies. If it is used for interim reports, a company must disclose any significant adjustments from the annual physical inventory.
15. An assumption underlying the retail inventory method is that either the company’s markup is uniform for all inventory items or that the proportions of items with different markups are the same in ending inventory and goods available for sale.

Answer: True
This is one of two basic assumptions underlying the retail inventory method. If this assumption were not true, it would cause the estimates that are calculated to be of little to no value because of the use of one cost-to-retail ratio for many varied markups.

Multiple Choice Questions

Select the one best answer for each of the following questions.

1. The term "market" in lower of cost or market refers to:
   (a) market price at time of purchase.
   (b) selling price by the retailer.
   (c) selling price by the retailer less normal profit.
   (d) current replacement cost.

Answer: (d) current replacement cost.
The term "market," when used in lower of cost or market inventory valuation, refers to the current replacement cost (either by purchase or manufacture) and not the selling price.
Choice (a) is incorrect because the market price at the time of purchase is what we use as the actual cost in the lower of cost or market method. Choice (b) is incorrect because the selling price by the retailer is not the market price to "replace" the item. This price is used as the "ceiling" price when there are no disposal costs or costs to complete the item. Choice (c) is incorrect because this is the "floor" price in the LCM method.

2. The lower limit in the lower of cost or market is:
   (a) selling price.
   (b) selling price less costs of disposal.
   (c) net realizable value less normal profit margin.
   (d) selling price less normal profit.

Answer: (c) net realizable value less normal profit margin.
The lower limit, or "floor," is the net realizable value less the normal profit margin. This is the amount that a company would expect to make as its normal profit.
Choice (a) is incorrect because the selling price, while used, is not the "floor" price. Choice (b) is incorrect because the selling price less cost of disposal is the upper limit or ceiling in the LCM method. Choice (d) is incorrect because it does not take into account any disposal costs. If there were no disposal costs or costs to complete the item, then this would be the same as the net realizable value.
3. The lower of cost or market rule may be applied to:
   (a) individual inventory items.
   (b) categories of inventory.
   (c) total inventory.
   (d) all of these.

   **Answer: (d) all of these.**

   Lower of cost or market may be applied to either the individual inventory items, categories of inventory, or total inventory. According to ARB No. 43, the method used should clearly reflect the periodic income.

   Choices (a), (b), and (c) are each appropriate methods to apply LCM, but the best answer to this question is (d) because all three could be chosen depending on the individual circumstances of each company and its inventory.

4. If a company has a noncancelable purchase commitment at a fixed price:
   (a) the company must recognize a gain in the period if the current market price is greater than the fixed price.
   (b) the company must recognize an expected loss in the period if the current market price is less than the fixed price.
   (c) the company must disclose a loss in a note to the financial statements rather than recognize the loss when the current market price is less than the fixed contract price.
   (d) no disclosure or accounting entry is necessary to record the expected gain or loss on noncancelable fixed-price contracts.

   **Answer: (b) the company must recognize an expected loss in the period if the current market price is less than the fixed price.**

   The company is required to report a loss if the current market price of a noncancelable purchase commitment is less than the contract's fixed price. This treatment is consistent with the conservatism principle and also provides the users of the financial statements with information about the decision-making ability of management.

   Choice (a) is incorrect. This choice would appear to be logical because we are required to record a loss in the opposite situation, as the correct answer to this problem shows. However, due to conservatism we never record an anticipated gain. These gains would only be recognized when they are actually realized. Choice (c) is incorrect because a loss is required to be recognized in the financial statements in keeping with conservatism and recognizing losses as soon as they are apparent. Choice (d) is incorrect because at a minimum a disclosure is required for noncancelable purchase commitments. This disclosure is required because the purchase commitment is an expected future cash outflow.

5. Stating inventory at an amount in excess of cost is a violation of:
   (a) the conservatism convention but not the revenue recognition principle.
   (b) the revenue recognition principle but not the conservatism convention.
   (c) both the conservatism convention and the revenue recognition principle.
   (d) neither the conservatism convention nor the revenue recognition principle.

   **Answer: (c) both the conservatism convention and the revenue recognition principle.**

   While inventories that decline in value are subject to immediate loss recognition, the opposite is not true. In other words, we would violate the conservatism convention to recognize a gain before it is realized. This also violates the revenue recognition principle because we should not recognize the increase in value until the actual sale takes place, matching expenses to revenues.

   Choices (a), (b), and (c) are incorrect because both the conservatism convention and the revenue recognition principle are violated by stating inventory at a value greater than cost.
6. The gross profit method may be used:
(a) to estimate the amount of an inventory theft.
(b) to estimate the amount of the loss of inventory from flood or fire.
(c) by auditors to estimate the value of inventory.
(d) to determine the inventory value for interim financial statements.
(e) all of the above.

