1) i) $z\bar{w} = 16(-\sqrt{3}+i)(2-i\sqrt{3})$

$\cancel{= 16(-2\sqrt{3}+\sqrt{3}i+2i+3)}$

$\cancel{= 16(-2\sqrt{3}+3+5i)}$

$= 16(-2\sqrt{3}+3i+2i+\sqrt{3})$

$= 16(-\sqrt{3}+5i)$

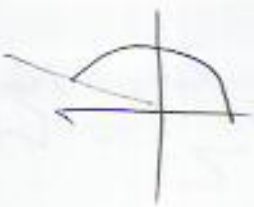
$$\frac{z}{w} = \frac{z\bar{w}}{w\bar{w}} = \frac{16(-\sqrt{3}+5i)}{(2+i\sqrt{3})(2-i\sqrt{3})} = \frac{16(-\sqrt{3}+i5)}{7}$$

$$\frac{z\bar{z}}{w+\bar{w}} = \frac{16(-\sqrt{3}+i)16(-\sqrt{3}-i)}{2+i\sqrt{3}+2-i\sqrt{3}}$$

$$= \frac{256(3+\cancel{i\sqrt{3}}-\cancel{i\sqrt{3}}-(i)^2)}{4}$$

$$= \underline{256}$$

ii) $|z| = 16\sqrt{(\sqrt{3})^2+1^2} = 32$

$\text{Arg}(z) = \tan^{-1}\left(\frac{1}{-\sqrt{3}}\right) = \frac{5\pi}{6}$

$z = 32e^{5\pi i/6}$