Minnesota State High School Mathematics League

2019-20 Meet 1, Individual Event A

Question #1 is intended to be a quickie and is worth 1 point. Each of the next three questions is worth 2 points.
Place your answer to each question on the line provided. You have 12 minutes for this event.

NO CALCULATORS are allowed on this event.

_____ 1. Express $\dfrac{\frac{4}{3}+\frac{5}{4}}{\frac{3}{4}+\frac{4}{5}}$ as a quotient of two relatively prime integers.

_____ 2. Let b be a positive integer. For how many values of b is 21_b a two-digit number in base 10 ?

_____ 3. Determine exactly the smallest positive rational number which when divided by $\frac{4}{11}$ or $\frac{3}{22}$ or $\frac{5}{33}$ always yields an integer?

_____ 4. Determine the number of ordered triples of digits $(\underline{A},\underline{B},\underline{C})$, such that $.\overline{\underline{A}\underline{B}} \div .\overline{\underline{C}\underline{A}} = 2$, that is, a decimal with a two-digit repetend divided by a decimal with a two-digit repetend equals 2.

Name: _____ Team: _____