Ch 17 HW

1.

a) Total copying cost:

The array grows by doubling.

Hence, total # copies $= 1 + 2 + 4 + 8 + \cdots n/2$

$$\sum_{i=0}^{\log_2 n - 1} 2^i = 2^{\log_2 n} - 1 = n - 1$$

the actual cost $= O(n)$

the amortized cost $= \frac{O(n)}{n} = O(1)$

$\boxed{O(1)}$ (Answer)

b) Charge per insertion = $3

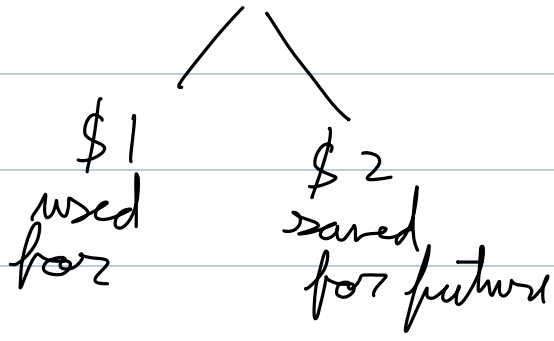
Cost of resizing from m to $2m = 2m - m$

$= m$

Total saved $= 2 \times m = 2m$

Remaining credits $= 2m - m = m$

Amortized charge per insertion = $3



Total cost for n insertions $= 3 \times n = O(3n)$

Amortized cost per insertion $= \frac{3n}{n} = O(1)$

$\therefore$ amortized cost $= O(1)$