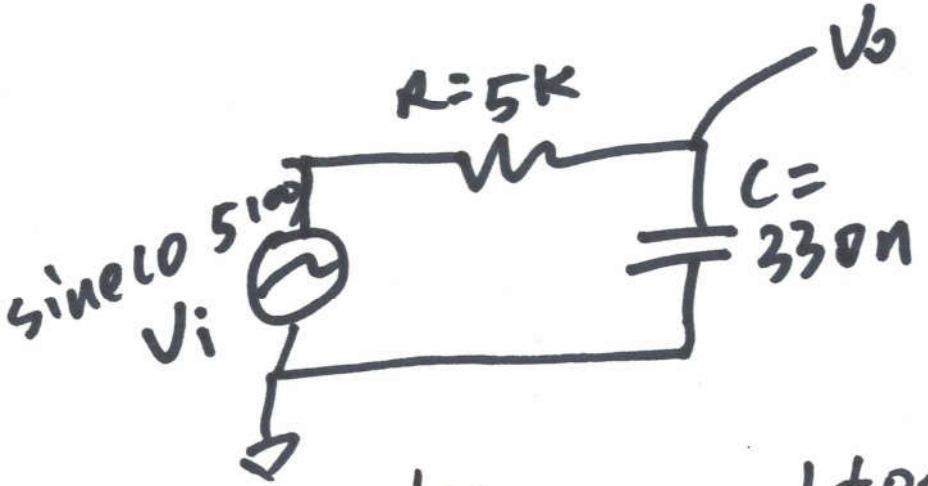


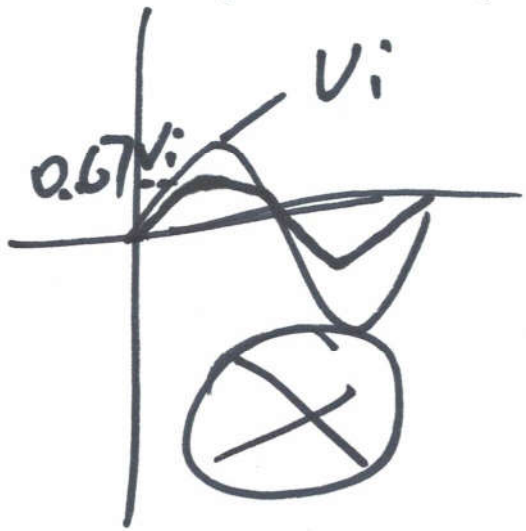
$Z_C = \frac{1}{j\omega C}$ → 330n

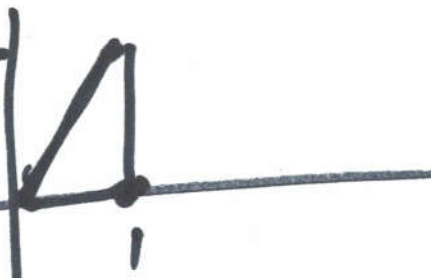
$\omega = 2\pi f$

3.14 100

$$\frac{V_o}{V_i} = \frac{\frac{1}{j\omega C}}{R + \frac{1}{j\omega C}} = \frac{1+0j}{1+j\omega RC}$$

$$\left|\frac{V_o}{V_i}\right| = \frac{|V_o|}{|V_i|} = \frac{\sqrt{1^2+0^2}}{\sqrt{1^2+(\omega RC)^2}}$$





