Edudigm...Paradigm in Education

Q	a b c d	Q	a b c d	Q	a b c d	Q	a b c d
1		16	○○○●	31	○○●○	46	○○●○
2		17	○●○○	32	○○○●	47	○○●○
3		18	○○●○	33	○●○○	48	○●○○
4		19	○○○●	34	●○○○	49	○○○●
5		20	○○●○	35	○●○○	50	○○○●
6		21	○○○●	36		51	○○●○
7	○○○●	22	○○○●	37		52	●○○○
8	○●○○	23	○○●○	38		53	○○●○
9	○○●○	24	●○○○	39		54	○○●○
10	●○○○	25	○●○○	40		55	○○○●
11	●○○○	26	●○○○	41	○●○○	56	○●○○
12	○○○●	27	○○●○	42	○○○●	57	○○●○
13	○○●○	28	○●○○	43	○○●○	58	●○○○
14	○●○○	29	○●○○	44	○●○○	59	○○○●
15	○●○○	30	○○●○	45	○○●○	60	○○○●

1) The sum is given by $1111 \ldots 2n\ digits + 44444 \ldots n\ digits + 1 = \frac{1}{9}(10^{2n}-1) + \frac{4}{9}(10^n - 1) + 1 = \frac{10^{2n}+4.10^n+4}{9} = \left(\frac{10^n+2}{3}\right)^2$

2) Take the AM GM inequality on $2^0, 2^1, 2^2, 2^3 \ldots . 2^n$, we get $\frac{1+2+4+\cdots .2^n}{n} > (1.2.4 \ldots . 2^n)^{\frac{1}{n}}$, Complete both sides to get the solution

3) This was a sitter, and it was a bit of a setback to see only 2 ppl solve it correctly!

   a+b+c>a+b-c; a+b+c>a-b+c; and a+b+c>b+c-a multiply all the three.

4) $b^2 + c^2 - 2bc > 0 => 2b^2 + 2c^2 > b^2 + c^2 + 2bc => b^2 + c^2 > \frac{(b+c)^2}{2}$

   Add all three such equation to get the answer.

5) Try to prove this using the method in the part 3

6) Apply AM GM inequality on $\frac{2}{y+z}, \frac{2}{x+y}, \frac{2}{x+z}$

$$\frac{\left(\frac{2}{y+z} + \frac{2}{x+y} + \frac{2}{x+z}\right)}{3} \geq \frac{3}{\frac{y+z}{2} + \frac{x+y}{2} + \frac{x+z}{2}}$$

Hence proved