Tomer Belmar

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7. $k = 3$

All integers between $30 \le n \le 180$

A = set of n divisible by 10

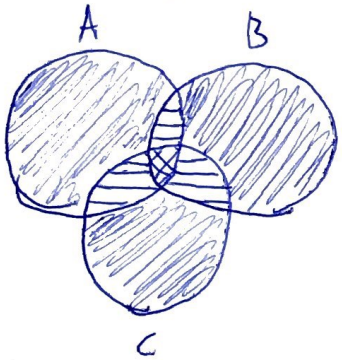
B = set of n divisible by 12

C = set of n divisible by 18

Set of n divisible by any of these three is

$A \cup B \cup C$

~~$|A \cup B \cup C| = |A \cup B| + |A \cup C| + |B \cup C| - |A \cap B|$~~



Looking for $|A \cup B \cup C|$

$$|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |A \cap C| - |B \cap C| + |A \cap B \cap C|$$

$|A| = \frac{180-30}{10}+1 = 16$ $\quad |B| = \frac{180}{12}-1 = 13$ $\quad |C| = 9$

$|A \cap B| = 3$ ($180 / LCM(10,12)$) $\quad |A \cap C| = 2$ ($180/LCM(10,18)$) $\quad |B \cap C| = 5$ ($\frac{180}{LCM(12,18)}$) $\quad |A \cap B \cap C| = 1$ ($180/LCM(10,12,18)$)

$$|A \cup B \cup C| = 16 + 13 + 9 - 3 - 2 - 5 + 1$$

$$= 38 - 10 + 1$$

$$= 39 - 10 = \boxed{29}$$