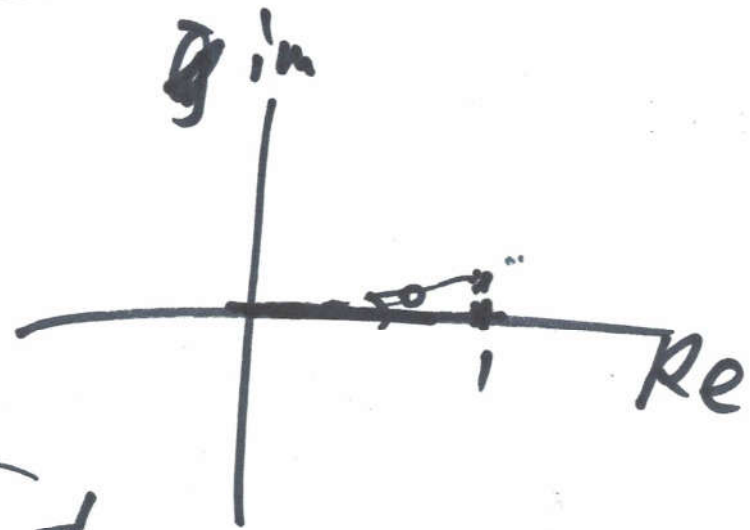
$$= \frac{1}{\sqrt{1^2+(2\pi \cdot 100 \cdot 5K \cdot 330n)^2}}$$

$$= \frac{1}{\sqrt{1^2+(1.04)^2}} = \frac{1}{1.44} = 0.67$$

(1)

$\angle V_o - \angle V_i$ phase shift

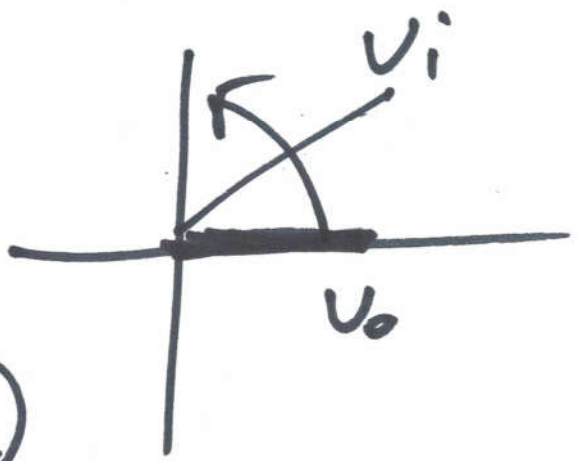
$$\frac{V_o}{V_i} = \frac{1+0j}{1+j\omega RC}$$



$$\angle V_o = \tan^{-1}\frac{0}{1} = 0^\circ$$

$$\angle V_i = \tan^{-1}\frac{\omega RC}{1} = \tan^{-1} 1.04 = 46.12^\circ$$

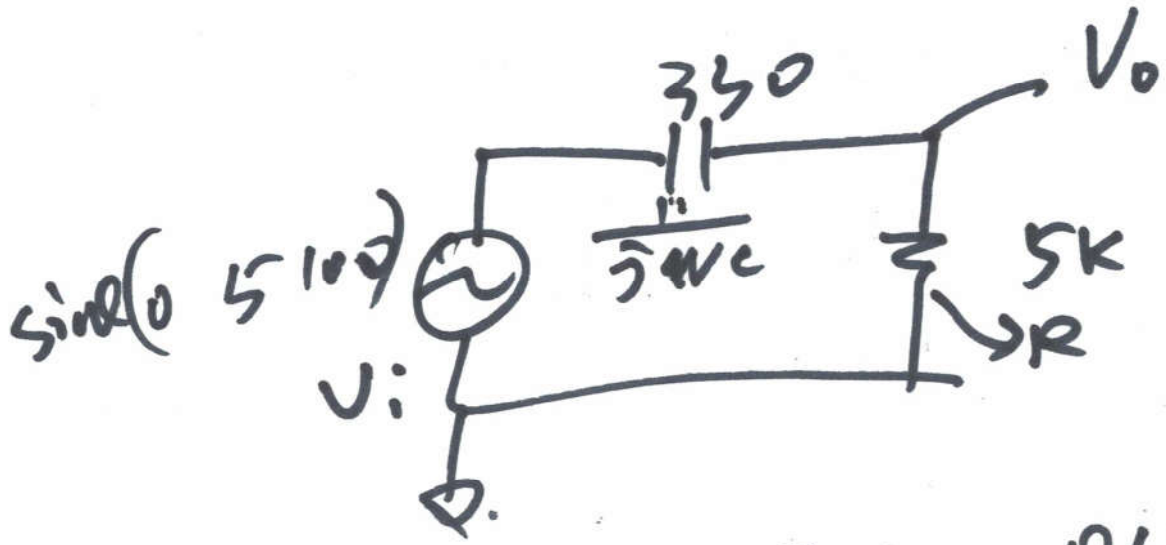
$$\angle V_o - \angle V_i = 0^\circ - 46.12^\circ = -46.12^\circ$$