Answer: (e) all of the above.

All of the choices are excellent examples of when the gross profit might be used to estimate inventory value or costs. In each of these choices, there is a specific reason for not completing a physical inventory and for relying on an estimated inventory based on historical data and ratios. In choices (a) and (b) it would be impossible to complete a physical inventory due to the destruction or theft of the items to be counted. Choices (c) and (d) would use estimates because the cost required to complete a physical inventory in both dollar values and time would exceed the value that a precise inventory would provide.

Choices (a), (b), (c), and (d) are all appropriate uses of the gross profit method, but the best answer to this question is (e) because all four could be chosen depending on the individual circumstances of each company and its inventory.

7. Which of the following would not have an effect on the cost-to-retail ratio if the lower of average cost or market rule were applied to the retail-inventory method?
(a) markdown
(b) markup cancellation
(c) additional markup
(d) markup

Answer: (a) markdown

Net markdowns are excluded from the cost-to-retail ratio to achieve the effects of the lower of cost or market on the retail inventory method. The net markdowns are excluded because they are reductions in normal profit margins.

Choices (b), (c), and (d) are all incorrect because they are all used to calculate the cost-to-retail ratio using the lower of cost or market approach to the retail inventory method.
Use the following information to answer questions 8 through 11. In each question, round your answer to the nearest dollar before answering.

Note: You should round only at the end of the problem to achieve your final answer or use at least four significant digits (numbers after the decimal) in your intermediate steps. Rounding at intermediate steps or using fewer significant digits may cause your answer to be slightly different.

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
<th>Retail</th>
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<td>Beginning inventory</td>
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<td>$2,500</td>
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<tr>
<td>Purchases</td>
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<td>20,000</td>
</tr>
<tr>
<td>Net markups</td>
<td>1,000</td>
<td>500</td>
</tr>
</tbody>
</table>

8. The cost of ending inventory using average cost under the retail inventory method is:
   (a) $3,750.
   (b) $17,250.
   (c) $3,889.
   (d) $2,000.

   Answer: (a) $3,750.

   Using average cost (this is NOT lower of average cost or market), we add net markups to beginning inventory (retail) and purchases (retail) and subtract net markdowns to determine our goods available for sale at retail ($1,000 + $2,500 + $20,000 − $500 = $23,000). On the cost side we add the beginning inventory (cost) and the purchases (cost) to determine our goods available for sale at cost ($2,250 + $15,000 = $17,250).

   We then compute the cost-to-retail ratio ($17,250 ÷ $23,000 = 0.75). We then subtract sales from our goods available for sale (retail) to determine our ending inventory at retail ($23,000 − $18,000 = $5,000). Using the cost-to-goods ratio we then calculate our cost of ending inventory ($5,000 × 0.75 = $3,750).

   Choice (b) is incorrect because this is the cost of goods available for sale at cost, not the cost of ending inventory. Choice (c) is incorrect because the net markups and markdowns were ignored in the calculation of the cost-to-retail ratio. Instead, they were used to arrive at the retail value of ending inventory. Choice (d) is incorrect because this is the cost of purchases less sales.
9. The cost of ending inventory using FIFO under the retail inventory method is:
   (a) $3,750.
   (b) $3,659.
   (c) $1,829.
   (d) $3,781.

   **Answer: (b) $3,659.**

   Using FIFO we do not use the cost or retail values of beginning inventory to calculate the cost-to-retail ratio, but we do add the net markups and subtract the net markdowns. We would then use a retail amount of $20,500 ($20,000 (purchases) + $1,000 (net markups) − $500 (net markdowns)), and a cost amount of $15,000 (purchases only) to give us a cost-to-retail ratio of 0.7317. At this point, we add in the beginning inventory to get the goods available for sale at retail ($20,500 + $2,500 = $23,000). We then subtract sales from our goods available for sale (retail) to determine our ending inventory at retail ($23,000 − $18,000 = $5,000). Using the cost-to-goods ratio we then calculate our cost of ending inventory of $3,659 ($5,000 × 0.7317 = $3,658.50, which is then rounded to the nearest dollar).

   Choice (a) is incorrect because it includes the beginning inventory amounts when determining the cost-to-retail ratio. Choice (c) is incorrect because it neglects to add back in the beginning inventory to determine the correct ending inventory at retail. Choice (d) is incorrect because the net markups and net markdowns were included in both the cost and retail calculations. Net markups and net markdowns are only to be included in the retail calculations because they are based on the retail, not cost, prices.
10. The cost of ending inventory using LIFO under the retail inventory method is:
   (a) $3,750.
   (b) $3,659.
   (c) $5,000.
   (d) $4,079.

