Dilations

I) the complex plane is referred to a direct orthonormal system $(O, \vec{u}, \vec{v})$.

consider the dilations:

h_1 of center $I(-1, 2)$ and ratio $k_1 = 2$

h_2 of center $J(1, 3)$ and ratio $k_2 = -4$

h_3 of center $L(0, 1)$ and ratio $k_3 = \frac{1}{2}$.

1) Write a complex form of each of the dilations h_1, h_2 and h_3

2) a) Determine the nature and characteristic elements of $h_2 o h_1$

b) Determine $h_3 o h_2$ and its characteristic elements.

c) Show that $h_3 o h_1$ is a translation whose vector is to be determined.

II) ABC is a right triangle such that $AB = 4$, $AC = 3$ and $(\overrightarrow{AB}, \overrightarrow{AC}) = \frac{\pi}{2} (2\pi)$.

D is the midpoint of $[AB]$ and E is the midpoint of $[BC]$.

Let h be the dilation of center A that transforms D onto B.

t is the translation of vector $\overrightarrow{DB}$.

1) a) identify toh and locate its center I in the figure

b) identify hot and locate its center J in the figure

2) the plane is referred to a direct orthonormal system $(A, \vec{i}, \vec{j})$ such that $\vec{i} = \frac{1}{2}\overrightarrow{AD}$.

Define analytically h, t and toh.