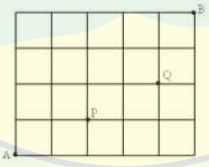
COUNTING REVIEW

Students explain the solution in detail in your notebook!

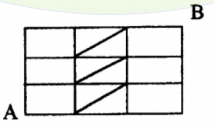
No	English	Meaning
1	Exactly	Chính xác, đúng...
2	Path	Con đường, đường đi
3	Pattern	Mẫu, quy luật...
4	Vertial	Thẳng đứng
5	Horizontal	Nằm ngang
6	Inclined	Đường xiên
7	Adjacent	Liền nhau
8	intersections of the grid	Giao điểm của các lưới
9	upwards / Downward	Đi lên/Đi xuống
10	List all the possibilities	Liệt kê tất cả các khả năng...

P1. In the following diagram, an ant is moving from A to B. If the ant is only allowed to move to the right or upwards a long the grid lines, how many different paths are there from A to B?

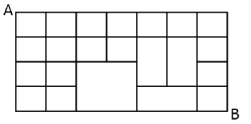
P2. (APMOPS2001) In how many different ways can you walk from A to B in the direction | or →, without passing through P and Q



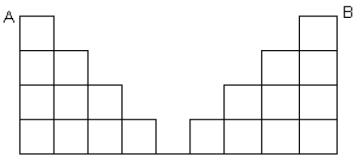
P3. How many paths from A to B consist of excactly six line segments (vertial, horizontal or inclined)?



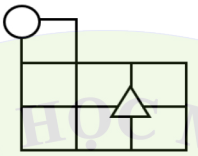
P4. A bug crawls A to B along the grid shown. The bug may only move to the right or downward. How many differents paths can the bug follow in going from A to B?



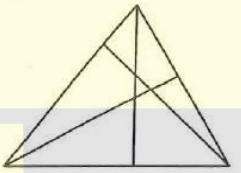
P5. How many shortest ways to go from A to B in below figure?



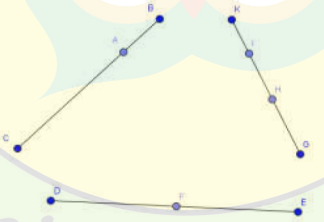
P6. A circle and a triangle are placed on intersections of the grid. The circle and the triangle are not allowed to lie on the same vertical and horizontal line. How many total possible ways are there of placing the circle and the triangle? (the following is an example)



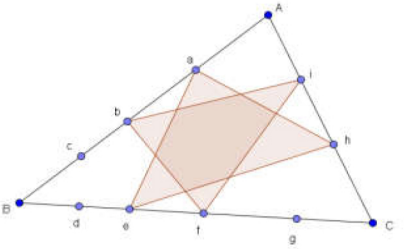
P7. (APMOPS): Find the total number of triangles in the diagram.



P8. The points A, B, C, D, E ,F, G, H, I, K are on the 3 straight lines as below. How many triangles can be formed with any 3 of the 10 points as vertices ?

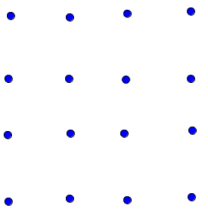


P9. Following figure shows 9 fixed points a, b, c, ... and i which are located on the sides of triangle ABC. If we select one such point from each side and join the selected points to form a triangle, how many such triangle can be formed?

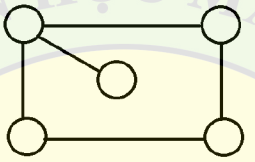


P10. Twenty lattice points are arranged along the edges of a 4 x 4 square as shown. How many

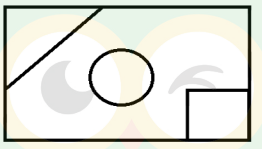
triangles have all three of their vertices among these points?



P11. Five circles are connected as shown. Three different colours are available. Each circle is to be coloured and no two adjacent connected circles can have the same colour. How many different patterns of colouring the circles are possible?

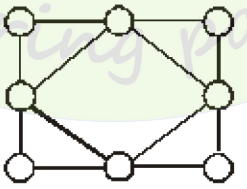


P12. Use the four colours red, yellow, blue and green to fill in the regions of the following diagram so that adjacent regions are not the same colour. How many different ways are there to colour the regions?

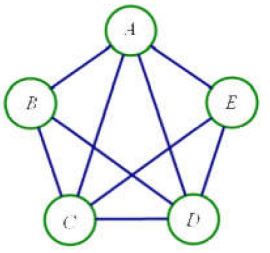


P13. (APMOPS)

In the figure, each circle is to be colored by one of the colors: red, yellow and blue. In how many ways can we color the 8 circles such that any two circles which are joined by a straight line have different colors?



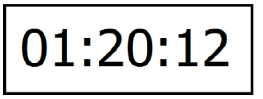
P14. The figure shows five circles *A*, *B*, *C*, *D* and *E*. They are to be painted, each in one color. Two circles joined by a line segment must have different colors. If five colors are available, how many different ways of painting are there?



P15. a) Find the number of integers from 100 to 500 that do not contain the digit "0".

b) Find the numbers of integers from 100 to 500 that contain exactly one "0" as a digit.

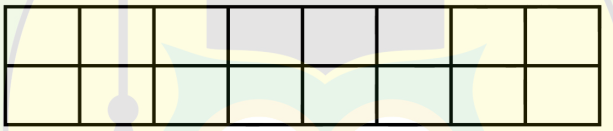
P16. One digital clock displays in format of HH:MM:SS (2 digits for the hour, 2 digits for the minutes and 2 digits for the secon) and in 24 hours format. One example is:



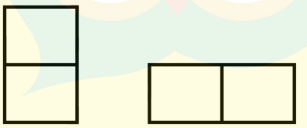
Notice that the first three digits are the same as the last three digits and in the same order. How many times in twenty four hours does this happen? (after 23:59:59, it comes to 00:00:00, after 11:59:59, it comes to 12:00:00)

P17. Dates can be written as an 8-digit integer in the format YYYYMMDD. For example 20190129 stands for January 25th 2019. How many days are there in year 2019 such that its 8-digit representation contains equal numbers of digit 0, 1, 2?

P18. We want to cover the following 2 x 8 rectangle by using eight 2 x 1 rectangles.



Each 2 x 1 rectangle is placed horizontally or vertically.



How many arrangements are possible to cover the 2 x 8 rectangle?

P19. A stair has 10 steps. Susan climbs up from the ground to the top of the stair. Each time, she can move upwards one step, two steps or three steps. How many different combinations of movements can she use to reach the 10th step?

P20. The '0' button on Ali 's calculator is broken, so he can not enter number which contains a'0'. Unfortunately, his calculator does not display 0 if 0 is part of an answer either. So he can not enter the calculation 9 x 20 and do not attempt to do so. Also, the result of adding 56 and 24 is displayed as 8 (instead of 80) and The result of multiplying 7 by 29 is displayed as 23 (instead of 203). If Ali multiplied a single-digit number by a two-digit number on his calculator and it displayed 35. List all the possibilities for the two numbers that he could have multiplied.