1. Solve the following problem using the Kuhn-Tucker conditions and verify your solution geometrically

Find the extrema of \( x \)
with \( (x-4)^2 + y^2 \leq 16 \)
and \( (x-3)^2 + (y-2)^2 = 13 \)

2. Write down the Kuhn-Tucker conditions for the problem
\( f(X) = f(x,y,z) = x^2 + y^2 + z^2 \)
subject to
\( g_1(X) = g_1(x,y,z) = -x + y - z \geq -10 \)
and
\( g_2(X) = g_2(x,y,z) = x + y + 4z \geq 20 \)
Obtain the solution in any manner.