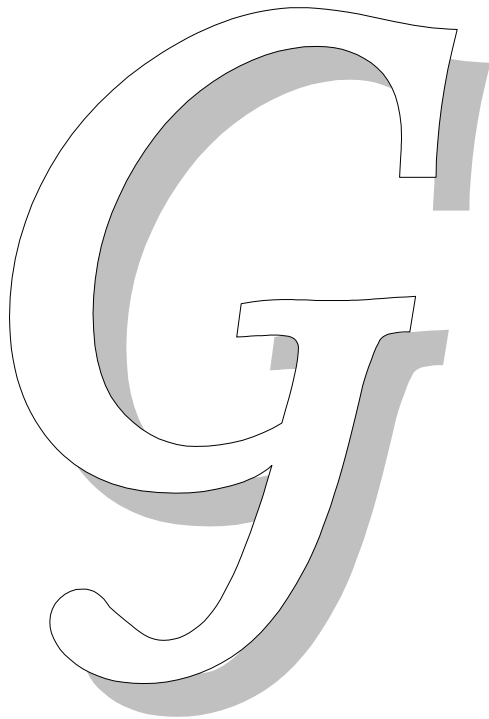


**REMT 2008**

**ANSWERS**



**MATHEMATICAL**

**REASONING**

1. \_\_\_\_\_
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LAST NAME

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

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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 algebra but not chemistry?

6. If two standard dice are rolled, what is the probability that the *product* of the two numbers showing is divisible by 3 ?
  
  
  
  
  
  
  
  
  
  
7. What is the only value of  $k$  for which the equation  $3x^2 + 4x + k = 0$  has exactly one solution?
  
  
  
  
  
  
  
  
  
  
8. 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?
  
  
  
  
  
  
  
  
  
  
9. A certain water tank has two drain valves. The first valve will drain the tank in six hours. The second valve will drain the tank in nine hours. How many hours will it take to drain the tank using both valves?
  
  
  
  
  
  
  
  
  
  
10. How many liters of a forty percent alcohol solution must be mixed with three liters of a twenty-eight percent alcohol solution to create a thirty-two percent alcohol solution?

11. If  $x^2 + y^2 = 36$  and  $(x + y)^2 = 64$ , what is the value of  $xy$  ?
12. A ballet troupe has six ballerinas; four of them are to be chosen to dance as handmaidens to the Swan Princess. In how many ways could this choice be made?
13. At the candy store I can buy one pound of chocolates and five pounds of peppermints for \$9. Or I can buy five pounds of chocolates and one pound of peppermints for \$16.20. How much will it cost if I buy just one pound of chocolates and one pound of peppermints?
14. The square of Dee's age exceeds the square of Lee's age by 31. How old is Dee?
15. A music stand has 3 legs, and a musician's chair has 4 legs. I'm supposed to set up the stands and chairs for tonight's concert, but I've forgotten how many of each to set up. I do remember that there are supposed to be 50 items altogether (not necessarily 25 of each) with a total of 177 legs. How many music stands am I supposed to set up?