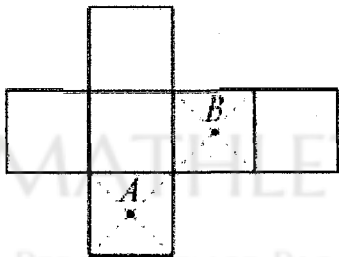


Mathlete Training Centre
WMI 2022 GRADE 9B

1. Suppose $x + 5y + 3z = 5$ and $2x + 8y + 5z = 12$. Find the positive squared root of $x + y + z$
(A) 2 (B) 3 (C) 4 (D) 7

2. Given a 2-digit prime number. If its tens digit and units digit switch places, the new number is still a prime number. Find the sum of the prime numbers that satisfy the conditions above.
(A) 418 (B) 429 (C) 457 (D) 482

3. Below shows one of the ways to unfold a cube, and it is formed by 6 squares. Suppose the intersection point of the diagonals on each square is the center of such square (exA, B). Among the 11 ways to unfold a cube, find the longest distance between any two distinct centers on the plane.



- (A) $\sqrt{18}$ (B) $\sqrt{17}$ (C) $\sqrt{13}$ (D) $\sqrt{11}$

4. Suppose a 5-digit number $x976y$ is divisible by 72. Set $m = x^y + y^x$, find the sum of all units digits of m 's.

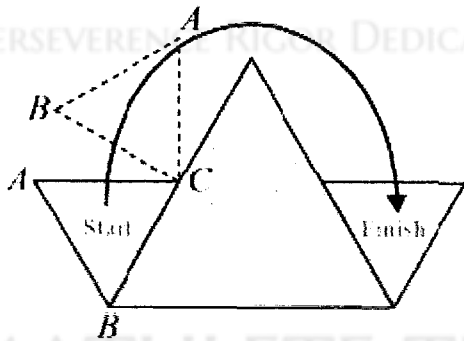
- (A) 6 (B) 5 (C) 3 (D) 1

5. Given three positive integers and $a > b > c$, If $b + c$, $a + c$, and $a + b$ happen to be the squares of three consecutive positive integers, find the smallest value of $a^2 + b^2 + c^2$.
- (A) 265 (B) 994 (C) 1297 (D) 1358

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6. Look at the picture. A small regular $\triangle ABC$ whose side length is 1 rolls over a large regular triangle whose side length is 2. If $\triangle ABC$ rolls clockwise from "start" to "finish", find the length of the rolling track of point A.



- (A) $\frac{1}{3}\pi$ (B) $\frac{2}{3}\pi$ (C) $\frac{4}{3}\pi$ (D) $\frac{5}{3}\pi$

7. Divide numbers 1, 2, 3, 4, 5, 6, 7, 8 and 9 into three groups, and each forms a 3-digit number without repetition. Suppose the largest 3-digit number is 3 times the smallest 3-digit number, and the second largest 3-digit number is 2 times the smallest 3-digit number. How many groups of number combination satisfy the conditions above?
- (A) 4 (B) 3 (C) 2 (D) 1

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8. Tom and Jerry play a game. Every round, each of them plays a card from their hand. The one with a larger number wins 1 point. If it is a tie, both of them will not score. Suppose each card can only be used once, after five rounds, how many scoring ways are there?

Tom

21

22

24

25

28

Jerry

20

22

23

24

27

- (A) 12 (B) 11 (C) 10 (D) 9

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9.
$$\frac{5}{1 + \frac{1}{\frac{1}{\sqrt{7-4\sqrt{3}}} + \frac{1}{\sqrt{7+4\sqrt{3}}}}} = \frac{p}{q}, (p, q) = 1, p + 2q = ?$$

(A) 34 (B) 47 (C) 52 (D) 64

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10. Start from the 'W' in the upper left corner, a mouse follows the route of "WMI 2022" from one square to the next square with a common side. How many different routes are there to walk these 7 squares?

W	M	I	2	2
M	I	2	0	2
I	2	0	2	2
2	0	2	2	
2	2	2		

- (A) 82 (B) 60 (C) 58 (D) 52

