1. Find the smallest natural number with 6 as the last digit, such that if the final 6 is moved to the front of the number it is multiplied by 4.

2. Find all real x satisfying: $\sqrt{3 - x} - \sqrt{x + 1} > 1/2$.

3. The cube ABCDA'B'C'D' has upper face ABCD and lower face A'B'C'D' with A directly above A' and so on. The point x moves at constant speed along the perimeter of ABCD, and the point Y moves at the same speed along the perimeter of B'C'CB. X leaves A towards B at the same moment as Y leaves B' towards C'. What is the locus of the midpoint of XY?

4. Find all real solutions to $\cos^2 x + \cos^2 2x + \cos^2 3x = 1$.

5. Given three distinct points A, B, C on a circle K, construct a point D on K, such that a circle can be inscribed in ABCD.

6. The radius of the circumcircle of an isosceles triangle is R and the radius of its inscribed circle is r. Prove that the distance between the two centers is $\sqrt{R(R - 2r)}$.

7. Prove that a regular tetrahedron has five distinct spheres each tangent to its six extended edges. Conversely, prove that if a tetrahedron has five such spheres then it is regular.