JMO Number Grid Questions

Level: Junior   Ref No: J02   Puzz Points: 11

[JMO 2002 B2] Five teams played in a competition and every team played once against each of the other four teams. Each team received three points for a match it won, one point for a match it drew and no points for a match it lost. At the end of the competition the points were:

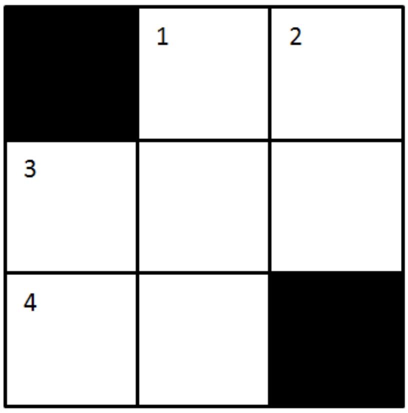
Yellows 10, Reds 9, Green 4, Blues 3, and Pinks 1.

I) How many of the matches resulted in a draw?
II) What were the results of Greens' matches against the other four teams?

Solution: (I) 3   (II) Greens drew with Blues, lost to Yellows, lost to Reds and beat Pinks.

Level: Junior   Ref No: J08   Puzz Points: 11

[JMO 2000 B2] A crossnumber puzzle is like a crossword puzzle – except that the answers are numbers instead of words and each square contains one single digit. None of the answers starts with the digit 0. How many solutions are there to this crossnumber? (You must use logic, not guesswork.)



Across
1. Square
3. Square
4. Square

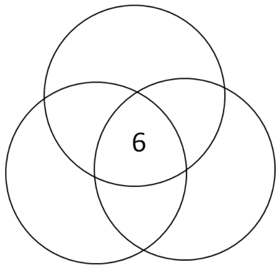
Down
1. Cube
2. Square
3. Cube times square

Solution: 1 solution only

Level: Junior   Ref No: J24   Puzz Points: 15

[JMO 2006 B6] The numbers 1 to 7 are to be placed in the seven regions formed by three overlapping circles, with 6 in the central region, so that there is one number inside each region and the total of the numbers inside each circle is T.

What values of T are possible?

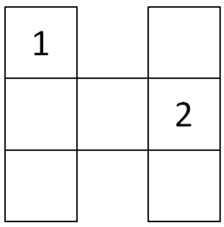


Solution: $T = 16$ or 18 only.

Level: Junior   Ref No: J25   Puzz Points: 10

[JMO 2001 B1] The numbers from 1 to 7 inclusive are to be placed, one per square, in the diagram so that the totals of the three numbers in the horizontal row and each of the two columns are the same.

In how many different ways can this be done if the numbers 1 and 2 must be in the positions shown?

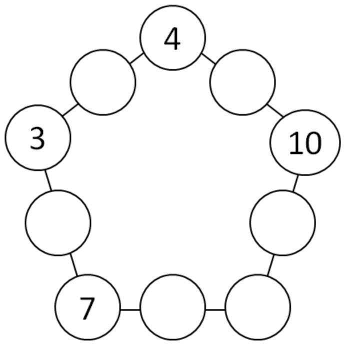


Solution: 4

Level: Junior   Ref No: J38   Puzz Points: 11

[JMO 2008 B2] Each of the numbers from 1 to 10 is to be placed in the circles so that the sum of each line of three numbers is equal to T. Four numbers have already been entered.

Find all the possible values of T.



Solution: $T = 16$ only.

Level: Junior Ref No: J45 Puzz Points: 12

[JMO 2004 B3] The solutions to each clue of this crossnumber is a two-digit number. None of the these numbers begin with zero.

Complete the crossnumber, stating the order in which you solved the clues and explaining why there is only one possibility at each stage.

