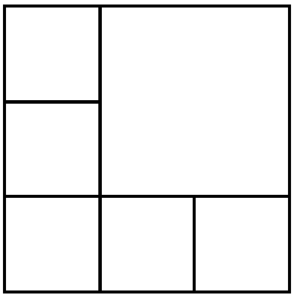
RIPMWC 2018 Round2

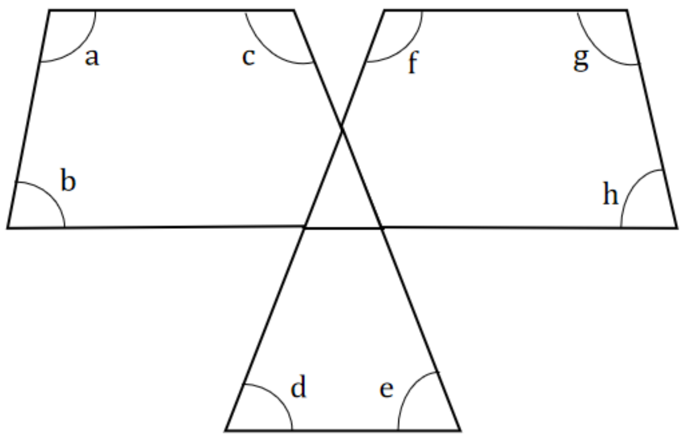
1. Calculate $[(20182018 \times 20162016)] \div [(20000 + 20002 + 20004) \times 1009]$

2. Use three different colour to colour the shape as shown below such that the touching sides of the squares must be different. How many different ways are there?



3. $A \times 2108$ equals a square number. Find the smallest value of positive integer A?

4. Find $\angle a + \angle b + c + \angle d + \angle e + \angle f + \angle g + \angle h$

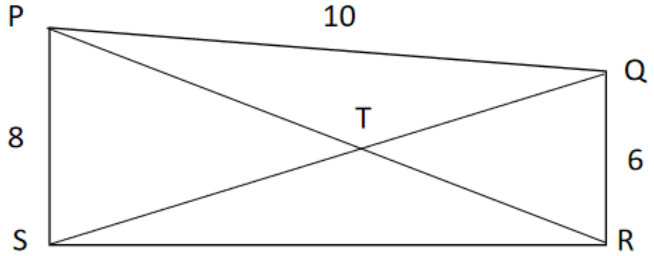


5. Find the ratio of A: B

$$A = \frac{1}{1} + \frac{1}{2^3} + \frac{1}{3^3} + \cdots\cdots$$

$$B = \frac{1}{1} + \frac{1}{3^3} + \frac{1}{5^3} \cdots\cdots$$

6. It is given that $PS = 8$, $PQ = 10$, $QR = 6$ and $QS = 12$ in a quadrilateral $PQRS$. $\angle PSQ + \angle PQR = 180°$. Let the intersection of the diagonals be T. Find PT: TR.



7. Pick any 3 numbers from 5 to 27 such that the sum of these three numbers is an odd number. How many ways are there?

8. Using the digits 2018 at most 1 time, how many 3 and 4 digits number that larger than 200 can be formed?

9. What is the last 2 digits of $1! + 2! + 3! + 4! + \cdots + 2018!$? $(n! = 1 \times 2 \times \cdots \times n)$

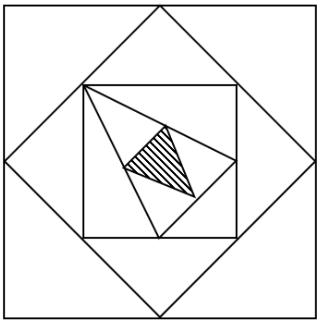
10. Calculate $1\frac{1}{2} + 4\frac{1}{4} + 7\frac{1}{8} + 10\frac{1}{16} + 13\frac{1}{32} + 16\frac{1}{64} + 19\frac{1}{128} + 22\frac{1}{256}$

11. The ratio of blue balls to green balls is 3: 4 at first. Take 182 blue balls and green balls in the ratio of 5: 8. Now the ratio of blue balls to green balls is 4: 3. How many balls are there at first?

12. A 2018 digits number starts with a 6. Any two adjacent digits are a multiple of 17 or 23. Find the last 6 digits.

13. It is known that $n \leq 2018$. When n divided by 29, the answer is q with remainder r. Find the largest possible value of $q + r$.

14. The area of the shaded triangle is $2\frac{2}{3}$ cm^2. Find the side of the largest square. (All are midpoints)



15. Find the area of the shaded parts. The radius of the semi-circles are 4, 2 and 1 respectively. (Take $\pi = 3.14$)