



MONTGOMERY COUNTY MATHEMATICS LEAGUE

Individual for Contest # 7 (No Calculators) 2014-2015

Time: 10 minutes

1. Find the 2015th digit to the right of the decimal point in the repeating decimal expansion of $7/11$.
 2. A, B, and C agree to share a sum of money, with A getting $1/6$, B getting $1/8$, and C getting the rest. In a change of plans, A gives $2/3$ of his share to C who *then* gives $3/4$ of the resulting total amount he has to B. If B's final share is \$213, find the number of dollars in C's final share.
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Time: 10 minutes

3. The perimeter of one square is 36 more than the perimeter of a second square. The area of the first square is 243 more than the area of the second. Find the length of a side of the larger square.
 4. Find the polynomial equation of least degree, with integral coefficients, one of whose roots is $\sqrt{2} + \sqrt[3]{2}$ and whose leading coefficient is positive and small as possible.
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Time 10 minutes

5. A mother was telling her child a fairy tale which went as follows: In a strange and distant land called Sitty of Nooey Ork, the government found that it had a surplus of money at the end of each fiscal year. To remedy the situation, the Secretary of the Treasury offered to give away \$15 to each adult and \$3 to each minor. Naturally, all the minors accepted the offer each year; but, for some unknown reason, 80% of the adults declined the offer each year. If the total population of the Sitty was a stable 7,695,429, how many dollars did the government give away annually this way?
6. In right $\triangle ABC$, \overline{CD} is the altitude to hypotenuse \overline{AB} . If the ratio $AC:CB = 4:9$, find the ratio $AD:DB$