

Names:

High School:

**Group Work (9th and 10th grades) Time: 40 Minutes**

1. A careless professor typed a six-digit number, but the two 1's the professor typed did not show. What appeared instead was 2002. How many 6-digit numbers could the professor have typed?
2. What three-digit positive number is exactly 32 times the sum of its digits?

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3. A pair of eight-sided fair dice have sides numbered one through eight. The dice are rolled and the number on the side each die lands on is noted. What is the probability that the product of the two numbers noted is larger than 36?
4. A point is chosen at random from within a circular region. What is the probability that the point is closer to the center than it is to the boundary of the region?

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5. If  $a$  and  $b$  are positive integers, neither of which is divisible by 10, and

$$a \cdot b = 10,000,$$

find the sum

$$a + b.$$

6. The perimeter of a square  $A$  is 24 cm. The area of the square  $B$  is  $\frac{1}{4}$  the area of the square  $A$ . What is the perimeter of the square  $B$ ?

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7. Take two numbers whose sum is 1. Which is larger: the square of the larger number added to the smaller number, or the square of the smaller number added to the larger number?
  
8. There are 50 marbles in total distributed between 5 boxes labeled A, B, C, D, and E. The total number of marbles in boxes A and B is 27, the total number of marbles in boxes B and C is 23, the total number of marbles in boxes C and D is 18, and the total number of marbles in boxes D and E is 13. How many marbles are in each box?