A1. How many 2-digit integers are there whose digits sum to 12?

A2. Let $k$ be the number you receive. For what number $n$ is $x + k$ a factor of $x^2 + (k+1)x + n$?

A3. Let $k$ be the number you receive. Find the slope of the line through the points $(k+4, 7k+1)$ and $(3k+1, 2k^2+7)$.

A4. Let $k$ be the number you receive. Multiplying out

$$(x - 2) (x - k + 1) (x + 2k)$$

gives

$$x^3 + bx^2 + cx + d$$

for numbers $b$, $c$, and $d$. Find $b$.

A5. Let $k$ be the number you receive. Find the area of the region consisting of all points $(x, y)$ with $0 \leq x \leq k$, $0 \leq y \leq k$, and $2x + y \geq k$.

1. 7  
2. 7  
3. 5  
4. 4  
5. 12
B1. Find the larger of the two roots of the quadratic $2x^2 - x - 15$.

B2. Let $k$ be the number you receive. Find the area of the square with perimeter $4k - 4$.

B3. Let $k$ be the number you receive. If $f(x + 1) = 3x - 5$ for all $x$, find $f(k)$.

B4. Let $k$ be the number you receive. Find the length of the hypotenuse of a right triangle with legs of lengths $k - 1$ and $2k^{\frac{1}{2}}$.

B5. Let $k$ be the number you receive. Let $x$ and $y$ satisfy the following two equations.

\[
\begin{align*}
y^2 &= x^2 + 2k \\
y &= x + 2
\end{align*}
\]

Find $x + y$.

1. 3  
2. 4  
3. 4  
4. 5  
5. \boxed{5}
C1. How many pairs of integers \(a\) and \(b\) with \(1 < a < b\) have product 96?

C2. Let \(k\) be the number you receive. Find the area of the triangle bounded by the lines \(x = 0\), \(y = 1\), and \(x + y = k\).

C3. Let \(k\) be the number you receive. Find the smaller solution \(x\) to \(|x - 2k| = k - 1\).

C4. Let \(k\) be the number you receive. Find the \(x\)-coordinate of the point of intersection of the following two lines.
\[
\begin{align*}
kx + y &= k^2 + 3 \\
x + y &= 4k
\end{align*}
\]

C5. Let \(k\) be the number you receive. For what number \(n\) do the points \((3, 7)\), \((k, 2k + 1)\) and \((k - 1, n)\) lie on a line?

1. 5  2. 8  3. 9  4. 6  5. 11
D1. How many prime numbers are factors of 165?

D2. Let $k$ be the number you receive. Solve for $x$:

$$4^{3x} = 8^{2k}$$

D3. Let $h$ be the number you receive from the front, and let $k$ be the number you receive from the back. A right triangle with legs of lengths $x$ and $h$ has the same hypotenuse as a right triangle with legs of lengths $x + 1$ and $k$. Find $x$.

D4. Let $k$ be the number you receive from the back. What is the remainder when $x^3 + x^2 + 9x + k$ is divided by $x + 2$?

D5. How many ways are there to arrange the letters in MATH?

1. 3  
2. 3  
3. [2]  
4. 2  
5. 24