

Mathlete Training Centre
RMO

2024 Round 2 - Open

1. Calculate: $\frac{1 \times 2 + 2 \times 3 + 3 \times 4 + \dots + 44 \times 45}{15}$

MATHLETE TRAINING CENTRE

PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

MATHLETE TRAINING CENTRE

PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

2. Find the sum of digits for $\underbrace{333\dots33}_{2024 \text{ digits}} \times 2024$

MATHLETE TRAINING CENTRE

PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

3. Andrew and Bill start from the Town A and Town B at the same time, travelling towards each other at constant speed and meet at Town C. The distance between Town A and Town B is 200km. If Andrew increased his speed by 12 km/h, they would meet at the place 25km away from town C. If Bill increased his speed by 12km/h, they would meet at the place 15km away from town C. What is the speed of Bill?

MATHLETE TRAINING CENTRE

PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

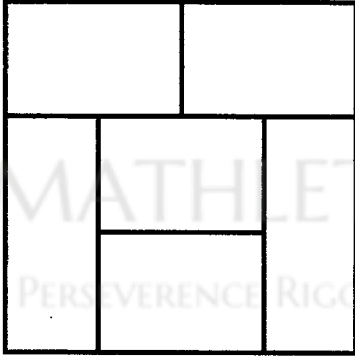
4. There are two 2-digit numbers. Charlie wanted to find their product but forgot the multiplication sign and obtained a 4-digit number N that is two times the correct product. Find the value of N.

PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

MATHLETE TRAINING CENTRE

PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

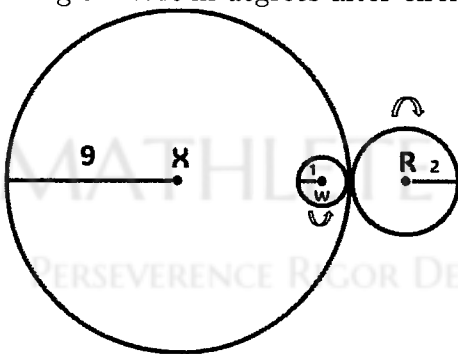
5. The figure below is a garden divided into 6 areas. There are 4 different tulips to be planted in the garden. Each area can only plant a tulip and two adjacent areas cannot have the same type of tulip. How many ways are there to plant the tulip?



MATHLETE TRAINING CENTRE

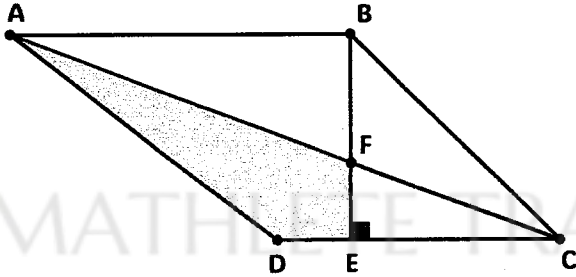
PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

6. As shown in the figure below, Circle W, R and X each with radius of 1, 2 and 9 respectively. Circle W rotate in anti-clockwise direction while Circle R rotate in clockwise direction. Find the angle XWR in degrees after circle W and R each turn 20 revolutions.



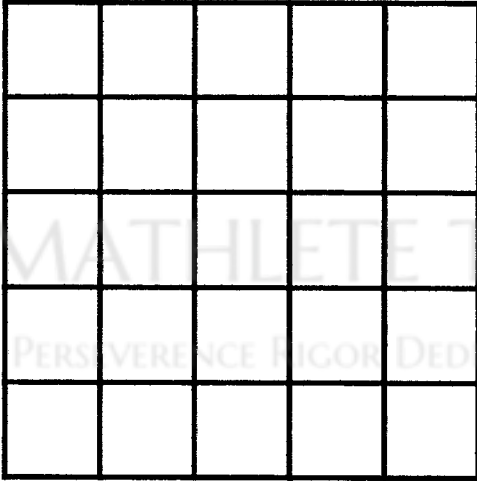
PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

7. As shown in the figure below, $ABCD$ is a rhombus with $AB = 18$. $\triangle BCE$ is an isosceles right triangle. Find the area of the shaded part



8. What is the maximum value of $10 - (x - 1)(x - 3)(x + 3)(x + 1)$ where x is a real number. (need solution)

9. Shade the tiles in the grid below such that there are odd number of tiles shaded in each row, each column and each of the 18 diagonals. At most how many tiles can be shaded?



(need solution)

MATHLETE TRAINING CENTRE

PERSISTENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

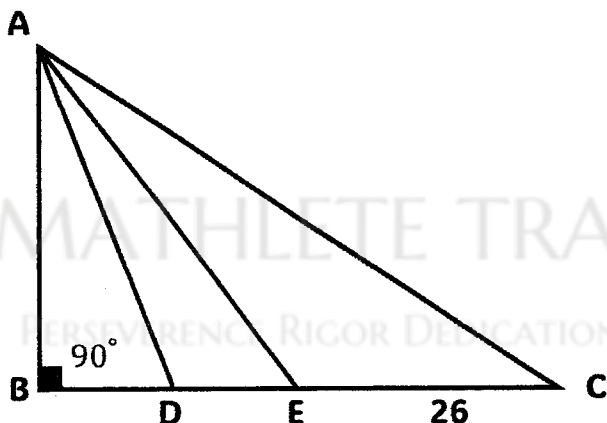
MATHLETE TRAINING CENTRE

PERSISTENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

MATHLETE TRAINING CENTRE

PERSISTENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

10. As shown in the figure below, $\triangle ABC$ is a right angle triangle with $\angle B = 90^\circ$ and $\angle BAC = 55^\circ$. Points D and E are on BC such that $\angle BAD = 20^\circ$ and $\angle BAE = 35^\circ$. Given that $EC=26$, find the length of BD (need solution)



11. A number is called a "Dragon Number" if the sum of its digits is a prime number. For example, 16 is a "Dragon Number" as $1+6=7$, but 26 is not as $2+6=8$. At most how many "Dragon Numbers" can be found in 5 consecutive integers? (need solution)