ACSL

2005 - 2006 **American Computer Science League** **Contest #3**

Intermediate Division Solutions

1. Boolean Algebra

$\overline{\overline{\overline{A} + AB(B+C)C} = \overline{\overline{\overline{A}}\,\overline{AB}(BC+C)}} = \overline{A(\overline{A}+\overline{B})(BC+C)} =$

$\overline{(A\overline{A} + A\overline{B})C(B+1)} = \overline{A\overline{B}C}$

1. $\overline{A\overline{B}C}$

2. Graph Theory

$$\begin{vmatrix} 0 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 0 \end{vmatrix} 2 = \begin{vmatrix} 1 & 1 & 1 \\ 1 & 3 & 1 \\ 1 & 1 & 1 \end{vmatrix}$$

2. 11

3. Graph Theory

The cycles are ABA, ABCA, ACBA, ACA, BCB and CC

3. 6

4. Digital Electronics

A	B	C	AB	$\overline{B+C}$	$\oplus$
0	0	0	0	1	1
0	0	1	0	0	0
0	1	0	0	0	0
0	1	1	0	0	0
1	0	0	0	1	1
1	0	1	0	0	0
1	1	0	1	0	1
1	1	1	1	0	1

4. 4

5. Digital Electronics

$\overline{\overline{A}\overline{B} + (B+C)} = \overline{\overline{A}\overline{B}}\,\overline{(B+C)} = (A+B)(\overline{B}\,\overline{C}) =$

$A\overline{B}\,\overline{C} + B\overline{B}\,\overline{C} = A\overline{B}\,\overline{C}$

5. $A\overline{B}\,\overline{C}$