

MATH FIELD DAY 2009

Relay A

A1. Find the sum of the solutions to the equation $x^2 - 3x = 4$.

A2. Let k be the number you receive. Find the slope of the line passing through the two points $(k, k + 6)$ and $(2k + 2, k^2)$.

A3. Let k be the number you receive. Simplify $4 + \frac{3}{3 + \frac{k}{k+1}}$.

A4. Let k be the number you receive. Find the area of the triangle with vertices $(0,0)$, $(k,0)$, and $(0, k-1)$.

A5. Let k be the number you receive. Evaluate and simplify $\frac{k - k^{-1}}{1 + k^{-1}}$.

1. 3

2. 0

3. 5

4. 10

5. 9

Relay B

B1. Solve the equation $2^{k-8} = \frac{1}{8^k}$

B2. Let k be the number you receive. Find the sum of the solutions to the equation $|x - k| = 1$.

B3. Let k be the number you receive. Find the area of a square with perimeter k .

B4. Let k be the number you receive. Find the remainder when $x^3 + 4x^2 + 2$ is divided by $x - k$.

B5. Let k be the number you receive. Solve for x : $(6x^{-1} + 5)^{-1} = \frac{1}{k}$

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Relay C

- C1. Find the value of k so that $x^2 + 2x + k$ has two equal roots.
- C2. Let k be the number you receive. If a circle with center $(k, 2)$ passes through the point $(1, 4)$, find the radius.
- C3. Let k be the number you receive. Let $(a, 0)$ and $(0, b)$ be the x and y intercepts of the line $x + 2y = k$. Evaluate $a + b$.
- C4. Let k be the number you receive. Find the positive solution x of $x^2 - 1 - kx - k = 0$.
- C5. Let k be the number you receive. Find the y -coordinate of the vertex of the parabola $y = x^2 + kx + 9$.

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Relay D

D1. Solve for x : $\sqrt{2x - 6} - \sqrt{x} = 0$

D2. Let k be the number you receive. Find x if $x > 0$ and $(3x - 3)^2 - k^2 = 0$

D3. Let k be the number you receive from the front. Let m be the number you receive from the back. Solve for x : $\frac{k}{x-1} + \frac{m}{x+1} = \frac{x+2}{x^2-1}$.

D4. Let m be the number you receive from behind. Find the slope of the line going through the points $(m,1)$ and $(4,3)$.

D5. Find the number of solutions in the real numbers to the equation $x^4 - x = 0$.

1. 6

2. 3

3. 0

4. 1

5. 2