$$\frac{46.12^\circ}{360^\circ} \cdot T = \frac{46.12}{360} \cdot \frac{1}{100}$$

$$= 1.28\,ms$$

(2)

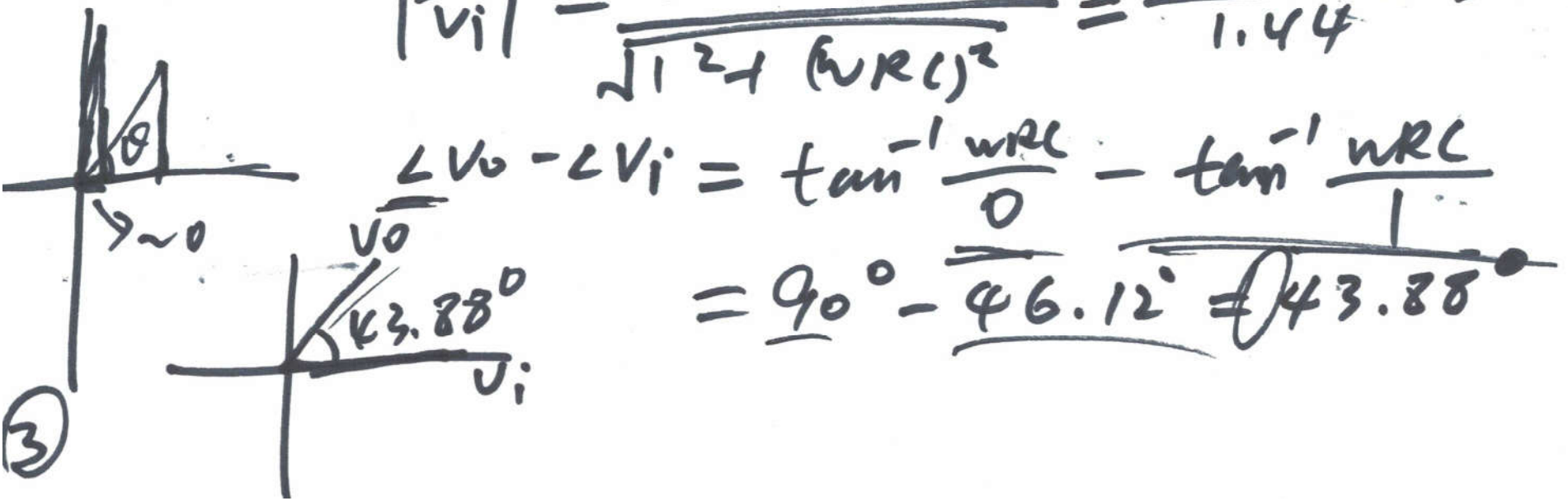


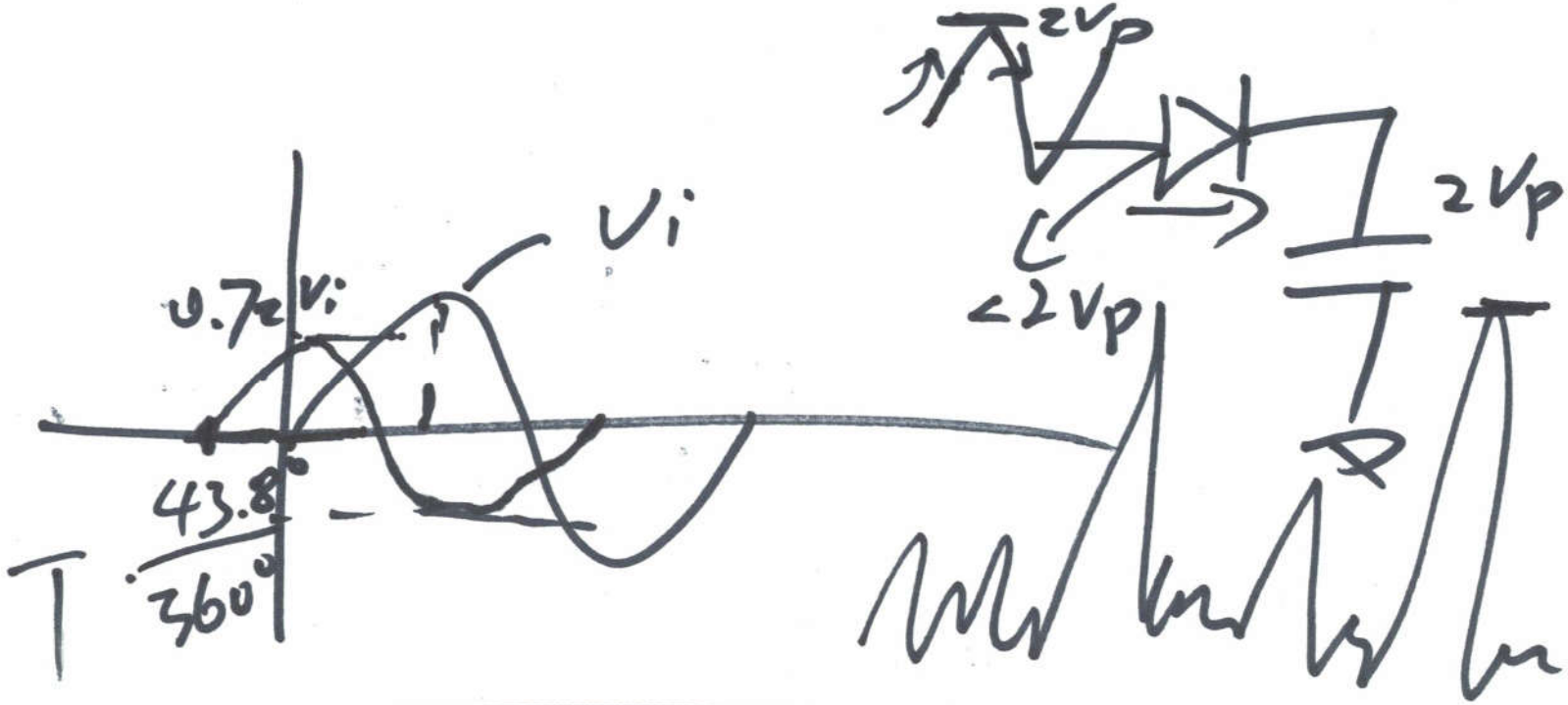
$$\frac{V_o}{V_i} = \frac{R}{R + \frac{1}{j\omega C}} = \frac{0 + j\omega RC}{1 + j\omega RC}$$

$$\left|\frac{V_o}{V_i}\right| = \frac{\sqrt{0^2 + (\omega RC)^2}}{\sqrt{1^2 + (\omega RC)^2}} = \frac{1.04}{1.44} = 0.72$$

$$\angle V_o - \angle V_i = \tan^{-1}\frac{\omega RC}{0} - \tan^{-1}\frac{\omega RC}{1}$$

$$= 90^\circ - 46.12^\circ = 43.88^\circ$$





Voltage multipliers