$$z = \frac{5+11i\sqrt{3}}{7-4i\sqrt{3}} \times \frac{7+4i\sqrt{3}}{7+4i\sqrt{3}}$$

$$= \frac{(5+11i\sqrt{3})(7+4i\sqrt{3})}{7^2+(4\sqrt{3})^2}$$

$$= \frac{35+i(97\sqrt{3})-132}{97}$$

$$= \frac{-97+i(97\sqrt{3})}{97}$$

$$= -1+i\sqrt{3}$$

$$\begin{array}{r} 2 \\ 1\cancel{3}2 \\ 35 \\ \hline 97 \end{array}$$

$$r = |z| = \sqrt{(-1)^2+(\sqrt{3})^2}$$

$$= \sqrt{1+3}$$

$$= \underline{2}$$

$$\theta = \tan^{-1}\left(\frac{\sqrt{3}}{-1}\right)$$

$$= \tan^{-1}(-\sqrt{3})$$

$$= \frac{2\pi}{3}$$

$$z = 2e^{i2\pi/3}$$

$$z = \frac{\sqrt{2}}{1-i}$$

$$= \frac{\sqrt{2}+i\sqrt{2}}{1^2+1}$$

$$= \frac{1}{\sqrt{2}} + \frac{i}{\sqrt{2}}$$

$$|z| = \sqrt{\frac{1}{2}+\frac{1}{2}} = 1$$

$$\theta = \tan^{-1}\left(\frac{1/\sqrt{2}}{1/\sqrt{2}}\right)$$

$$= \tan^{-1}(1)$$

$$= \frac{\pi}{4}$$

$$z = e^{i\pi/4}$$

$$x^2 - 4x + y^2 - 12y + z^2 - 8z = m$$

$$(x-2)^2 - 4 + (y-6)^2 - 36 + (z-4)^2 - 16 = m$$

$$(x-2)^2 + (y-6)^2 + (z-4)^2 = m + 56$$

For this to be a sphere

$$m + 56 > 0$$

$$\underline{m > -56}$$

$$\vec{n_1} = \langle 3, -1, 1 \rangle$$

$$\vec{n_2} = \langle 1, -1, 1 \rangle$$

$$\vec{u} = \vec{n_1} \times \vec{n_2} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3 & -1 & 1 \\ 1 & -1 & 1 \end{vmatrix} = \langle 0, -2, -2 \rangle$$

$$\begin{cases} x = 2 \\ y = 3 - 2t \\ z = 5 - 2t \end{cases}$$

$\vec{u} = \langle 3, 2, 1 \rangle$

$P = (2, -1, 5)$

$Q = (3, 1, 0)$

$$d = \frac{\| PQ \times \vec{u} \|}{\| \vec{u} \|}$$

$\vec{n} = \langle 1, 2, -5 \rangle$

$P\ (1, 0, 0)$

$$D = \frac{| PQ \cdot \vec{n} |}{\| \vec{n} \|}$$