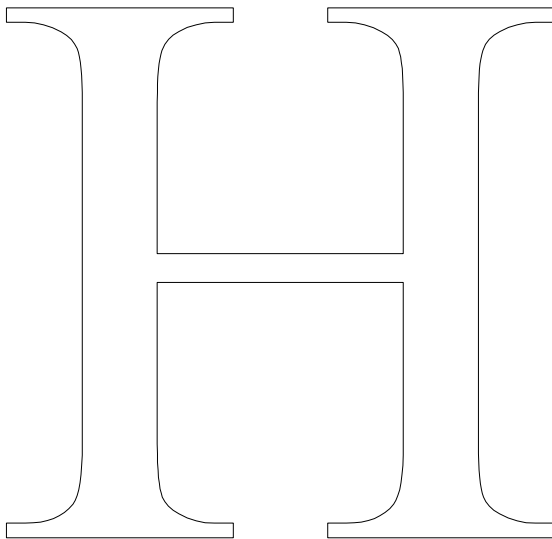


REMT 2006

ANSWERS



MATHEMATICAL

LOGISTICS

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

LAST NAME

FIRST NAME

GRADE

1. The sum of two numbers is 45 and the sum of their reciprocals is $\frac{3}{5}$. What is the product of these two numbers?
2. What is the exact sum of the infinite series $1 + \frac{2}{3} + \left(\frac{2}{3}\right)^2 + \left(\frac{2}{3}\right)^3 + \dots$?
3. If 10 distinct points on a circle are selected, and if each pair of these points is connected by a line segment, how many segments will there be in all?
4. A candy store owner has 20 pounds of \$5 per pound candy that he wants to use in a mix that will sell at a lower price. How many pounds of \$2.50 per pound candy should he mix with the 20 pounds of \$5 per pound candy to get a mix that will sell for \$3.50 per pound?
5. How many different 6-digit numbers can be made using, as digits, three fives and three sixes?

6. If two standard dice are rolled, what is the probability that the sum of the numbers showing is a prime?

7. At 7:00 a.m. a ship leaves port and sails northwest at a speed of 24 nautical miles per hour. At noon a second ship leaves the same port and sails southwest at a speed of 15 nautical miles per hour. How many nautical miles apart are the two ships at 10:00 p.m.? (Ignore the curvature of the earth.)

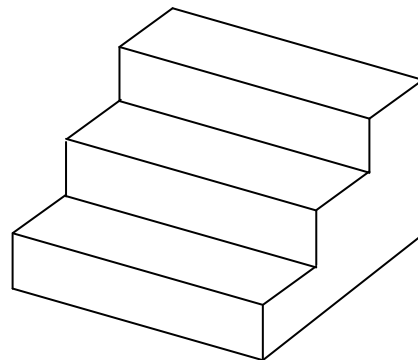
8. Two cubes with integral sides have their combined volume equal to the sum of the lengths of all their edges. What is their combined volume?

9. Each page in a 400-page book is numbered. How many times does the digit 7 appear among the page numbers?

10. When a valve at the bottom of a full water tank is opened, it takes 4 hours to drain the tank. A second valve, located halfway up the side of the tank, can drain the upper half of the tank in 6 hours. If the tank starts out full, and both valves are opened simultaneously, how many hours will it take to drain the tank?

11. A certain school has 500 students. Two-thirds of the students who are taking mathematics are also taking English, and three-fourths of the students who are taking English are also taking mathematics. There are 60 students who are taking neither mathematics nor English. How many students are taking both mathematics and English?
12. How many minutes does it take a $\frac{3}{8}$ mile long train traveling at 45 miles per hour to pass completely through a $\frac{3}{4}$ mile long tunnel?
13. On a recent trip, I drove for $4\frac{1}{2}$ hours at an average speed of 55 miles per hour. On the way back over the same route it took me $5\frac{1}{2}$ hours. What was my average speed, in miles per hour, for the return trip?

14. A stairway, 30 inches wide, is constructed of solid concrete as shown. Each step is 8 inches high, and the top of each step is 12 inches deep. How many cubic feet of concrete is needed for this stairway?



15. Art can paint a fence in 12 hours, but Bev can do the same job in only 4 hours, and it would take Cal 6 hours. Art and Bev, working together, can paint the fence in the same amount of time that Cal and Deb, working together, can. How many hours would it take Deb, working alone, to paint the fence?