Ralph's nonseparable valuation

Ralph is committed to supply 100 units of his product to a customer during the first period and 200 units of the same product during the second period. Proceeds equal to \$220 per unit are received at the end of period one and proceeds equal to \$266.20 per unit are received at the end of period two. Production combines capital and labor. Capital is acquired at the beginning of period one at a cost of \$200 per unit. First period labor costs \$100 per unit and is paid at the beginning of period one. Second period labor costs \$110 per unit and is paid at the beginning of period two. Capital is limited to 150 units. Ralph's opportunity cost of financing is 10% per period. Ralph's production technology is

$$\begin{aligned} q_1 &\leq \sqrt{KL_1} \\ q_2 &\leq \sqrt{KL_2} \\ K &\leq \overline{K} \end{aligned}$$

where q_j is the quantity of output j produced, K is the quantity of capital employed, L_j is the quantity of labor employed for product j, and $\overline{K}$ is the upper limit on capital. Ralph's valuation of assets is based on present value of future cash flows.

Suggested:

1. Determine Ralph's optimal production plan.

2. Determine Ralph's valuation of capital at the beginning of period one.
   — at the end of period one.

Now, suppose Ralph can build inventory to satisfy future demand.

2. Determine Ralph's optimal production plan with inventory. (hint: is production balanced between the two periods?)

3. Determine Ralph's valuation of capital at the beginning of period one.
   — at the end of period one.

4. What is the value of inventory at time one?

5. What does this suggest about accountants' ability to individually value a firm's assets (and equities)?