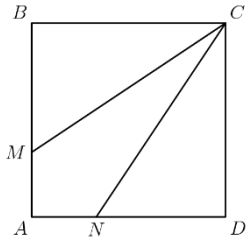
Name:

Grade 8

Answer the questions you are confident in. Guess at your own risk.

1. When $10^{93} - 93$ is expressed as a number, the sum of the digits' is
    a. 833
    b. 826
    c. 819
    d. 93
    e. 10
2. If a is a constant, then the equation $x^2 + a|x| + 1 = 0$ has four distinct roots when
    a. $a <- 2$
    b. $a > 2$
    c. $a <- 1$
    d. $a > 1$
    e. $a = 0$
3. Disease Z infects 1 out of every 1000 people. There's a test for Disease Z which is guaranteed to test positive for someone with the disease. For those without the disease, they will test positive 1% of the time. You tested positive for Disease Z, and your doctor wants to place you on an expensive emergency treatment. What's the probability you actually have it?
    a. Less than 1%
    b. Between 1% and 5%
    c. Between 5% and 10%
    d. Between 10% and 25%
    e. Between 25% and 100%
4. A triangle has sides of length 5, 6, and 8. What type of triangle is it?
    a. Acute
    b. Right
    c. Obtuse
    d. Cannot be determined
    e. It cannot be a triangle
5. Doug was born Saturday, November 9, 2002. On what day of the week will Doug be 706 days old?
    a. Monday
    b. Wednesday
    c. Friday
    d. Saturday
    e. Sunday

6. Square ABCD has sides of length three. Segment CM and CN divide the squares area into three equal parts. How long is segment CM?



   a. $\sqrt{15}$
   b. $\sqrt{14}$
   c. $\sqrt{13}$
   d. $\sqrt{12}$
   e. $\sqrt{10}$

7. The average of 5 people in a room is 30 years. An 18 year old leaves the room. What is the average of the remaining people?
   a. 25
   b. 26
   c. 29
   d. 33
   e. 36

8. How many pairs of parallel edges does a cube have?
   a. 24
   b. 4
   c. 16
   d. 8
   e. 18

9. When 1999^{2000} is divided by five, the remainder is
   a. 4
   b. 3
   c. 2
   d. 1
   e. 0

10. How many whole numbers between 99 and 999 contain exactly one 0?
   a. 72
   b. 90
   c. 144
   d. 162
   e. 180

11. What is the correct ordering of the three numbers, $10^8,\ 5^{12},\ 2^{24}$?
    a. $10^8 < 5^{12} < 2^{24}$
    b. $10^8 < 2^{24} < 5^{12}$
    c. $5^{12} < 2^{24} < 10^8$
    d. $2^{24} < 5^{12} < 10^8$
    e. $2^{24} < 10^8 < 5^{12}$
12. Fill the grid below with the numbers 1 through 6 (one in each square). There will be five sums: two made by adding up the numbers in each row, and three by adding up the numbers in each column. There is a way to fill the grid so four of the sums are the same and one will be different.What is the sum that is different?

    a. 11
    b. 12
    c. 13
    d. 14
    e. 15
13. What is the minimum possible product of three different numbers of the set {-8, -6, -4, -2, 0, 1, 3, 5, 7}?
    a. -336
    b. -280
    c. -210
    d. -192
    e. 0
14. Morgan wrote six different numbers on each side of three cards and laid the cards on the table. The three numbers that were facing up are 44, 59, and 38. The sums of the two numbers on each of the three cards are equal. The three numbers on the hidden sides are prime numbers. What is the average of the hidden prime numbers?
    a. 18
    b. 17
    c. 16
    d. 15
    e. 14

15. One half of the water is poured out of a full container. Then one third of the remainder is poured out. Continue the process: one fourth of the remainder for the third pouring, one fifth of the remainder for the fourth pouring, etc. After how many pouring does exactly one tenth of the water remain?
    a. 6
    b. 7
    c. 8
    d. 9
    e. 10
16. What is the units digit of $20^{20} + 19^{19}$?
    a. 0
    b. 1
    c. 5
    d. 7
    e. 9
17. The digit sum of 998 is 9 + 9 + 8 = 26. How many 3-digit whole numbers, with digit sum of 26, are even?
    a. 1
    b. 2
    c. 3
    d. 4
    e. 5
18. You have nine coins: a collection of pennies, nickels, dimes and quarters having a total value of $1.02, with at least one coin of each type. How many dimes must you have?
    a. 1
    b. 2
    c. 3
    d. 4
    e. 5
19. Let a, b, and c be numbers with 0 < a < b < c. Which of the following is impossible?
    a. a + b < c
    b. a * b < c
    c. a + c < b
    d. a * c < b
    e. b / c = a
20. What is the smallest possible average of four distinct positive even integers?
    a. 4
    b. 5
    c. 6
    d. 7
    e. 8