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# Po Leung Kuk
# 20th Primary Mathematics World Contest
# Team Contest 2017

**Item 1**

A 4-digit number $\overline{abcd}$ satisfies the following conditions:

a) $a > b > c > d$,

b) $\overline{abcd}$ is a multiple of 4,

c) The number $\overline{ab}$ is divisible by the number $\overline{cd}$.

How many such 4-digit numbers $\overline{abcd}$ satisfy the conditions above?

**Item 2**

In the following mathematical sentences, +, –, ×, ( ) have their usual meaning, but the digits in the mathematical sentences have different meanings. (Different digits stand for different numbers)

A. $6 \times 9 = 6$,
B. $8 - 5 = 7$,
C. $5 \times 5 \times 5 = 5$,
D. $9 \times 9 = 8$,
E. $(5+6+8) \times 8 = 96$.

What number does each digit stand for?

**Item 3**

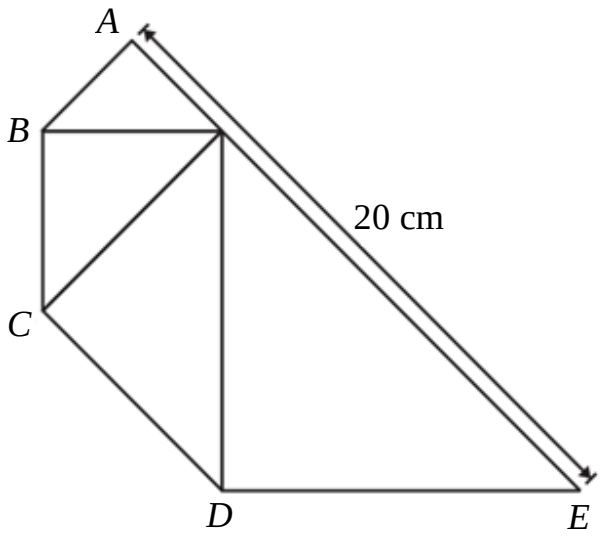
*M* is the largest 8-digit number that we can make so that any two adjacent digits form a 2-digit prime number, which are all different.

*N* is the smallest 9-digit number, which follows the same rules as *M*.

Find the value of $N - M$.

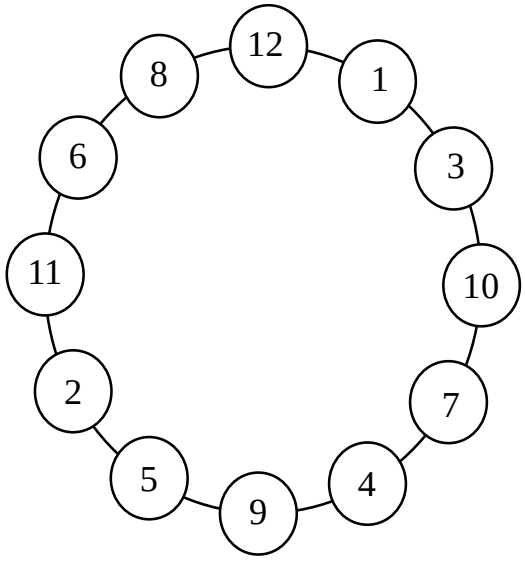
## Item 4

The figure below is formed by four isosceles right triangles with length $AE$ = 20 cm. Find the area of pentagon $ABCDE$, in $cm^2$.



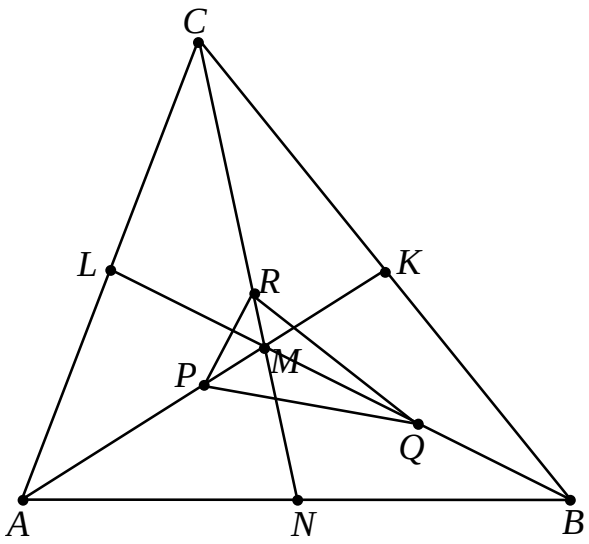

## Item 5

The diagram below shows a ring of 12 circles, each containing a number. Start at any circle and move clockwise to another circle the number of spaces equal to the number on the current circle. Continue in this way and visit all the circles exactly once. At which number in the ring should you start?