   **Answer: (d) $4,079.**

   The key to working LIFO retail problems is to remember that unless sales exceed purchases, we will be adding a new layer of costs (LIFO layer) on top of the existing inventory costs. So in this method we also ignore the beginning inventory because it was purchased at a different price and has its own cost. The new layer at retail is $20,500 (purchases ($20,000) + net markups ($1,000) - net markdowns ($500)). The new layer at cost is $15,000 (purchases). This allows us to calculate the cost-to-retail ratio, which is 0.7317 ($15,000 ÷ $20,500). We then subtract sales of $18,000 from our goods available for sale of $23,000 (new goods at retail of $20,500 + beginning value at retail of $2,500) to determine our ending inventory at retail of $5,000. We must then calculate our cost of ending inventory. We know that this layer consists of the beginning inventory of $2,500 plus anything that we did not sell from our new layer, which is also $2,500 ($5,000 ending inventory – $2,500 beginning inventory = $2,500 new LIFO layer). The cost of the new LIFO layer is calculated using the new cost-to-retail ratio. The cost of this new layer is $1,828.50 (0.7317 × $2,500 = $1,828.50). When we add this to the $2,250 cost of the existing layer we determine the cost of ending inventory to be $4,079 ($1,828.50 + $2,250 = $4,078.50, which rounds to $4,079).

   Choice (a) is incorrect because this is the value calculated using the average cost method. Choice (b) is incorrect because it uses the new layer cost-to-retail ratio (0.7317) to apply to the whole ending inventory value at retail ($5,000), which is also the FIFO method. Choice (d) is incorrect because it is the ending inventory at retail, not cost.
11. The cost of ending inventory using the 
lower of average cost or market under the 
retail inventory method is:
(a) $3,750.  
(b) $3,670.  
(c) $3,833.  
(d) $3,450.

Answer: (b) $3,670.
To approximate the lower of cost or market we do 
not use the net markdowns in the calculation of the 
cost-to-retail ratio. They are however used in the 
calculation of goods available for sale. To calculate 
the cost-to-retail ratio we use purchases at cost 
($15,000) + beginning inventory at cost ($2,25) and 
divide this amount, $17,250, by $23,500 (which is 
purchases at retail ($20,000) + beginning inventory 
at retail ($2,500) + net markups ($1,000)). This gives 
us a cost-to-retail ratio of 0.7340 ($17,250 ÷ 
$23,500). We then deduct net markdowns ($500) 
and sales ($18,000) from our retail total ($23,500) to 
arrive at ending inventory at retail of $5,000. 
Applying the cost-to-retail ratio to the ending 
inventory at retail gives us a cost of ending inventory 
of $3,670 (0.7340 × $5,000 = $3,670).
Choice (a) is incorrect because this is the value using 
the average cost, not the lower of average cost or 
market. This is the same value if the net markdowns 
were included in the cost-to-retail ratio. Choice (c) is 
incorrect because it does not use the net markups in 
the cost-to-retail ratio. Choice (d) is incorrect because 
it does not use the net markdowns at any point in the calculation.

12. The accountants at the Piper Company 
neglected to record a $10,000 credit 
purchase in the Purchases account. 
However, ending inventory is reported at 
the correct value. As a result, which of the 
following statements is correct?
(a) In the current year income is correct, 
and in the succeeding year accounts 
payable are overstated.
(b) In the current year accounts payable 
are understated, and in the succeeding 
year retained earnings is overstated.
(c) In the current year cost of goods sold is 
overstated, and in the succeeding year 
accounts payable are overstated.
(d) In the current year income is 
understated, and in the succeeding 
year ending inventory is overstated.

Answer: (b) In the current year accounts payable 
are understated, and in the succeeding year retained 
earnings is overstated.
Because of the failure to record a purchase the 
accounts payable are understated in the current year. 
Because purchases are understated in the current 
year it means that cost of goods sold will also be 
understated. Because COGS is understated, net 
income will be overstated, meaning that Retained 
Earnings will also be overstated.
While choice (a) is correct in stating that accounts 
payable in the succeeding year will be overstated, it is 
wrong in stating that current income is correct. 
Income in the current year is overstated because 
purchases are understated, leading to an 
understatement of COGS, which leads to an 
overstatement of income. Choice (c) is incorrect 
because the cost of goods sold is understated. Choice 
(c) would be correct if the accountants had recorded 
a purchase twice, not neglected to record a purchase. 
Choice (d) is incorrect because in the current year 
income is overstated due to the understatement of 
cost of goods sold and the inventory in the 
succeeding year will be correct (assuming no 
additional mistakes) because the ending inventory, 
which is the beginning inventory of next year, is 
correct.
Problem-Solving Strategies

Lower of Cost or Market

Remember that lower of cost or market (LCM) is used to ensure that inventory is not overstated.

