$\boxed{\begin{matrix}3.73\\18\end{matrix}}$

I

$$q = \frac{i-1}{1+i} = \frac{\sqrt{2}\,cis\,135}{\sqrt{2}\,cis\,45} = cis\,90 = i$$

$$S_{10} = \frac{(1+i)(i^{10}-1)}{i-1} = \frac{(1+i)(-2)}{i-1} = \frac{-2}{q} = \frac{-2\cdot(-i)}{1} = 2i$$

II

$$\left|\frac{(1+i)^8(3i-4)^2}{5i\left(\sin\frac{3\pi}{4}+i\cos\frac{\pi}{4}\right)}\right| = \left|\frac{(\sqrt{2}\,cis\,45)^8\left(5\,cis\left(\arctan\left(-\frac{3}{4}\right)\right)\right)^2}{5i\left(\cos\left(\frac{\pi}{4}\right)+i\sin\left(\frac{\pi}{4}\right)\right)}\right| =$$

$$\left|\frac{16\,cis\,360\cdot 25\,cis\left(2\arctan\left(-\frac{3}{4}\right)\right)}{5i\,cis\left(\frac{\pi}{4}\right)}\right| = \frac{|16\,cis\,360|\cdot\left|25\,cis\left(2\arctan\left(-\frac{3}{4}\right)\right)\right|}{|5i|\cdot\left|cis\,\frac{\pi}{4}\right|} =$$

$$= \frac{16\cdot 25}{5\cdot 1} = 80$$

$\boxed{\begin{matrix}3.73\\19\end{matrix}}$

$$z^4 = -\frac{3}{2}-\frac{\sqrt{3}}{2}i = \sqrt{3}\,cis\left(\frac{7\pi}{6}\right)$$

$$r = \sqrt{\frac{9}{4}+\frac{3}{4}} = \sqrt{3}$$

$$\tan\theta = \frac{-\frac{\sqrt{3}}{2}}{-\frac{3}{2}} = \frac{1}{\sqrt{3}} \rightarrow \theta = 210$$

$$z_i = \sqrt[8]{3}\,cis\left(\frac{7\pi}{24}+\frac{\pi}{2}k\right) \quad k=0,1,2,3$$