

MATH FIELD DAY 2018

RELAY A

A1. How many prime numbers are less than or equal to 16?

A2. Let k be the number you receive. Find the solution to the equation $\frac{x-1}{2x+1} = \frac{k-4}{k-1}$

A3. Let k be the number you receive. If $f(x+k) = kx+2$, find $f(6)$.

A4. Let k be the number you receive. Find the remainder when $x^2 - 3x - 1$ is divided by $x+k$

A5. Let k be the number you receive. Find the negative integer x closest to 0 such that $k+x$ is a perfect cube.

B1. Find the solution to the equation $4^x = 8^{2x+4}$.

B2. Let k be the number you receive. Find the closest integer to $2\pi - 3k$

B3. Let k be the number you receive. Find the y -intercept of the line $(12 - k)x - (k - 19)y = k - 3$

B4. Let k be the number you receive. Find the slope of the line passing through the points $(k + 2, k - 1)$ and $(k + 1, 3k - 7)$.

B5. Let k be the number you receive. Find the smallest two-digit integer whose digits differ by $(k + 2)$.

C1. Solve the equation $\sqrt{x+9} = \sqrt{x} + 3$.

C2. Let k be the number you receive. Find the largest zero of $x^2 + (k+1)x - 30$.

C3. Let k be the number you receive. Find the degree measure of an interior angle of a regular polygon with k sides.

C4. Let k be the number you receive. Find the largest prime factor of k .

C5. Let k be the number you receive. Find $(k+1)^k$.

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RELAY D

D1. How many positive integers evenly divide 289?

D2. Let k be the number you receive. Find the number of subsets of a set with k elements.

D3. Let the number you receive from the front be the sum and the number you receive from the back be the difference of the hypotenuse and a side of a right triangle. Find the remaining side.

D4. Let j be the number you receive. Find the smallest prime number greater than or equal to \sqrt{j} .

D5. Find the greatest integer less than $(\frac{\pi}{2})^2$.

1. 3

2. 8

3.

4. 2

5. 2