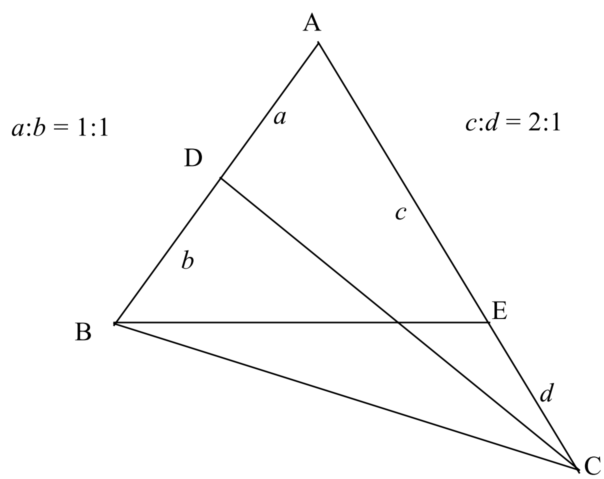
Student Name: ______________________

1. What is the smallest positive integer such that, if we remove the leftmost digit, the resulting number is 1/33 of the original integer?

Answer: ____________________

2. D divides AB in half (a:b = 1:1). E divides AC in the ratio of 2:1, with AE being twice as long as EC (c:d = 2:1). The area of triangle ABE is 1. What is the area of triangle ACD?



Answer: ____________________

3. For a positive whole number n, define $n! = n \cdot (n-1) \cdot (n-2) \cdot \ldots 2 \cdot 1$. For example, $4! = 4 \cdot 3 \cdot 2 \cdot 1 = 24$, while $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$. How many zeros are at the end of 100! ?

Answer: ____________________

Student Name: ______________________

4. Isaac and Carl play a tennis match, where the first person to win 3 sets wins the match. Assume that the players are equally skilled, so that each player is equally likely to win each set. Let x be the probability that the match finishes in exactly 4 sets. Let y be the probability that the match finishes in exactly 5 sets. Compute x - y.

Answer: ____________________

5. In Mike's aquarium, the ratio of gold fish to guppies is 5:4. After Mike buys 18 guppies, the ratio of gold fish to guppies is now 4:5. How many guppies did Mike originally have?

Answer: ____________________

6. A farmer has 100 meters of fencing and he wants to construct a rectangle to fence off as much area as possible. Fortunately, there is a river in his fields (in the shape of a straight line) that he can use as one side of the fence. What is the maximum area he can surround using the fence and the river?

Answer: ____________________ m^2

7. Let's call a number 'bizarre' if it is a multiple of 9, but the sum of its digits is not 9. How many bizarre numbers are there from 1 to 1000?

Answer: ____________________

8. What is the remainder when

$$2^{9^{9}} + 3^{2^{2}}$$

is divided by 7?

Answer: ____________________