

**cse547/ams547 ONE QUESTION Quiz 3 Spring 2017**  
**(25 points)**

**NAME**

**ID:**

**ams/cs**

**QUESTION**

Here are 7 steps of our BOOK solution

$$1 \quad W = \sum_{n=1}^{1000} [n \text{ is a winner}] = \sum_{n=1}^{1000} [\lfloor \sqrt[3]{n} \rfloor | n]$$

$$2 \quad W = \sum_{k,n} [k = \lfloor \sqrt[3]{n} \rfloor] [k|n] [1 \leq n \leq 1000]$$

$$3 \quad W = \sum_{k,n,m} [k^3 \leq n < (k+1)^3] [n = km] [1 \leq n \leq 1000]$$

$$4 \quad W = 1 + \sum_{k,m} [k^3 \leq km < (k+1)^3] [1 \leq k < 10]$$

$$5 \quad W = 1 + \sum_{k,m} \left[ m \in \left[ k^2 \dots \frac{(k+1)^3}{k} \right) \right] [1 \leq k < 10]$$

$$6 \quad W = 1 + \sum_{1 \leq k < 10} \left( \lceil k^2 + 3k + 3 + \frac{1}{k} \rceil - \lceil k^2 \rceil \right)$$

$$7 \quad W = 1 + \sum_{1 \leq k < 10} (3k + 4) = 1 + \frac{7+31}{2} 9 = 172$$

Evaluate the value of

$$W = \sum_{n=1}^{p^3} [\lfloor \sqrt[3]{n} \rfloor | n] \quad \text{where } p \in \mathbb{Z}^+$$

WRITE detailed EXPLANATIONS of each step.

Solution space