Question V#1:

Stephen wants you to solve this equation: $\sum_{k=1}^{5} \frac{1}{k} = \frac{x}{5!}$ for x.

Question V#2:

Professor Li and her daughter went to the Atlanta zoo. They noticed that the number of animals per cage is 5. Later that day, they realized they have miscounted the number of animals in one cage: there are 2 extra animals. They computed the new average, and found it to be 5.1. How many different cages did Professor Li and her daughter visited that day?

Question V#3:

Professor McCuan loves geometry. Recently, a student came to him asking for help with this problem: Three points $(0, 0)$, $(4, 0)$, and $(5, -3)$ lie on the circumference of a circle. Determine the center of this circle. Can you impress the professor and solve this problem?

Question V#4:

David likes to play with series, he wants you to evaluate $\sum_{n=1}^{\infty} \frac{1}{n(n+2)}$.

Question V#5:

Two integers multiplied together gives 1000. If neither contains a zero, what is the larger of the two numbers?

Question V#6:

There were 6 people at a party. Guest A shook hand with 5 people. Guest B shook hand with 3 people. Guest C shook hand with 2 people. Guest D shook hand with 2 people. Guest E shook hand with 3 people. And guest F shook hand with 3 people. How many handshakes were exchanged?

Question V#7:

Find a 3-digit number such that when multiplied by itself will yield a number whose last 3 digits are the same as our original number. We know that the last digit is a 5.

Question V#8:

How many ways are there to sit 4 people around a round table with 6 seats? Only relative positions – who is to the left of whom and who is to the right of whom – count.

Question V#9:

Let $\Psi_{2004} = \{\frac{1}{2004}, \frac{1}{2003}, ..., \frac{1}{2}, 1\}$. Let $a, b \in \Psi_{2004}$, remove a, b and replace with $ab + a + b$ to get a smaller set with one less element. Repeat until we are left with 1 element-set. What is this element?

Question V#10:

In how many different ways can we represent 10 as the sum of 5 non-negative integers? In other words, find the number of non-negative integer solutions to $x_1 + x_2 + x_3 + x_4 + x_5 = 10$.