1	2
3	

Clues Across
1. Multiple of 3
3. Three times a prime

Clues Down
1. Multiple of 25
2. Square

Solution: Numbers in each row going from left to right: 7, 8, 5, 1

Level: Junior Ref No: J47 Puzz Points: 14

[JMO 2004 B5] On an adventure holiday five children, called A, B, C, D, E, all take part in five competitions, called V, W, X, Y, Z. In each competition marks of 5, 4, 3, 2, 1 are awarded for coming 1st, 2nd, 3rd, 4th or 5th respectively. There are no ties for places.

Child A scores a total of 24 marks, child C scores the same in each of four competitions, child D scores 4 in competition V, and child E scores 5 in W and 3 in X. Surprisingly, their overall positions are in alphabetical order. Show that this information is enough to find all the scores, and that there is only one solution. Give the marks scored by each child in each competition by filling in a copy of this table.

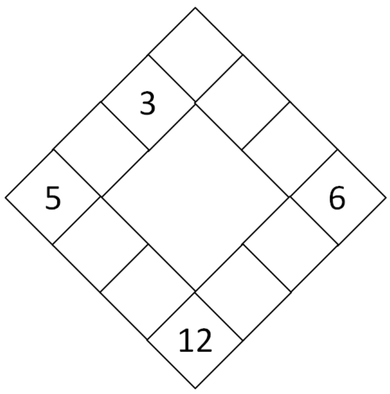
	V	W	X	Y	Z	Total
A						
B						
C						
D						
E						

Solution: Rows going left to right (including totals): 5, 4, 5, 5, 5, 24,   2, 1, 4, 4, 4, 15,   3, 3, 1, 3, 3, 13,   4, 2, 2, 2, 2, 12,   1, 5, 3, 1, 1, 11

Level: Junior Ref No: J48 Puzz Points: 15

[JMO 2004 B6] Suppose that the diagram is to be completed so that each white square contains a different whole number from 1 to 12 inclusive and also so that the four numbers in the set of squares along each edge have the same total.

In how many different ways can the diagram be completed correctly?

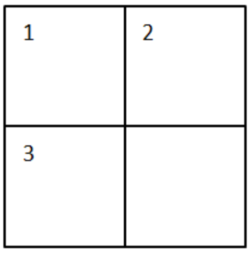


Solution: 16

Level: Junior Ref No: J52 Puzz Points: 13

[JMO 2010 B4] The solution to each clue of this crossnumber is a two-digit number, not beginning with zero.

In how many different ways can the crossnumber be completed correctly?



Clues Across
1. A triangular number
3. A triangular number

Clues Down
1. A square number
2. A multiple of 5

Solution: 3 ways (6, 6, 4, 5), (2, 1, 5, 5), (2, 8, 5, 5)

Level: Junior Ref No: J54 Puzz Points: 15

[JMO 2010 B6] Sam has put sweets in five jars in such a way that no jar is empty and no two jars contain the same number of sweets. Also, any three jars contain more sweets in total than the total of the remaining two jars.

What is the smallest possible number of sweets altogether in the five jars?

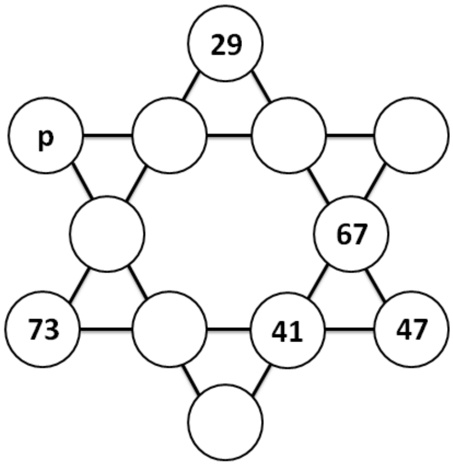
Solution: 35

Level: Junior Ref No: J65 Puzz Points: 14

[JMO 2005 B5] In a magic hexagram, the numbers in every line of four circles have the same total. The diagram shows a magic hexagram which uses twelve different prime numbers.

Five numbers, including the smallest and the largest of the twelve primes, are shown.

Find the value of p, explaining the steps in your reasoning.



Solution: $p = 53$