Strategy: In LCM, the market price is not the current selling price. Instead, it is the current replacement cost of inventory.

To apply the LCM method, a company:

(1) calculates and ranks the current replacement cost, ceiling, and floor. Once these have been calculated the middle amount is the market value.

(2) compares the selected market value to the company’s actual cost in acquiring the item and uses the lower of the two amounts.

(3) reports inventory at the lower value on its balance sheet and reports any loss on its income statement.

The example below illustrates the calculation of LCM:

<table>
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<tr>
<th>Case</th>
<th>Current Replacement Cost</th>
<th>Net Realizable Value (Ceiling)</th>
<th>Net Realizable Value Less a Normal Markup (Floor)</th>
<th>Market (Constrained by Ceiling and Floor)</th>
<th>Cost</th>
<th>Lower of Cost or Market Inventory Value</th>
<th>Loss</th>
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</thead>
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<td>1.</td>
<td>$4.00</td>
<td>$6.00</td>
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<td>2.00</td>
<td>2.00</td>
<td>0</td>
</tr>
<tr>
<td>5.</td>
<td>7.00</td>
<td>6.00</td>
<td>3.00</td>
<td>6.00</td>
<td>8.00</td>
<td>6.00</td>
<td>2.00</td>
</tr>
</tbody>
</table>

The market value used in columns 1 through 3 is underlined and that value placed in column 4. Column 4 is then compared to column 5 and the lower value is used, listed in **bold**, and placed in column 6. The loss in column 7 is the difference between column 6 and 7.

The results for each case are explained below:

- **Case 1.** Replacement cost is used because it is between the ceiling and floor and is less than cost.

- **Case 2.** Cost is used because it is less than the ceiling, which is between replacement cost and the floor.

- **Case 3.** The floor is used because it is between replacement cost and the ceiling, and is less than cost.

- **Case 4.** Cost is used because it is less than the floor, which is between replacement cost and the ceiling.
Case 5. The ceiling is used because it is between replacement cost and the floor, and is less than cost.

Companies have two choices when recording the loss determined in column 7. They may use the direct write-off method, which deducts the loss directly from the inventory and cost of goods sold accounts, or they may create an allowance. The allowance method is most commonly used. The following journal entries illustrate the allowance method:

Income Summary XX
Inventory XX
To close beginning inventory.

Inventory XX
Income Summary XX
To record ending inventory.

Loss Due to Market Valuation XX
Allowance to Reduce Inventory to Market XX
To record inventory at market.

**Gross Profit Method**

The gross profit method is used to estimate the value of a company’s inventory. The method involves four steps:

1. Calculate the historical gross profit rate by dividing the gross profit (net sales minus cost of goods sold) of the prior period(s) by the net sales of the prior period(s).
2. Estimate current gross profit by multiplying the historical gross profit rate by net sales for the period.
3. Subtract the estimated gross profit from the actual net sales to determine the estimated cost of goods sold.
4. Subtract the estimated cost of goods sold from the actual cost of goods available for sale to determine the estimated cost of the ending inventory.

The following example illustrates the application of the gross profit method:

**Given Information:**

| Historical gross profit rate (on net sales) | 30% |
| Net sales for the current year | $100,000 |
| Cost of goods available for sale | 90,000 |

**Estimation of Ending Inventory:**

| Cost of goods available for sale | $ 90,000 |
| Less: Estimated cost of goods sold: |
| Net sales | $100,000 |
| Gross profit rate | 0.30 |
| Estimated gross profit | $ 30,000 |
| Cost of goods sold ($100,000 − $30,000) | (70,000) |
| Estimated cost of ending inventory | $20,000 |
Retail Inventory Method

The following terms are used in the retail inventory method:

(a) **Markup** - the original markup from cost to the *first* selling price.

(b) **Additional markup** - an increase in the selling price *above* the original selling price.

(c) **Markup cancellation** - a reduction in the selling price after an additional markup. The markup cancellation cannot be greater than the additional markup.

(d) **Net markups** - total additional markups less total markup cancellations.

(e) **Markdown** - a decrease in the selling price *below* the original selling price.

(f) **Markdown cancellation** - an increase in the selling price after a markdown. The markdown cancellation cannot be greater than the markdown.

(g) **Net markdown** - total markdowns less total markdown cancellations.

A company may use the retail inventory method with the FIFO, average, and LIFO cost flow assumptions, and the company can use the lower of cost or market rule with each. The specific items included in the cost and retail calculations are discussed below.

---

**Strategy:** Notice that the methods differ in the calculation of the cost-to-retail ratio, but that the net markup and net markdown *always* are added and subtracted to compute the retail value of the ending inventory, and that markups and markdowns are only recorded at retail, not cost.

