CSE20 Midterm 2, February 18, 2010, Name_____

1. Residual Number System (10 points): Show the operation of 11×23 in a residual number system with moduli $(m_1, m_2, m_3) = (7, 8, 9)$.
2. Residual Number System (15 points): Suppose $(x\%5, x\%6, x\%7) = (1, 3, 5)$, where symbol % denotes modulus operation. Find the smallest positive integer x that satisfies this system.
3. Boolean Algebra (15 points): Express Boolean function
$E(x, y, z) = (x + y + z)(x'y' + xy'z)'$ in sum-of-products form.
4. Boolean Algebra (20 points): Express Boolean function
$E(x, y, z) = x'y + x[(x' + y)(y' + z)]'$ in product-of-sums form.
5. Boolean Algebra (20 points): Prove or disprove that for any elements a, b, and c in set B of Boolean algebra, we have the equality: $(a'+c)(a+b)(b+c) = (a'+c)(a+b)$.
6. Boolean Algebra (20 points): Reduce the following to an expression of a minimal number of literals (3): $E(a, b, c) = abc + ac'd + bc'd' + a'b'c' + ab'c'd' + bc'd$.