

- c. Cycle time
 - d. Total annual cost
2. A general property of the EOQ inventory model is that total inventory holding and total ordering costs are equal at the optimal solution. Use the data in Problem 1 to show that this result is true. Use equations (11.1), (11.2), and (11.3) to show that, in general, total holding costs and total ordering costs are equal whenever Q^* is used.
3. The reorder point [see equation (11.6)] is defined as the lead-time demand for an item. In cases of long lead times, the lead-time demand and thus the reorder point may exceed the economic order quantity Q^* . In such cases, the inventory position will not equal the inventory on hand when an order is placed, and the reorder point may be expressed in terms of either the inventory position or the inventory on hand. Consider the economic order quantity model with $D = 5000$, $C_o = \$32$, $C_h = \$2$, and 250 working days per year. Identify the reorder point in terms of the inventory position and in terms of the inventory on hand for each of the following lead times.
 - a. 5 days
 - b. 15 days
 - c. 25 days
 - d. 45 days
4. Westside Auto purchases a component used in the manufacture of automobile generators directly from the supplier. Westside's generator production operation, which is operated at a constant rate, will require 1000 components per month throughout the year (12,000 units annually). Assume that the ordering costs are \$25 per order, the unit cost is \$2.50 per component, and annual holding costs are 20% of the value of the inventory. Westside has 250 working days per year and a lead time of 5 days. Answer the following inventory policy questions.
 - a. What is the EOQ for this component?
 - b. What is the reorder point?
 - c. What is the cycle time?
 - d. What are the total annual holding and ordering costs associated with your recommended EOQ?
5. Suppose that Westside's management in Problem 4 likes the operational efficiency of ordering once each month and in quantities of 1000 units. How much more expensive would this policy be than your EOQ recommendation? Would you recommend in favor of the 1000-unit order quantity? Explain. What would the reorder point be if the 1000-unit quantity were acceptable?
6. Tele-Reco is a new specialty store that sells television sets, videotape recorders, video games, and other television-related products. A new Japanese-manufactured videotape recorder costs Tele-Reco \$600 per unit. Tele-Reco's annual holding cost rate is 22%. Ordering costs are estimated to be \$70 per order.
 - a. If demand for the new videotape recorder is expected to be constant with a rate of 20 units per month, what is the recommended order quantity for the videotape recorder?
 - b. What are the estimated annual inventory holding and ordering costs associated with this product?
 - c. How many orders will be placed per year?
 - d. With 250 working days per year, what is the cycle time for this product?
7. A large distributor of oil-well drilling equipment operated over the past two years with EOQ policies based on an annual holding cost rate of 22%. Under the EOQ policy, a particular product has been ordered with a $Q^* = 80$. A recent evaluation of holding costs shows that because of an increase in the interest rate associated with bank loans, the annual holding cost rate should be 27%.
 - a. What is the new economic order quantity for the product?
 - b. Develop a general expression showing how the economic order quantity changes when the annual holding cost rate is changed from I to I' .