



Competitive Math Assessment - Counting Practice Quiz #2

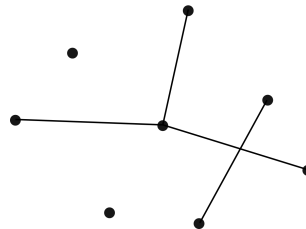
Here are some suggestions for how to practice replicating testing conditions:

- Make sure you have a quiet place to practice on your own for an extended period of time. This will help model the actual experience of a competition. When you have finished the quiz, check your solutions using the online Brilliant quiz.
- Set a timer, or at least keep an eye on the clock to learn your own pace. If you want to set a specific time goal, math competitions provide an average of about 2 minutes per problem, so you should give yourself 30-40 minutes to complete these problems. Keep in mind that the general difficulty of problems increases as you move forward.
- Some competitions allow students to use calculators while others do not. We encourage you to use a calculator only for the most in-depth calculations on this practice quiz.

1. _____ If 17 people walk into a room and each person shakes hands with every other person, how many handshakes occur in total?

2. _____ If the serial number on a watch contains one of the letters A, B, or C, followed by four digits and then either the letter X or Q, how many watches can be produced before the manufacturer needs to repeat a serial number?

3. _____ How many additional lines are needed to connect every point to every other in the figure below? (There are 8 points and you may assume that no three of them are collinear.)



A. 24

B. 28

C. 52

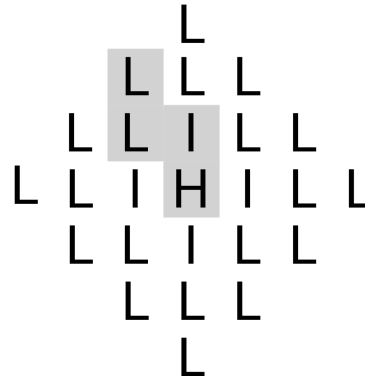
D. 56

4. _____

How many three digit numbers are multiples of 5?

5. _____

In the arrangement of letters below, how many ways can you spell out the word HILL? Beginning with the H in the middle, you can only move from one letter to an adjacent one (horizontally or vertically, but not diagonally). One example is traced in the image.



6. _____

How many three-digit numbers that are divisible by 9 can be constructed with distinct digits from the list $\{1, 2, 3, 4, 6\}$?

A. 6

B. 12

C. 45

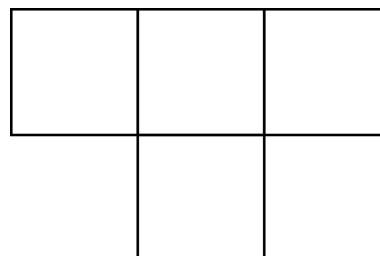
D. 90

7. _____

How many three-digit even numbers can be formed without using a 5?

8. _____

How many distinct ways can the figure below be colored such that no two adjacent regions share a color, if we are allowed to use yellow, blue, green, and red as many times in the figure as we like?



9. _____ Andy doesn't like to repeat things, and he has the following options on each day: three different workspaces, two different lunch options, two different afternoon meeting options, and three different paths home. Assuming Andy chooses carefully and delays as long as possible, what is the number of the first day that Andy will have to do the same exact things for the eleventh time?

10. _____ If all of the possible permutations of the letters in ABCD are placed in alphabetical order and numbered starting at one, in what position is the sequence DCAB?

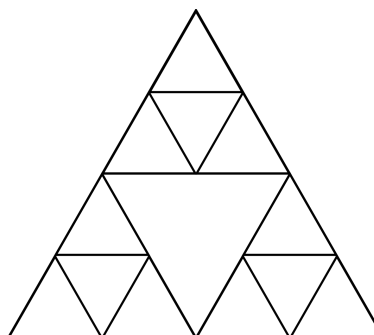
A. 20 B. 22

C. 23 D. 24

11. _____ If we have 5 different books, 2 of which are red and 3 of which are blue, how many ways are there to order them so that the red books aren't touching?

12. _____ A palindrome is a number that is the same forwards and backwards, such as 1221. How many 5-digit palindromes could be formed using only digits 1, 2, 3, or 4?

13. _____ How many triangles are present in this figure?



14. _____ In a school of 200 students, there are 58 people on the football team and 40 people on the basketball team. If there are 128 students who play neither sport, how many students are on both teams?
15. _____ If we roll a die with numbers 1-6 on it, another die with numbers 1-4 on it, and another die with numbers 1-10 on it and then add the results on each die, what are the total number of possible outcomes?