Spring 2016 McNabb GDCTM Contest
Pre-Algebra

NO Calculators Allowed

1. What percent of 45 is 36?
2. Cindy is 3 miles away from home. If she walks at a rate of 4 miles per hour, in how many minutes will she arrive at home?
3. How many edges does a prism with hexagonal bases have?
4. In a certain triangle the base is doubled and the height is tripled. What is the ratio of the area of the new triangle to the area of the orginal triangle?
5. Music streaming company Ossify charges a flat monthly fee of \$8 but charges 10 cents for each hour of listening over 50 hours for a given month. On the other hand, music streaming company Panaplex charges a flat monthly fee of \$6 but charges 14 cents for each hour of listening over 40 hours for a given month. How many total hours of listening would be required per month to make the total charges for that month from these companies turn out to be the same?
6. How many even postitive integers are factors of $3^5 - 1$?
7. Three times the complement of what angle is equal to the supplement of that angle?
8. Hezy, Zeke, and Elias are running around a track in the same direction. Each of them runs at their own constant pace. Hezy is the fastest and passes Elias every 8 minutes. Meanwhile, Elias passes Zeke every 12 minutes. So how many seconds elapse between times Hezy passes Zeke?
9. Admission to a zoo was \$ 20 per person when it was reduced to a new, lower rate. This caused the number of customers per day to increase by 40%. This in turn caused the amount collected by the zoo per day from admissions to increase by 12%. What is this new lower admission fee per person?
10. In how many ways can the letters in DALLAS be arranged so that neither the A's nor the L's are next to each other?

11. A group of 7th and 8th graders took the same math contest. The average score of all these students was 30. The average 7th grade score was 28 while the average 8th grade score was 33. What is the ratio of the number of 7th graders to the number of 8th graders?

12. Find the 17th decimal place in the decimal expansion of the fraction 17/2200.

13. Find the smallest value of the positive integer n so that the sum

$$1 + 2 + 3 + 4 + 5 + \cdots + n$$

is divisible by 100.

14. Today my son is 1/5 of my age. Two years ago he was 1/7 of my age. In how many years from today will he be 1/3 of my age?

15. Let $P = \{1, 4, 9, 16, 25, ...\}$ be the set of the squares of the positive integers. For how many elements p of P is $p + 144$ also an element of P?