RUID: 202002034

(1) $a=0$, $b=0$

..... That's kind of awkward .....

I'll set $a=2$ and $b=3$ in order to keep this question meaningful.

Line 1 : $(2,0,0)+t((0,0,3)-(2,0,0))$

$=(2,0,0)+(-2t,0,3t)$

$=(-2t+2,0,3t)$

Line 2: $(0,2,0)+s((3,0,0)-(0,2,0))$

$=(0,2,0)+(3s,-2s,0)$

$=(3s,-2s+2,0)$

$(-2t+2,0,3t)=(3s,-2s+2,0)$

$\begin{cases} -2t+2=3s \\ -2s=0 \rightarrow s=0 \\ 3t=0 \rightarrow t=0 \end{cases}$

Plug in $s=0$ and $t=0$, $2=0$

s and t have no solution. Line 1 and 2 never meet.

(2) $a=2$, $b=0$

centre : $(0,2,0)$

$x^2+(y-2)^2+z^2=0$ ..... looked it's a dot instead of a sphere.

(3) $a=0$, $b=2$, $c=0$

(I) $(0,2,0)\cdot(2,0,0)=(0,0,0)$

(II) $(0,2,0)\times(2,0,0)$

$$\begin{bmatrix} i & j & k \\ 0 & 2 & 0 \\ 2 & 0 & 0 \end{bmatrix}$$

$(0-0)i-(0-0)j+(0-4)k$

$=(0,0,-4)$