

Mathlete Training Centre
WMI 2022 GRADE 10B

1. If x, y and z are positive integers, and $(x-1)(y+2)(z-3) = 2022$, how many groups of results (x, y, z) satisfy the conditions above?

(A) 17 (B) 16 (C) 15 (D) 14

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2. Delete one number from n consecutive positive integers, and the sum of cubes of the remaining $n-1$ numbers is 7769. Which number is deleted?

(A) 4 (B) 6 (C) 8 (D) 9

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3. $(\log_3 4 + \log_2 9)^2 - (\log_3 4 - \log_2 9)^2 = ?$
(A) 16 (B) 9 (C) 18 (D) 8

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4. Given that $mx^2 - 2(m - 3)x + m - 2 = 0$ is an equation of x , and it has at least one integer root. Find the sum of all the negative integers m 's.
(A) -8 (B) -10 (C) -14 (D) -16

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5. $i = \sqrt{-1}$, $\sum_{k=1}^{2022} (k \cdot i^k) = a + bi$, $a + b = ?$
(A) -2 (B) -1 (C) 1 (D) 2023

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6. Company W is hiring, and Alvin, Bryan, Chris, Daisy and Emma attend the interview with their resume. When it comes to educational background, 2 of them have a master degree while 3 of them have a doctor's degree. When it comes to age, 2 of them are above age 30 while 3 of them are below age 30. Given that Alvin and Chris are in the same age interval while Bryan and Emma are in different age intervals; Daisy and Emma are at the same degree level while Bryan and Chris are at different degree levels. If a 36-year-old applicant with a master degree is hired in the end, who will he/she be?
(A) *Bryan* (B) *Chris* (C) *Daisy* (D) *Emma*

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7. As shown below, write nine numbers 1-9 in the nine squares (numbers 4 and 8 are written). If the numbers on each row are written in ascending order from left to right, and the numbers on each column are written in ascending order from top to bottom, how many ways are there to write the numbers?

	4	
	8	

- (A) 16 (B) 15 (C) 12 (D) 6

8. Suppose each term in the arithmetic sequence $\{a_n\}$ is not 0, and it satisfies $a_4 - 3a_7 + 3a_8 = 0$. If $\{b_n\}$ is a geometric sequence, and $b_7 = a_7$, find b_3b_{11} .

- (A) $\frac{16}{9}$ (B) $\frac{9}{4}$ (C) $\frac{4}{3}$ (D) $\frac{3}{2}$

9. Set infinite sequences $\{a_n\}$, $\{b_n\}$ and $\{c_n\}$ satisfy $n \in N$, and $a_{n+1} = |b_n| - |c_n|$, $b_{n+1} = |c_n| - |a_n|$, $c_{n+1} = |a_n| - |b_n|$, $d_n = \max\{a_n, b_n, c_n\}$. If $a_1 = 1, b_2 = 2, c_3 = 3$, find $d_2 + d_3 + d_4$.
 (A) 7 (B) 8 (C) 9 (D) 11

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10. As in the picture, fill 0-9 in the number sentences below. Each \square contains only a 1-digit number.

As 2-digit number should be filled in a linked \square or $\square\square$. Find $A + B + C + D + E + F$.

$\square \times 3 = \square$	$\square \times B = \square$	$\square \times 2 = \square$	$\square \div \square = \odot$
$\square + \square = \square$	$\square \times \square = \square$	$\square + \square = \square$	$\square \times \square = \odot$
$\square = \square$	$\square = \square$	$\square = \square$	$\square = \odot$
$\square = 4$	$\square = 2$	$\square = 6$	$\square = \odot$
$\square \times \square = \square$	$\square + \square = \square$	$\square \div \square = \square$	$\square \times \square = \odot$
$\square = A$	$\square = C$	$\square = D$	$\square = F$
$\square \times \square = \square$	$\square - 1 = \square$	$\square - 6 = \square$	$\square = \odot$

$\odot < 4$
 $\odot > 5$

- (A) 24 (B) 26 (C) 28 (D) 30

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