

MATH FIELD DAY - Relay A

A1 What is the smallest whole number that can be the length of the hypotenuse of a right triangle whose leg lengths are also whole numbers?

A2 Let k = the number you will receive. You buy a Digimon card for $\$k$, sell it to a friend for $\$2k$, later buy it back for $\$3k$, and sell it for $\$4k$. What is your profit?

A3 Let k = the number you will receive. What is the k th prime number? (Remember, 1 is not a prime number.)

A4 Let k = the number you receive.
Find the positive solution of $x^2 - kx - k - 1 = 0$.

A5 Let n = the number you receive. Evaluate

$$1 - \frac{1}{1 - \frac{n}{n-1}}$$

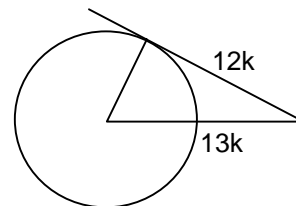
MATH FIELD DAY 2001 - Relay B

B1 How many different prime numbers divide 350 evenly?

B2 Let k be the number you receive.
Find the y -intercept of the line through $(-3, -1)$ with slope k .

B3 Let k be the number you receive.
Solve for x : $\frac{7x-5}{4x-10} = k$.

B4 Let k be the number you receive.
Find the radius of the circle with center A and tangent line BC .



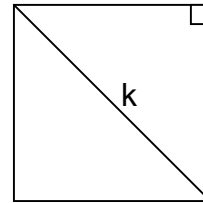
B5 Let k be the number you receive.
How many black socks must be added to k white socks so that the probability of randomly drawing a black sock is $4/5$?

MATH FIELD DAY - Relay C

C1. Find the sum of the solutions of $x^2 - 3x - 28 = 0$.

C2. Let k be the number you receive.
Find the x -coordinate of the intersection :
 $y = kx - 2$
 $y = 2x + k$

C3. Let k be the number you receive.
Find the area of a square with diagonal k .



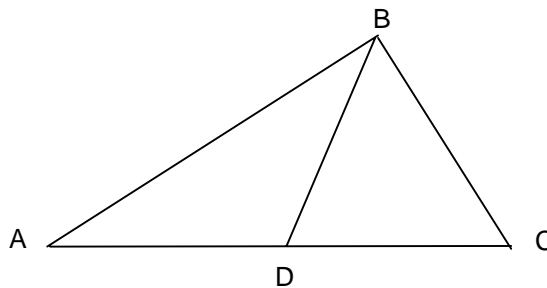
C4. Let k be the number you receive
Solve $k = \frac{50}{x} - \frac{k}{3}$ for x .

C5. Let k be the number you receive.
Find the coefficient of x^k in the expansion of $(x + 2)^5$.

MATH FIELD DAY Relay D

D1 If $a_1 = 1$, $a_2 = 1$, and $a_{n+2} = a_{n+1} + a_n$ for every positive integer n , find a_9 .

D2 Let k be the number you receive. In the figure, $AD = BD = BC$ and angle BAD measures k degrees. What is the degree measure of angle DBC ?



D3 Let f be the number you receive from the front and b = the number you receive from the back. Find $x + y$ if

$$bx + fy = 272$$

and $bx - fy = 228$.

D4 Let k be the number you receive. Find the y-intercept of the line whose equation is $x - ky = -1/2$.

D5 What is the probability of guessing an unknown 3-digit PIN on the first try? Express your answer as a reduced fraction. The digits are 0 – 9, and the first digit is allowed to be 0.