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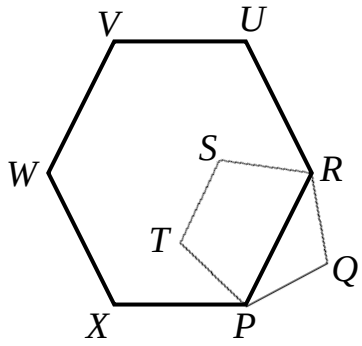
Po Leung Kuk
14th Primary Mathematics World Contest
Team Contest 2011

Team : _____

Question 1:

1. In the diagram below, regular hexagon *PRUVWX* lies on one diagonal *PR* of regular pentagon *PQRST*.

   Find the measure of $\angle SRU$, in degrees.



2. How many positive integers less than 100 have exactly four positive divisors?

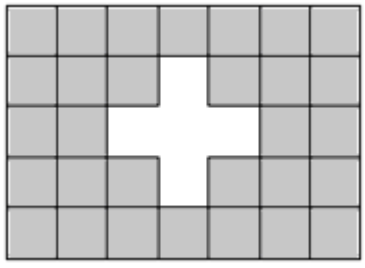
3. In the number pattern below, in which row and which column will the number **2011** appear? (For example, 23 is on the 3rd row and in the 5th column.)

1	2	9	10	25	…
4	3	8	11	24	
5	6	7	12	23	
16	15	14	13	22	
17	18	19	20	21	

4. The *"PLK number"* is a positive integer which is both *triangular number* and *square number*. For example, 36 is a *"PLK number"* since 36 = 1+2+3+...+8 (*triangular number*) and 36 = 6 × 6 (*square number*). What is the next *"PLK number"* which is greater than 36?

Note: A "*triangular number"* is the sum of the consecutive positive integers beginning with 1, such as 1, 3=1+2, 6=1+2+3, 10=1+2+3+4, etc.
A "*square number*" is the product of a positive integer multiplied by itself, such as 1=1×1, 4=2×2, 9=3×3, 16=4×4, etc.

5. Dissect the shaded area along the grid line in the diagram below into two pieces and reassemble them to form a 6×5 rectangle. Indicate your answer by drawing a line along the grid on the answer area to show the division line.

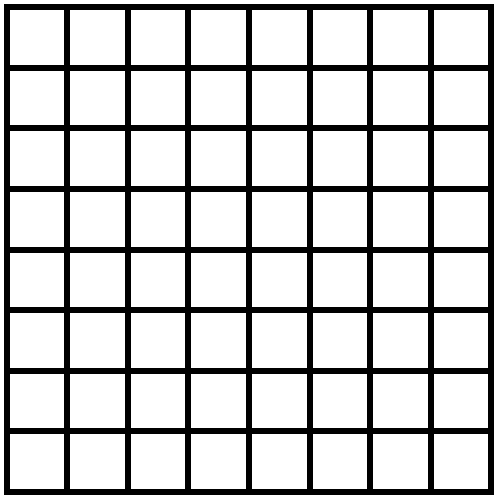


6. Each box in the diagram below contains a multiple of 5 (from 5 to 60) without repetition. Which number will be placed in each box if

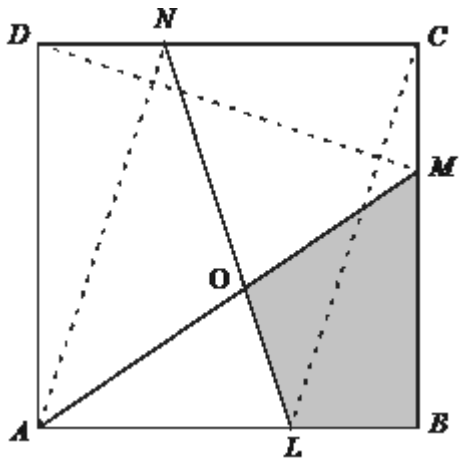
   a. A box never contains its multiple of 5.
      (e.g. box 4 may not have 4×5=20 in it)
   b. 15, 40 and 55 are in successive boxes.
   c. 5 is in an odd numbered box.
   d. The number in box 6 is larger than the number in box 8.
   e. The difference between the numbers in box 8 and box 7 is 5.
   f. 20 appears in box 2.
   g. The number in box 5 ends in a zero.
   h. The number in box 4 is twice the number in box 12.
   i. 25 is in a box numbered two lower than the box that contains the 35.

Box	1	2	3	4	5	6	7	8	9	10	11	12

7. The diagram below shows an 8 by 8 square comprising 64 unit squares. Shade the unit squares so that
   I all rows have the same number of unit squares shaded **and**
   II no two columns have the same number of unit squares shaded.



8. There is a square *ABCD*. Points *L*, *M* and *N* are on the sides *AB*, *BC* and *CD* respectively. Also *AL:LB = BM:MC = CN:ND* = 2 : 1. The sum of the areas of the triangles *ADN*, *DCM* and *CLB* is 2178 cm^2. Find the area of quadrilateral *BMOL* in cm^2, where *O* is the intersection point of *AM* and *NL*.



9. Analyze all 6-digit numbers from 100000 to 999999. The number is “pretty” if the sum of the first 3 digits equals the sum of the last 3 digits. The number is “elegant” if the sum of odd-placed digits equals the sum of even-placed digits. How many of these numbers are “pretty” and “elegant” at the same time?

10. The map below shows a country with 6 states *A*, *B*, *C*, *D*, *E* and *F*. Five different colours are available to colour the map such that each state is coloured by only one colour and states sharing the same border cannot have the same colour. Find the number of different ways to colour the map. (Note: all colours need not be used every time)