**Item 6**

The area of triangle *ABC* is 144 cm$^2$. Point ***N*** is the midpoint of *AB*, point *K* is the midpoint of *BC* and point *L* is the midpoint of *AC*. If point *M* is the intersection of *AK*, *CN* and *BL*. Point *P* is the midpoint of *AK*, point *Q* is on *BL* with *QL* = 2*BQ*, point *R* is on *CN* with $CR = \frac{5}{4} RN$. Find the area of triangle *PQR*.




**Item 7**

A five-digit number $\overline{abcde}$ is composed of five different digits from 1 to 9. When divided by 3, the remainders of the three numbers $\overline{abcde}$ , $\overline{ab}+\overline{bc}+\overline{cd}+\overline{de}$ and $\overline{abc}+\overline{bcd}+\overline{cde}$ are not the same to each other. What is the maximum possible value of $\overline{abcde}$?

**Item 8**

Each distinct letter represents a distinct digit such that the following addition sentence is correct:

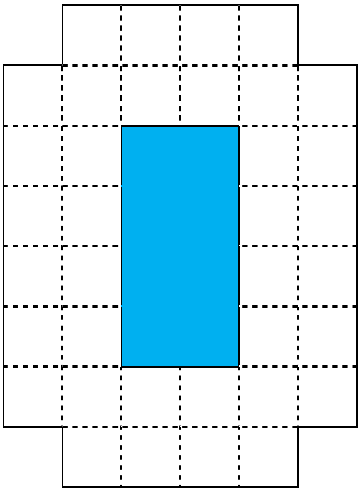
```
    F O U R
      O N E
  T H R E E
+ T H R E E
------------
E L E V E N
===========
```

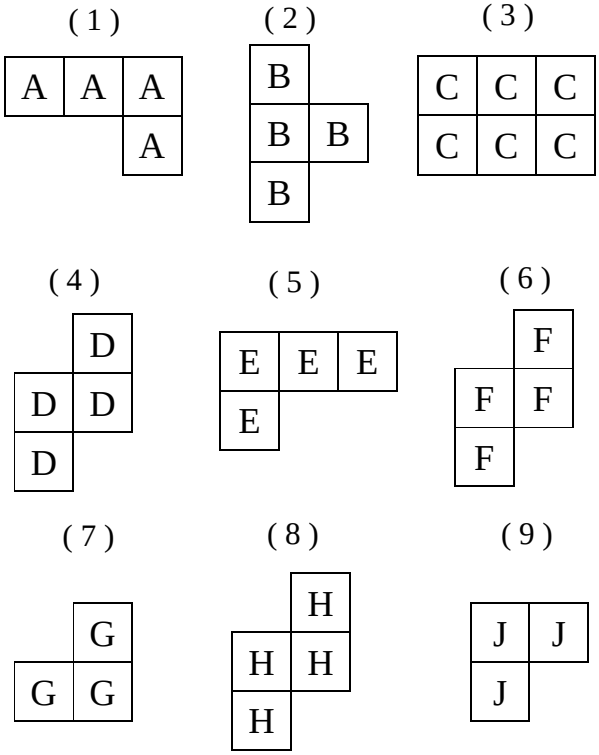
What is the number that the word “ELEVEN” represents?
(Given one solution is enough)

## Item 9

Use the 9 pieces in the figure on the right to fill the unshaded part of the figure on the left. The pieces can be rotated, but cannot be reflected nor overlap.

Draw and label your answer. (Given one solution is enough)






## Item 10

$\overline{PPWP}$, $\overline{MWCM}$, $\overline{MCPW}$ and $\overline{PCCC}$ represent four 4-digit prime numbers while $P$, $M$, $W$ and $C$ represent distinct digits.

Find the sum of these four prime numbers.