1. Three whole numbers a, b, c. The sum of the squares of a, b, c is a perfect square. Prove at least two of the three numbers a, b, c are even numbers.
   Answer:
   Assume a, b, c, and u are whole numbers, then we need to prove $a^2 + b^2 + c^2 = u^2$ while at least two of the numbers a, b, c are even numbers or $a^2 + b^2 + c^2 \neq u^2$ while at lease two of the numbers a, b, c are odd numbers.

   Let us use the second approach to prove:
   Assume c is the even number and a, b are odd number, then c can be written as 2k, a can be written as 2m + 1, b can be written as 2n + 1.
   Thus $a^2 + b^2 + c^2 = (2m + 1)^2 + (2n + 1)^2 + (2k)^2 = 4(m^2 + n^2 + k^2 + m + n) + 2$ which can not be a perfect number.

   Similar approval can be applied to a, b, c if the 3 are all odd number:
   $a^2 + b^2 + c^2 = (2m + 1)^2 + (2n + 1)^2 + (2k + 1)^2 = 8q + 3$.
   Any odd number's square should be written as 8q + 1 i.e. (2p + 1)2 = 4(p + 1) p + 1 = 8q + 1, therefore, 8q + 3 would not be a square number.

2. When dividing 1270 by a natural number (divisor), the quotient is 74. What are the divisor and remainder.
   Answer:
   If the remainder is r, and divisor is x, then $x > r = 1270 – 74x > 0$,
   Therefore, $1270/75 < x < 1270/74$, we get x = 17 and r = 12

3. Four digit number $\overline{abcd}$ can be divided by 11 with no remainder while a, b, c, d are numbers 0 to 9 and a is not equal to 0. b + c = a, and $\overline{bc}$ is a perfect square. What is $\overline{abcd}$?
   Answer:
   Since $\overline{abcd}$ can be divided by 11, then a + c – b – d = 0, or a + c – b – d = 11.
   Since $\overline{bc}$ is a perfect square, then c can only be 0, 1, 4, 5, 6, 9.

   First if a + c – b – d = 0. Since b + c = a, then 2c = d, thus c could be 1, or 4.
   If c = 1, then d = 2. To make $\overline{bc}$ is a perfect square, b would be 0 or 8.
   If b = 0, then a = 1; if b = 8, then a = 9. Then we found 9812, 1012 are the numbers.

   If c = 4, use the same method, we will get 4048.

   Second if a + c – b – d = 11, we will get 7161, 9361, 9097 respectively.

4. 1, 2, 3, 4, 5, 6 are 6 numbers forming $\overline{abcdef}$. $2|\overline{ab}$, $3|\overline{abc}$, $4|\overline{abcd}$, $5|\overline{abcde}$ and $6|\overline{abcdef}$. Please find $\overline{abcdef}$.
   Answer:

123654 or 361254

5. 17 classmates are having a meeting and shake hands. Please prove it is impossible that everyone shakes hands with 3 and only 3 people.