<table>
<thead>
<tr>
<th>(a) FIFO</th>
<th>Ratio</th>
<th>Cost</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchases $40,000</td>
<td>$57,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add net markups 2,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtract net markdowns</td>
<td>(5,000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost-to-retail ratio ($40,000/$54,000) 0.74</td>
<td>$40,000</td>
<td>$54,000</td>
<td></td>
</tr>
</tbody>
</table>

**Strategy:** You exclude the beginning inventory in computing the cost-to-retail ratio, but you include net markups and net markdowns.

**Strategy:** You account for the FIFO layer by applying the cost ratio of beginning inventory to the retail value of beginning inventory.

<table>
<thead>
<tr>
<th>(b) Average cost</th>
<th>Ratio</th>
<th>Cost</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning inventory $20,000</td>
<td>$26,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchases 40,000</td>
<td>57,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add net markups 2,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtract net markdowns</td>
<td>(5,000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost-to-retail ratio ($60,000/$80,000) 0.75</td>
<td>$60,000</td>
<td>$80,000</td>
<td></td>
</tr>
</tbody>
</table>
Strategy: In the average cost method, you include net markups and net markdowns in the computation of the cost-to-retail ratio. You also add the beginning inventory to purchases and determine ending inventory by applying the cost ratio to the retail value of ending inventory.

(c) LIFO

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning inventory</td>
<td>$20,000</td>
<td>$26,000</td>
</tr>
<tr>
<td>cost-to-retail ratio ($20,000/$26,000)</td>
<td>0.769</td>
<td></td>
</tr>
<tr>
<td>Purchases</td>
<td>$40,000</td>
<td>$57,000</td>
</tr>
<tr>
<td>Add net markups</td>
<td></td>
<td>2,000</td>
</tr>
<tr>
<td>Subtract net markdowns</td>
<td></td>
<td>(5,000)</td>
</tr>
<tr>
<td>Cost-to-retail ratio ($40,000/$54,000)</td>
<td>0.74</td>
<td>$40,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$54,000</td>
</tr>
</tbody>
</table>

Strategy: In the LIFO method, you calculate a separate cost-to-retail ratio for beginning inventory and purchases. This method includes both net markups and net markdowns in the computation of the cost-to-retail ratio for purchases. To account for LIFO retail layers you apply the appropriate cost-to-retail ratio to each layer of ending inventory and to the LIFO layers sold.

(d) Lower of average cost or market

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning inventory</td>
<td>$20,000</td>
<td>$26,000</td>
</tr>
<tr>
<td>Purchases</td>
<td>40,000</td>
<td>57,000</td>
</tr>
<tr>
<td>Add net markups</td>
<td></td>
<td>2,000</td>
</tr>
<tr>
<td>Cost-to-retail ratio ($60,000/$85,000)</td>
<td>0.706</td>
<td>$60,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$85,000</td>
</tr>
</tbody>
</table>

Strategy: The retail inventory method is commonly used with the lower of average cost or market cost flow assumption (conventional retail method). Unless markups and markdowns do not exist simultaneously or all marked-down items have been sold, this method results in an inventory value (less than cost) that only approximates the lower of cost or market.

Additional Retail Inventory Method Adjustments

A company using the retail inventory method makes adjustments for certain inventory activities. It subtracts purchase returns and allowances from both the cost and retail values of purchases that have been recorded at retail. It subtracts sales returns and allowances from sales at retail to determine net sales. However, it does not subtract sales discounts, which are considered financing items.
Dollar-Value LIFO Retail Method

To illustrate the dollar-value LIFO retail method we will use the following information:

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Retail</td>
<td>Cost</td>
<td>Retail</td>
</tr>
<tr>
<td>Jan. 1 Inventory</td>
<td>$12,000</td>
<td>$25,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Purchases</td>
<td>75,000</td>
<td>150,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Net markups</td>
<td>5,000</td>
<td>3,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Sales</td>
<td>140,000</td>
<td>210,000</td>
<td></td>
</tr>
</tbody>
</table>

Price Index:

<table>
<thead>
<tr>
<th>Date</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 1, 2009</td>
<td>100</td>
</tr>
<tr>
<td>Dec. 31, 2009</td>
<td>105</td>
</tr>
<tr>
<td>Dec. 31, 2010</td>
<td>115</td>
</tr>
<tr>
<td>Dec. 31, 2011</td>
<td>130</td>
</tr>
</tbody>
</table>

The dollar-value LIFO retail method consists of the following steps:

