1. Find the two numbers whose sum is 40 and whose product is maximum.

2. Sketch the graph of the function \( y = x^3 + \frac{3}{x} \) by going through the procedure described in the class.
3. A machine part is a circular sector of radius $r$ and angle $\theta$. Find $r$ and $\theta$ if the area is 1 and the perimeter is a minimum.

4. An alpha particle moves along the path $y = x^2 - 4$. Determine the closest the particle comes to the origin.

5. The curves $y = x^2 + 2$ and $y = 4x - x^2$ are tangent to each other. Find the point of tangency and the equation of the tangent line.