

REMT 2004

ANSWERS



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MATHEMATICAL

LOGISTICS

LAST NAME

FIRST NAME

GRADE

1. The sum of two numbers is 10. Their product is 15. What is the sum of their reciprocals?
2. A binary number is a number written using only the digits 0 and 1. How many binary numbers of eight or fewer digits are there in which the digit 1 appears either two or three times?
3. If the pattern of sums $\frac{3}{5} + \frac{9}{25} + \frac{27}{125} + \dots$ is continued indefinitely, what number will this expression become arbitrarily close to?
4. What positive number is three times as big as its reciprocal?
5. The polynomial $x^4 + 3x^2 + 3$ has four complex roots. What is the product of all these roots?

6. One thousand one-inch white cubes are fastened together to make a large 10 by 10 by 10 inch cube. The large cube is then painted red. If the smaller cubes are then separated, how many will have red paint on them?

7. How many sequences of three distinct letters are there in which the letters appear in the sequence in alphabetical order?

8. Tom can paint a fence in 3 hours. Becky can paint the same fence in 4 hours. But it takes Huck 6 hours to do the same job. How many hours will it take all three working together to paint the fence?

9. At a road rally, a car makes an uphill run at a speed of 50 miles per hour. How fast will it have to come back down the hill in order for its average speed over both directions to be 60 miles per hour?

10. Lin and Vin are running on an oval track. They start together, but run in opposite directions. In the time it takes Lin to run 5 laps, Vin runs 7 laps. Not counting the beginning and ending of their run, how many times do Lin and Vin pass each other during the run?

11. A box of chocolate candy contains eight pieces--four with cream centers and four with caramel centers. If I select two pieces of candy at random, what is the probability that I will get one of each?

12. What is the smallest positive number that leaves a remainder of 2 when it is divided by 3, a remainder of 3 when it is divided by 4, and a remainder of 4 when it is divided by 5?

13. The probability of rolling a sum of 5 with two dice is $\frac{4}{36}$. The probability of rolling 6 is $\frac{5}{36}$, and the probability of rolling 7 is $\frac{6}{36}$. What is the probability of rolling a sum of 8 with two dice?

14. A truncated octahedron is a solid figure having 8 hexagonal faces and 6 square faces. Since each edge belongs to two faces, the number of edges is $\frac{1}{2} \times (8 \times 6 + 6 \times 4) = 36$. How many vertices does it have?

15. The parking lot at the local playground is filled with bicycles and tricycles. If the lot has 70 wheels and 58 pedals, how many tricycles are there?