Step 1. Compute the ending inventory at retail by taking a physical inventory or by adding the beginning inventory, purchases, and markups and subtracting the sales and markdowns.

```
<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beg. Inv (Retail)</td>
<td>25,000</td>
<td>42,000</td>
<td>64,000</td>
</tr>
<tr>
<td>Purchases</td>
<td>+150,000</td>
<td>+190,000</td>
<td>+180,000</td>
</tr>
<tr>
<td>Net markups</td>
<td>+12,000</td>
<td>+35,000</td>
<td>+40,000</td>
</tr>
<tr>
<td>Net markdowns</td>
<td>-5,000</td>
<td>-3,000</td>
<td>-6,000</td>
</tr>
<tr>
<td>Sales</td>
<td>-140,000</td>
<td>-200,000</td>
<td>-210,000</td>
</tr>
<tr>
<td>End Inv (Retail)</td>
<td>42,000</td>
<td>64,000</td>
<td>68,000</td>
</tr>
</tbody>
</table>
```

Strategy: Note that the ending inventory at retail for one year is the beginning inventory at retail for the next year.

Step 2. Convert the retail ending inventory to base-year retail prices by applying the base year conversion index:

```
Ending Inventory at Base-Year Prices = Ending Inventory at Retail × \frac{\text{Base-Year Retail Price Index}}{\text{Current-Year Price Index}}
```

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>40,000</td>
<td>= 42,000</td>
<td>× 100</td>
<td>105</td>
</tr>
<tr>
<td>55,652</td>
<td>= 64,000</td>
<td>× 100</td>
<td>115</td>
</tr>
<tr>
<td>52,308</td>
<td>= 68,000</td>
<td>× 100</td>
<td>130</td>
</tr>
</tbody>
</table>
Strategy: The conversion index used in the above formula is based on a price index rather than a cost index (used in the dollar-value LIFO method in Chapter 8). A price index is computed using retail prices.

Step 3. Compare beginning inventory at retail in base-year prices with ending inventory at retail in base-year prices to determine the change (increase or decrease) in inventory at retail in base-year prices.

If changes are made above, they must be made here as well.

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>End Inv Retail in Base-year prices</td>
<td>40,000</td>
<td>55,652</td>
<td>52,308</td>
</tr>
<tr>
<td>Beg Inv Retail in Base-year prices</td>
<td>(25,000)</td>
<td>(40,000)</td>
<td>(55,652)</td>
</tr>
<tr>
<td>Increase (Decrease)</td>
<td>15,000</td>
<td>15,652</td>
<td>(3,344)</td>
</tr>
</tbody>
</table>

Step 4. Convert the increase or decrease in inventory at retail in base-year prices to current-year retail prices as follows:

Increase in inventory level:

The increase in inventory level at retail in base-year prices for the layer added in the current year is converted to current-year retail prices with the appropriate conversion index:

<table>
<thead>
<tr>
<th>Layer Increase at Current-Year Retail Prices</th>
<th>Increase at Base-Year Retail Prices</th>
<th>Current-Year Retail Price Index</th>
<th>Current-Year Price Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>15,000</td>
<td>×</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>15,750</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>15,652</td>
<td>×</td>
<td>115</td>
</tr>
<tr>
<td></td>
<td>18,000</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Decrease in inventory level:

The decrease in inventory at retail in base-year prices for a layer decrease is converted to appropriate retail prices using the appropriate conversion index:

<table>
<thead>
<tr>
<th>Decrease at Retail Prices of Most Recently Added Layer</th>
<th>Decrease at Base-Year Retail Prices</th>
<th>Price Index of Most Recently Added Layer</th>
<th>Base-Year Price Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>(3,344)</td>
<td>×</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>(4,347)</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Strategy: If the decrease affects more than one layer of inventory, the price index appropriate for each layer must be used.
Step 5. Convert the increase (decrease) at current-year retail prices to cost using the appropriate cost-to-retail ratio for the year each layer was added.

Before we can complete this step, we must calculate the cost-to-retail ratio for each year. This is done by using the following formula:

\[
\text{Cost-to-retail ratio} = \frac{\text{Purchases at cost}}{\text{Purchases at retail} + \text{Net markups} - \text{Net markdowns}}
\]

<table>
<thead>
<tr>
<th>Year</th>
<th>Purchases at Cost</th>
<th>Purchases at Retail + Net Markups - Net Markdowns</th>
<th>Cost-to-retail ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>75,000</td>
<td>157,000</td>
<td>0.478</td>
</tr>
<tr>
<td>2010</td>
<td>100,000</td>
<td>222,000</td>
<td>0.450</td>
</tr>
</tbody>
</table>

**Strategy:** Since 2011 was a decrease in inventory, we do not need to calculate a cost-to-retail ratio. Because we had a decrease we must have sold all of the items purchased in 2011 and the decrease was of items purchased in 2010.

