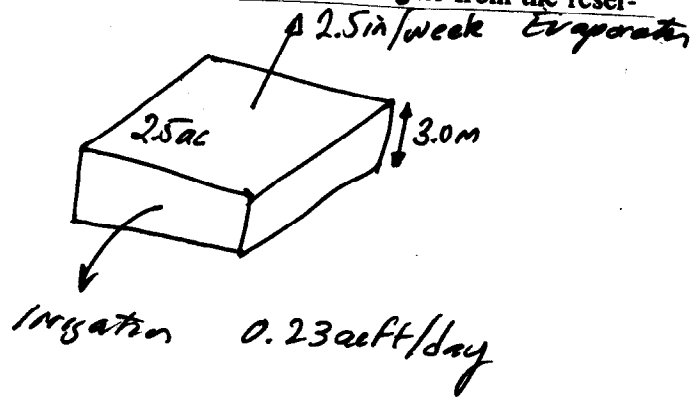


1. A farmer has a reservoir with vertical sides and a surface area of 2.5 ac. Following the rainy season, the reservoir is filled to a depth of 3.0 m. During the dry season the reservoir loses 2.5 in. of water per week (wk) to evaporation. If the average irrigation demand during the dry season is 0.23 ac-ft per day, for how many weeks can the farmer irrigate from the reservoir?

GIVEN:



FIND: HOW MANY WEEKS BEFORE RESERVOIR IS DRY?

$$V_{\text{STORAGE}} = (2.5 \text{ ac})(3.0 \text{ m})(3.28 \text{ ft/m}) = 24.6 \text{ ac}\cdot\text{ft}$$

$$\dot{I}_{\text{IRRIGATION}} = \left(0.23 \frac{\text{ac}\cdot\text{ft}}{\text{d}}\right) \left(\frac{7 \text{ d}}{\text{week}}\right) = 1.61 \text{ ac}\cdot\text{ft}/\text{week}$$

$$\dot{O}_{\text{EVAP}} = (2.5 \text{ ac}) \left(\frac{2.5 \text{ in}}{12 \text{ in/week}} \text{ ft}\right) = 0.52 \text{ ac}\cdot\text{ft}/\text{week}$$

$$\dot{I} - \dot{O} = \Delta V_{\text{STORAGE}}$$

$$\Delta V_{\text{STORAGE}} = V_{\text{STORAGE END}} - V_{\text{STORAGE BEGIN}} = -24.6 \text{ ac}\cdot\text{ft}$$

$$\therefore \left(-1.61 \frac{\text{ac}\cdot\text{ft}}{\text{week}} - 0.52 \frac{\text{ac}\cdot\text{ft}}{\text{week}}\right) X_{\text{weeks}} = -24.6 \text{ ac}\cdot\text{ft}$$

$$X = \frac{-24.6 \text{ ac}\cdot\text{ft week}}{-2.13 \text{ ac}\cdot\text{ft}} = 11.55$$

$$= \underline{\underline{11.5 \text{ weeks}}} \leftarrow$$