

**Problem 7-6****Goal:** Determine how much can be spent to repair existing tank

**Given:**

new Tank cost	\$10,000	$V_{\text{initial}}$
Nominal interest	0.06	$i_{\text{effective}}$
Length	10	$n, \text{ years}$
used Tank cost	\$0	$V_{\text{initial}}$
Length	3	$n, \text{ years}$
Repair cost	?	$C_{\text{repair}}$

The equation:  $K = C_{v_0} + C_r / [((1 + i)^n - 1)]$

**Approach:** **ASSUME** replacement cost = original cost  
 Annual interest rate and annual deposits, then  $i$  same  
 Equate capitalized cost for new tank and repairing used tank  
 Solve for repair cost

**Calculations:**

- (1) Capitalized cost new tank      0.06  $i_{\text{nominal}}$  since annual compounding effective = nominal = per period  
 $K_{10} = \$22,644.66 = \$10,000 + \$10,000 / [(1 + 0.06)^{10} - 1]$
- (2) Capitalized cost repair used tank  $K_3 = ? = \$C_r + \$C_r / [(1 + 0.06)^3 - 1]$   
 Repair costs,  $C_r = \$3,631.77 = K_{10} / [1 + 1/((1 + 0.06)^3 - 1)]$

**Answer****\$3,632** repair cost to occur every 3 years

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