We then use the following formula to convert the increases (or decreases) to cost from retail:

\[
\text{Layer Increase at Cost} = \text{Increase at Base-Year Retail Prices} \times \text{Cost-to-retail ratio}
\]

<table>
<thead>
<tr>
<th>Year</th>
<th>Layer Increase at Cost</th>
<th>Increase at Base-Year Retail Prices</th>
<th>Cost-to-retail ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>7,529</td>
<td>15,750</td>
<td>0.478</td>
</tr>
<tr>
<td>2010</td>
<td>8,100</td>
<td>18,000</td>
<td>0.450</td>
</tr>
<tr>
<td>2011</td>
<td>(1,956)</td>
<td>(4,347)</td>
<td>0.450</td>
</tr>
</tbody>
</table>

**Strategy:** Note that we used the 2008 cost-to-retail ratio for the decrease in 2009 inventory. This is because we decreased our inventory and those items were purchased at 2008, not 2009 prices.

Step 6. Compute ending inventory by adding (subtracting) the increase (decrease) at cost to the beginning inventory at cost.

<table>
<thead>
<tr>
<th>Year</th>
<th>Base-year layer</th>
<th>Layer added in 2007</th>
<th>Layer added in 2008</th>
<th>Layer subtracted in 2009 using 2008 costs</th>
<th>Ending inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>12,000</td>
<td>7,529</td>
<td>8,100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>12,000</td>
<td>7,529</td>
<td>8,100</td>
<td></td>
<td>27,629</td>
</tr>
<tr>
<td>2011</td>
<td>12,000</td>
<td>7,529</td>
<td>8,100</td>
<td>(1,956)</td>
<td>25,673</td>
</tr>
</tbody>
</table>
Test Your Knowledge

9-1. Determine the estimated ending inventory with use of the gross-profit method assuming the following facts:

- Sales (net) $200,000
- Gross profit percent on sales 40%
- Beginning inventory at cost $40,000
- Purchases (net) $115,000

Compute answer here:
9-2. The Hollywood Company, which uses the retail inventory method, had a beginning inventory of $9,000 at cost and a $12,000 retail value. The following data pertains for the year.

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning inventory</td>
<td>$9,000</td>
<td>$12,000</td>
</tr>
<tr>
<td>Markdowns (net)</td>
<td>8,000</td>
<td>8,000</td>
</tr>
<tr>
<td>Markups (net)</td>
<td>6,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Purchases</td>
<td>69,000</td>
<td>85,000</td>
</tr>
<tr>
<td>Sales</td>
<td>60,000</td>
<td>60,000</td>
</tr>
</tbody>
</table>

Determine the ending inventory using:

(a) Lower of average cost or market

(b) FIFO

(c) LIFO

(d) Average cost
9-3. The Peoria Company computed the following information for its inventory by applying the lower of cost or market method on a unit-by-unit basis.

<table>
<thead>
<tr>
<th>Inventory</th>
<th>Cost</th>
<th>Market*</th>
<th>LCM Allowance</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 1, 2010</td>
<td>$8,000</td>
<td>$8,400</td>
<td>- 0 -</td>
</tr>
<tr>
<td>December 31, 2010</td>
<td>11,000</td>
<td>7,000</td>
<td>$4,000</td>
</tr>
<tr>
<td>December 31, 2011</td>
<td>12,000</td>
<td>10,000</td>
<td>2,000</td>
</tr>
</tbody>
</table>

*Assume market has passed the ceiling and floor test.

(a) Prepare each of the following entries at December 31, 2010, if the allowance method is used.

Close beginning inventory:

Record ending inventory:

Record reduction of inventory to market:

(b) Prepare each of the following entries at December 31, 2011, if the allowance method is used.

Close beginning inventory:

Record ending inventory:
9-4. In January 1, 2011, the Skidaway Company adopted the dollar-value LIFO retail inventory method. The price index was 100 on January 1, 2011, and 105 on December 31, 2011. Information from the company's records is shown below:

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory 1/1/11</td>
<td>$30,000</td>
<td>$42,000</td>
</tr>
<tr>
<td>Markdowns (net)</td>
<td>6,000</td>
<td></td>
</tr>
<tr>
<td>Markups (net)</td>
<td>2,000</td>
<td></td>
</tr>
<tr>
<td>Purchases</td>
<td>90,480</td>
<td>120,000</td>
</tr>
<tr>
<td>Sales</td>
<td>95,000</td>
<td></td>
</tr>
</tbody>
</table>

Compute the cost of the Skidaway Company's inventory on December 31, 2011.

