

Answer to the question 85726, Math / Calculus

Let  $S$  be an open disc with centre  $(0,0,0)$  and radius 7 in  $\mathbb{R}^3$  and let  $x = 3a + b - 3c$  where  $a = (1,0,0)$ ,  $b = (0,1,0)$  and  $c = (0,0,1)$ . Show that  $x \in S$ .

The distance from the point  $x$  to the center of the disc  $S$  is

$$\sqrt{3^2 + 1 + (-3)^2} = \sqrt{19} < 7,$$

since  $19 < 49 = 7^2$ .

By definition  $S = \{p \in \mathbb{R}^3 : \text{dist}((0,0,0), p) < 7\}$ . Thus  $x \in S$ .