Spring 2014 GDCTM/McNabb Pre-Algebra Contest

NO Calculators Allowed

1. If $\angle A$ is supplementary to $\angle B$ and $\angle B$ is complementary to $\angle C$ then find the degree measure of $\angle A$ given that the sum of all three angles equals $217°$.

2. Given that $3/4$ of a number is $36/49$ what is $1/4$ of that number?

3. Find the sum of the first 20 positive odd integers.

4. Name a fraction less than $4/5$ and greater than $3/4$ whose denominator is less than twenty. Note that both the numerator and denominator of your fraction must be positive integers.

5. The sum of an integer, its cube, and its cube root is 522. What is this integer?

6. Two glasses of water together contain 29 ounces. One glass of water has 5 more ounces than the other. How much water does the larger glass have?

7. Find the value of
$$211 \cdot 253 + 147 \cdot 289 + 253 \cdot 289 + 147 \cdot 211$$

8. In how many way can the letters in $DALLAS$ be arranged? Include the original way!

9. Jessica has three standard six-sided dice—one is blue, one is red, and one is white. In how many ways can she roll the dice so that the sum of the dots showing on top equals 12?

10. Square the base-two number 111. Give your answer in base-two notation as well.

11. Let a, b, and c be distinct positive integers such that at least two of them are divisible by 6 and at least two of them are divisible by 9. Find the minimum possible value of $a + b + c$.

12. Find the number of factors of 30! which are perfect cubes.

13. Find the prime factorization of 9991.

14. Four cards are drawn randomly from a standard 52 card deck. What is the probability that no two of these cards belong to the same suit?

15. Eight cows graze a pristine field bare in 40 days. It would take 15 cows just 12 days to graze the same pristine field bare. How many days would it take 10 cows to graze that same pristine field bare? Assume that the grass in this field grows at a constant rate and the cows graze at a constant rate.