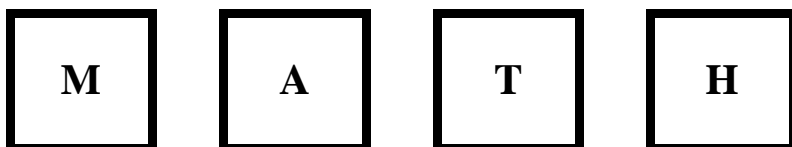


APMOPS: Sample Questions

Q1 There are 4 cards labeled with letters **M**, **A**, **T** and **H** respectively. A single-digit number is written at the back of each card. They are then placed side by side, as shown below, so that a four-digit number is obtained. Peter discovered that regardless of the number written behind the “**A**” card, the difference between the four-digit number and hundred times of the sum of its digits is always 4212.

Find the numbers written behind the cards labeled **M**, **T** and **H** respectively.



Q2 Given that
$$S = 1 + 11 + 111 + 1111 + \dots + \underbrace{111\dots1}_{100 \text{ of } 1's}$$

find the sum of the digits of S .

Q3 The diagram shows a 5 by 5 grid comprising 25 squares. Each square is filled with number 1, 2, 3, 4 or 5 in such a way that no row, column or the two main diagonal lines contain the same number more than once. Find the value of m .

	<i>1</i>			
			<i>m</i>	
	<i>2</i>	<i>3</i>		
<i>4</i>				
			<i>5</i>	

Q4 The diagram shows a square made up of nine rectangles. Rectangle E is also a square. Given that the areas of rectangles A , B and C are 7 cm^2 , 21 cm^2 and 2 cm^2 respectively, find the perimeter of the rectangle labeled D .

APMOPS: Sample Questions

A		B
	E	
C		D

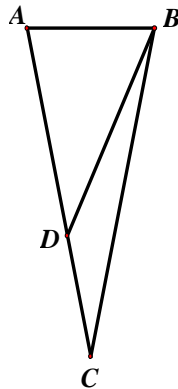
Q5 Given that

$$\left(1 + \frac{1}{2}\right) \times \left(1 + \frac{1}{2^2}\right) \times \left(1 + \frac{1}{2^4}\right) \times \left(1 + \frac{1}{2^8}\right) \times \dots \times \left(1 + \frac{1}{2^{2^{2009}}}\right) = 2 \left(1 - \frac{1}{2^{2^n}}\right),$$

find the value of n .

Q6 The diagram shows an isosceles triangle ABC where $AC = BC$ and $\angle BAC = 80^\circ$.

Given that $AB = CD$, find the value of $\angle BDC$.



Solutions to this question by accurate drawing will not be accepted.

End of Paper

Answers :

Q1 $M = 5$, $T = 1$ and $H = 2$

Q2 415

Q3

APMOPS: Sample Questions

5	1	2	3	4
3	4	5	1	2
1	2	3	4	5
4	5	1	2	3
2	3	4	5	1

Q4 $11\frac{2}{3} \text{ cm}^2$

Q5 2010

Q6 150°

End of Paper