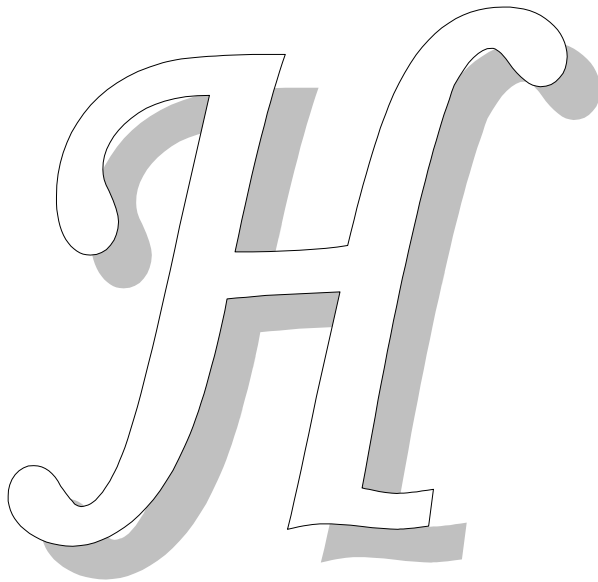


***REMT 2008***

***ANSWERS***



***MATHEMATICAL***

***LOGISTICS***

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
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\_\_\_\_\_  
LAST NAME

\_\_\_\_\_  
FIRST NAME

\_\_\_\_\_  
GRADE

1. How many digits are there in the number  $4^{20} \cdot 5^{35}$ ?
2. A jar contains nine balls labeled with the numbers 1 through 9. If three balls are drawn simultaneously at random, what is the probability that the sum of the numbers on the drawn balls is odd?
3. What is the units digit of the number  $3^{1001} \cdot 7^{1002} \cdot 13^{1003}$ ?
4. I have to create a password consisting of a sequence of three characters; each character must be either a letter or a digit. However, a password must contain at least one letter and at least one digit. How many possible passwords are there?
5. In an honors group of 72 students, 43 of them are taking algebra, 38 of them are taking chemistry, and only nine are taking neither algebra nor chemistry. How many are taking either algebra but not chemistry or chemistry but not algebra?

6. If two standard dice are rolled, what is the probability that the *product* of the two numbers showing is divisible by 4 ?
7. What is the only value of  $k$  for which the equation  $3x^2 + 4x + k = 0$  has exactly one solution?
8. What is the only value of  $k$  for which the system  $\begin{cases} x + y = 1 \\ x + ky = 2 \\ kx + y = 3 \end{cases}$  has a solution?
9. What rational number, written as a fraction in lowest terms, does the sum  $0.3 + 0.3^2 + 0.3^3 + 0.3^4 + \dots$  become arbitrarily close to?
10. An airliner makes a 1,050 mile flight into a headwind, reaching its destination in three and a half hours. On its return flight, with the same wind as a tailwind, the flight time is two hours 55 minutes. What is the wind speed in miles per hour?

