Mathlete Training Centre
Round 2 RIPMWC open

2015 RIPMWC open round 2

1. Calculate $\left[10\frac{1}{20} + (3 - 0.85) \div \frac{5}{6}\right] \div 505.2$

MATHLETE TRAINING CENTRE
PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

2. A pair of positive integers (a, b) are such that the highest common factor of a and b is 31 and the least common multiple of a and b is 12090. How many different pairs of such integers are there? [Note that the pairs $(1, 2)$ and $(2, 1)$ are considered as different]

MATHLETE TRAINING CENTRE
PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

3. Calculate $1\frac{1}{10} + 4\frac{1}{40} + 7\frac{1}{88} + 10\frac{1}{154} + 13\frac{1}{238} + 16\frac{1}{340}$

4. Calculate $\frac{1}{2015^3 - 2014 \times (2015^2 + 2016)}$

5. In the following addition, A, B, C, D and E represent different non-zero digits.

$$\begin{array}{cccccccc} A & B & C & D & E & D & B \\ & B & C & D & E & D & B \\ & & C & D & E & D & B \\ & & & D & E & D & B \\ & & & & E & D & B \\ & & & & & D & B \\ + & & & & & & B \\ \hline A & A & A & A & A & A & A \end{array}$$

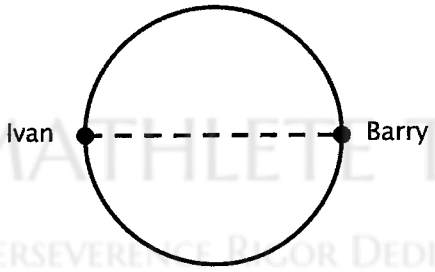
What is the 5-digit number $ABCDE$?

MATHLETE TRAINING CENTRE
PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

6. In a bag of marbles, the number of blue marbles is $\frac{3}{7}$ of the number of green marbles. 98 marbles are removed from the bag, of which the number of blue marbles removed is $\frac{5}{9}$ times the number of green marbles removed. The number of remaining blue marbles is $\frac{2}{7}$ times the number of remaining green marbles. Find the total number of marbles that were in the bag originally.

MATHLETE TRAINING CENTRE
PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

7. Ivan and Barry travel around a circular track at uniform speeds in opposite directions, starting from 2 ends of a diameter as shown in the diagram. They start at the same time and they first meet after Barry has travelled 90 m. They meet a second time 50 m before Ivan has completed one lap. Find the circumference of the track.



8. Find the last 2 digits of $6^{2015} + (2015 \times 6) + 2015^6$

9. How many 3-digit numbers are there with exactly 2 of its digits the same?

10. In country X, a car registration number consists of 4 different digits chosen from $1, 2, 3, 4, 6$ and 8, followed by 2 different letters chosen from the word BUCKLEY. Find the number of different car registration numbers if the car registration number must contain $4, 8$ and B.

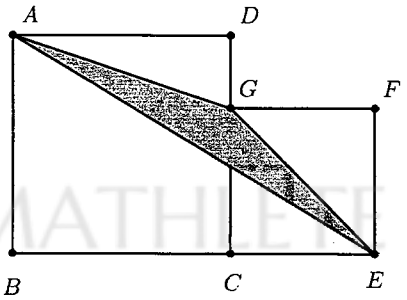
11. All positive integers $1, 2, 3, 4, 5, \ldots$ are coloured green, except 1, which is coloured blue. Any positive integer which is either 21 or 22 more than a blue number will be repainted blue. What is the largest positive integer that will remain green?

MATHLETE TRAINING CENTRE
PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

12. Calculate $\frac{1}{3^7+1} + \frac{1}{3^7+3} + \frac{1}{3^7+3^2} + \frac{1}{3^7+3^3} + \cdots + \frac{1}{3^7+3^{13}} + \frac{1}{3^7+3^{14}}$

MATHLETE TRAINING CENTRE
PERSEVERENCE RIGOR DEDICATION 224 BISHAN STREET 23 BI-131

13. As shown in the figure below, $ABCD$ and $CEFG$ are both squares. Given that $EF = 18$ cm and B, C and E are on a straight line, find the area of triangle AEG in cm^2.



14. A shopkeeper sold packets of salt and sugar in his provision shop. He sold each packet of salt at \$5 each and each packet of sugar at \$9 each. He started with a total of 350 packets of either salt or sugar. Not all the packets were sold and his total income was \$2015. What was the minimum number of packets of sugar that the hawker could have sold?

15. In the diagram below, $ABCD$ is a parallelogram with an area of $1cm^2$ and F is a point on BC such that $BF = 3FC$. E is the point of intersection of the lines AC and DF. Find the area of the triangle CEF in cm^2.