Answer on Question # 41398 – Math - Integral Calculus

Show that the open sphere S with centre at (3,1,4) and radius 5 in R3 is contained in the open cube
P1={(x,y,z) : |x-3|<5 , |y-1|<5 , |z-4|<5} and P1 is contained in the sphere with centre (3,1,4) and
radius 8.66 .

Solution:

As, we can see P1 is the cube with the center (3,1,4) and lateral length 10. And, the sphere with
radius 5 has diameter 10, so it is contained in such a cube.

The cube P1 has diagonal $10\sqrt{3} \approx 17.32$. And to put this cube into the sphere, its diameter must
not be less than 17.32. So, P1 is contained in sphere with centre (3,1,4) and radius 8.66, because
both two figures have the same center and sphere diameter is 8.66*2=17.32.