



Competitive Math Assessment - Counting Practice Quiz #1

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. _____ A palindrome is a number that reads the same forwards and backwards, like 383. How many 3-digit palindromes are there?

A. 19

B. 20

C. 90

D. 100

2. _____ A hot dog stand offers 6 different kinds of toppings: ketchup, mustard, sauerkraut, tomatoes, pickles, and onions. How many different ways can a hot dog be prepared by choosing from these toppings?

3. _____ Each of the squares in the diagram below can be colored red, blue, or green. How many ways are there to color the squares so that any 2 adjacent squares are different colors?



A. 6

B. 12

C. 18

D. 27

4. _____

In a local election, 450 people voted for Proposition A while 300 people voted for Proposition B. If 225 people who voted for Proposition A also voted for Proposition B, what percentage of the people who voted for Proposition B did not vote for proposition A?

5. _____

If the permutations of the letters in the word GLAD are numbered from 1 to 24 in alphabetical order, what permutation is number 14?

A. LADG

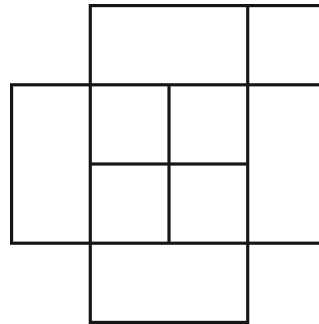
B. DLGA

C. GALD

D. GLAD

6. _____

How many squares are in the figure below?



7. _____

In the arrangement of letters below, how many ways can one spell out the word STAR? Beginning with the S in the middle, you can only move from one letter to an adjacent one directly above, below, to the left, or to the right, but not diagonally. One example is traced in the image.

```
      R
     R A R
    R A T A R
   R A T S T A R
    R A T A R
     R A R
      R
```

8. _____

If each country must be colored blue, orange, or green, and countries that share a border must be different colors, how many different ways are there to color the three countries?



- A. 3
- B. 6
- C. 9
- D. 12

9. _____

Construction is underway to connect a set of cities by train lines. If there are 19 cities, no three of which are in line with each other, and we want to connect all of them with direct lines how many train lines will be needed?

10. _____

A three digit number is created by selecting three distinct digits from 1 to 5, inclusive. How many multiples of 3 can be created this way?

11. _____

A school district assigns each student an id code. Each code begins with two vowels (A, E, I, O, U) followed by a string of n digits between 0 and 9. If there are approximately 10,000 students in the district, is the smallest value of n that will ensure that every student can be given a unique code?

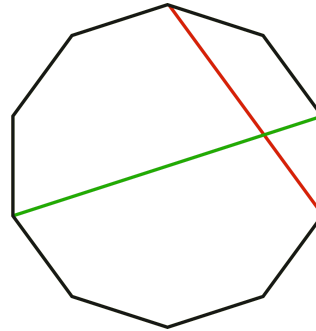
- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

12. _____

How many 4-digit numbers exist that only contain even digits?

13. _____

A “diagonal” of a polygon is any line that can be drawn to connect two vertices that aren't already connected. Two such diagonals of a ten-sided polygon are shown below. How many diagonals does a regular twelve-sided polygon have?



14. _____

There are 60 seats arranged in a circle. What is the fewest number of people that can sit in this arrangement such that the next person to take a seat must sit directly next to someone else?

15. _____

Starting with W in the middle and only moving to the letters that are immediately to the right and left in the row above or below, how many paths can be traced to spell out WORDS? A sample path is shown.

