$\tilde{\omega}^2 - 4\tilde{z}\tilde{\omega} + 4\tilde{z}^2 - 3\tilde{z}\tilde{\omega}^2 + \tilde{z}\tilde{\omega}^2 = 0$
$\tilde{\omega}, \tilde{z} = 0 \Rightarrow 0 = 0 \therefore (\infty,\infty)$ does lie on the conic. The equation reduces to $\tilde{\omega}^2 = 0$ if $\tilde{z} = 0 \therefore (\infty,\infty)$ has multiplicity 2.

$\frac{3}{3}$ ✓

c) i) From a) i), $z^2 - 3z\omega + \omega^2 + 3z - 1 = 0$ has two finite branch points: $(2/5, 3/5)$ and $(2,3)$. $\therefore (\infty,\infty)$ is a pinch point, since a conic has either two branch points or none.

✓

From a) ii) $z^2 - 4z\omega + 4\omega^2 - 3z + 1 = 0$ has the finite branch point $(1/3, 1/6) \therefore$ since the conic has two branch points (∞,∞) is a branch point

$\frac{2}{2}$ ✓

d) i) $z^2 - 3z\omega + \omega^2 + 3z - 1 = 0$
$b^2 - 4ac = (-3)^2 - 4 \cdot 1 \cdot 1 = 5 \neq 0 \therefore$ the main theorem says this locus is a pinched sphere containing two points corresponding to (∞,∞), which are pinch points.

✓

ii) $z^2 - 4z\omega + 4\omega^2 - 3z + 1 = 0$
$b^2 - 4ac = (-4)^2 - 4 \cdot 1 \cdot 4 = 0$. The main theorem says this locus is homeomorphic to the z-sphere, and that one of the branch points is (∞,∞)

$\frac{1}{1}$ ✓

Both these answers agree with c) i) & c) ii)