**ANSWERS TO TEST YOUR KNOWLEDGE**

9-1. Beginning inventory $40,000
Net purchases 115,000
Cost of goods available for sale $155,000
Less: Estimated cost of goods sold:
  Net sales $200,000
  Gross profit rate 0.40
  Estimated gross profit $80,000
  Cost of goods sold ($200,000 – $80,000) (120,000)
Estimated cost of ending inventory $35,000
9-2.  (a)  **Lower of average cost or market**

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning inventory</td>
<td>$9,000</td>
<td>$12,000</td>
</tr>
<tr>
<td>Purchases</td>
<td>69,000</td>
<td>85,000</td>
</tr>
<tr>
<td>Net markups</td>
<td>6,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$78,000</td>
<td>$103,000</td>
</tr>
</tbody>
</table>

Cost-to-retail ratio: \(\frac{78,000}{103,000} = 0.7573\)

Net markdowns: \(8,000\)

Goods available for sale: \(78,000\)

Less: Sales: \(60,000\)

Ending inventory at retail: \(35,000\)

Ending inventory at lower of cost or market: \((0.7573 \times 35,000) = 26,506\)

(b)  **FIFO**

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchases</td>
<td>69,000</td>
<td>85,000</td>
</tr>
<tr>
<td>Net markups</td>
<td>6,000</td>
<td></td>
</tr>
<tr>
<td>Net markdowns</td>
<td>(8,000)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$69,000</td>
<td>$83,000</td>
</tr>
</tbody>
</table>

Cost-to-retail ratio: \(\frac{69,000}{83,000} = 0.8313\)

Beginning inventory: \(9,000\)

Goods available for sale: \(78,000\)

Less: Sales: \(60,000\)

Ending inventory at retail: \(35,000\)

Ending inventory at FIFO cost: \((0.8313 \times 35,000) = 29,096\)

(c)  **LIFO**

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning inventory</td>
<td>$9,000</td>
<td>$12,000</td>
</tr>
</tbody>
</table>

Cost-to-retail ratio: \(\frac{9,000}{12,000} = 0.75\)

(for beginning inventory layer)

Purchases: \(69,000\)

Net markups: 6,000

Net markdowns: (8,000)

Total purchases: \(69,000\)

Cost-to-retail ratio: \(\frac{69,000}{83,000} = 0.8313\)

(for new inventory layer)

Goods available for sale: \(78,000\)

Less: Sales: \(60,000\)

Ending inventory at retail: \(35,000\)
Ending inventory at LIFO cost:

\[
\begin{align*}
$12,000 \times 0.75 \text{ (beginning inventory layer)} & = $9,000 \\
$23,000 \times 0.8313 & = 19,120 \\
\text{Total} & = $28,120
\end{align*}
\]

(d) **Average cost**

\[
\begin{align*}
\text{Beginning inventory} & = $9,000 \quad 12,000 \\
\text{Purchases} & = 69,000 \quad 85,000 \\
\text{Net markups} & = 6,000 \quad (8,000) \\
\text{Net markdowns} & = \frac{78,000}{95,000} = 0.8211 \\
\text{Goods available for sale} & = 78,000 \quad 95,000 \\
\text{Cost-to-retail ratio:} & = 0.8211 \\
\text{Less: Sales} & = (60,000) \\
\text{Ending inventory at retail} & = 35,000 \\
\text{Ending inventory at average cost} & = (0.8211 \times 35,000) = 28,739
\end{align*}
\]

9-3. (a) 2010

Dec. 31 | Income Summary | 8,000 | 8,000
--- | --- | --- | ---
Inventory | 11,000 | 11,000
Loss Due to Market Valuation | 4,000 | 4,000
Allowance to Reduce Inventory to Market | | |

(b) 2011

Dec. 31 | Income Summary | 11,000 | 11,000
--- | --- | --- | ---
Inventory | 12,000 | 12,000
Allowance to Reduce Inventory to Market | 2,000 | 2,000
Gain Due to Market Valuation | | |
9-4. Ending inventory at retail:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning inventory</td>
<td>$42,000</td>
</tr>
<tr>
<td>Purchases</td>
<td>120,000</td>
</tr>
<tr>
<td>Markups</td>
<td>2,000</td>
</tr>
<tr>
<td>Markdowns</td>
<td>(6,000)</td>
</tr>
<tr>
<td>Sales</td>
<td>(95,000)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$63,000</td>
</tr>
</tbody>
</table>

Ending inventory at base-year retail prices:

\[
\frac{100}{105} \times 63,000 = $60,000
\]

Increase in inventory at retail in base-year prices:

\[60,000 - 42,000 = $18,000\]

Layer increase in inventory at retail base-year prices converted to current-year prices:

\[
\frac{105}{100} \times 18,000 = $18,900
\]

Increase at current-year retail prices converted to cost:

\[18,900 \times 0.78^* = $14,742\]

Ending inventory at cost:

\[30,000 + 14,742 = $44,742\]

\[^*90,480/(120,000 + 2,000 - 6,000)\]