

Compiled Solutions – Senior Division

1. 10-11 C1 What Does this Program Do?

$$A * B + C * D - E = 9 * 6 + 1 * 8 - 18 = 44$$

44

A	B	C	D	E
2	4	1	3	5
2	5	1	3	5
2	5	1	8	5
13	5	1	8	5
13	5	1	8	18
8	5	1	8	18
8	6	1	8	18
9	6	1	8	18

2. 10-11 C2 What Does this Program Do?

S counts the numbers from 1 to the square root of I that divide into I.

19

I	1	2	3	4	4	5	6	6	7	8	8	9	9	10	10	11	12	12	12
J	1	1	1	1	2	1	1	2	1	1	2	1	3	1	2	1	1	2	3
S	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

3. 11-12 C1 What Does this Program Do?

The table contains the values of A, B, C, and D after each line.

3

A	B	C	D
2	10	5	20
4	10	5	20
4	10	6	20
4	10	4	20
4	10	4	6
4	10	4	7
4	6	4	7
4	6	4	7
4	6	4	3
4	6	4	4

4. 11-12 C3 What Does this Program Do?

This program alters the entries by taking differences. Then it checks for divisibility by 2 and then by 4. Finally, it checks to see if the entry is a perfect square. If a test fails then 1 is added or it is squared. There are only 4 which are not 0.

4

0	9	0	1
0	0	0	0
0	0	0	0
0	361	0	25

5. 12-13 C1 What Does this Program Do?

The table contains the values of a, b, c, d and e after each line.

7

a	b	c	d	e
18	8	2	-1	0
18	8	2	-1	8
18	8	2	-2	8
18	22	2	-2	8
18	22	2	-2	4
18	22	2	-2	4
18	22	1	-2	4

So $(b + d) / e + (a + e) / b + c = (22 - 2) / 4 + (18 + 4) / 22 + 1 = 7$

6. 12-13 C3 What Does this Program Do?

This program counts the number of primes from 2 to 25.

9

They are 2, 3, 5, 7, 11, 13, 17, 19, and 23. There are 9 of them.

It uses the method called the Sieve of Eratosthenes.

7. 13-14 C1 What Does this Program Do?

The table contains the values of a, b, c, d and e after each line.

-18

a	b	c	d	e
10	5	20	1	2
10	5	20	1	2
10	5	20	25	2
10	20	20	25	2
10	8	20	25	2
10	8	20	5	2

So $c / (b + e) - d^2 + a / e = 20 / (8 + 2) - 5^2 + 10 / 2 = -18$

8. 13-14 C3 What Does this Program Do?

This program changes all negative entries to 0,

3

then replaces all the even entries by the result of dividing by 2,

and finally makes all the entries less than 3 equal to 0.

That leaves 3 that are not 0.

Original:	-1	0	1	2	Final:	0	0	0	0
	-2	0	2	4		0	0	0	0
	-3	0	3	6		0	0	3	3
	-4	0	4	8		0	0	0	4

9. 14-15 C1 What Does this Program Do?

The table contains the values of a, b, c, d and e after each line.

-26

a	b	c	d	e
48	12	0	-2	3
4	12	0	-2	3
4	3	0	-2	3
4	3	0	4	3
1	3	0	4	3
1	3	0	2	3

So $a * (b + c) / e - b^e - c / (d + 1)$
 $= 1 * (3 + 0) / 3 - 3^3 - 0 / (2 + 1) = 1 - 27 = -26$

10. 14-15 C3 What Does this Program Do?

This program changes all the values in the original table and prints the entry with the largest value. The final values are:

24

10	15	24	15
13	11	12	13
4	2	7	10
5	2	7	6

11. 15-16 C1 What Does this Program Do?

The table contains the values of a, b, c, d and e after each line.

-17

a	b	c	d	e
16	2	4	0	5
14	2	4	0	5
14	2	4	0	5
14	2	4	1	5
10	2	4	1	5
5	2	4	1	5
5	2	4	0	5

So $a^d + b * e / a - c * (a / e + b^b) =$
 $5^0 + 2 * 5 / 5 - 4 * (5 / 5 + 2^2) = 1 + 2 - 4 * 5 = -17$

12. 15-16 C3 What Does this Program Do?

This program changes all the values in the original table and counts how many are 0. The final values are:

11

0	9	0	-9
-6	0	-5	0
0	0	0	0
7	0	0	0