

SPRING 2019 MCNABB GDCTM CONTEST
PRE-ALGEBRA

No calculators are allowed. You have 45 minutes. Enjoy the problems!

1. Simplify

$$200 \left(\frac{1}{2} + \frac{1}{4} + \frac{1}{5} + \frac{1}{10} \right)$$

2. A store raised the price of a dozen eggs from \$2.50 to \$2.85. What was the percent increase?

3. How many numbers are in the list

$$-21, -17, -13, \dots, 499$$

?

4. In the state of Xlandis the first 10,000 dollars of an inheritance is not taxed. After that, the state takes one-third of the remaining inheritance. If someone wishes to make sure their heir actually gets 20,000 dollars, how much should be left to that heir in the will?

5. Write 52 as the sum of three distinct primes. Only one way of doing this needs to be written down.

6. Sam bought 5 pens and 4 notebooks at the store. If each pen cost 84 cents and each notebook cost \$3.17, how much change did Sam get if he paid with a twenty dollar bill?

7. If Hezy drives for three hours at 30 miles per hour followed by five hours at 46 miles per hour, what is his average speed in miles per hour for the whole trip?

8. In many ways can the letters in the word MACAROON be arranged?

9. Solve the equation

$$x + \frac{x}{3} + \frac{x}{5} = 0$$

10. Simplify $\frac{30! - 29!}{31! - 30!}$.

11. What is the number of positive factors of the number 20^{19} ?

12. A Math Club has eleven eighth-graders, eight seventh-graders, and seven sixth-graders. In how many ways can this club put together a team that has two students from each of these grades?

13. Sandra reads a ten-volume history of Texas. Volume One is 110 pages long. Each subsequent volume is ten pages longer than the previous volume. She reads 50 pages per day except when reaching the end of a volume she stops reading for that day. How many days does it take Sandra to finish reading all ten volumes of this history of Texas?

14. What is the number of subsets of $\{1, 2, 3, 4, \dots, 99, 100\}$ with an even number of even numbers? Recall that 0 is an even number. Answer in the form 2^n where n is an integer.

15. Find the number of ways to color the edges of a square if four colors are available and two colorings are considered the same if one can be rotated into the other.