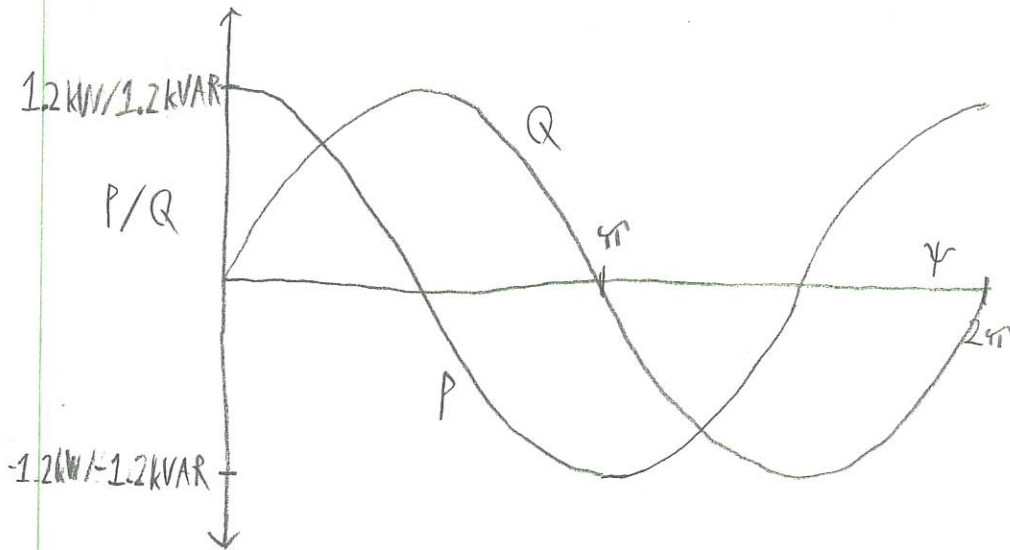
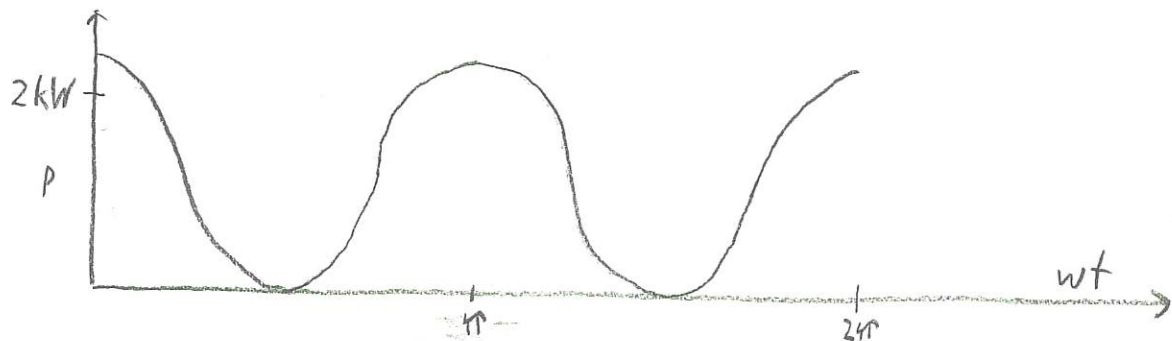


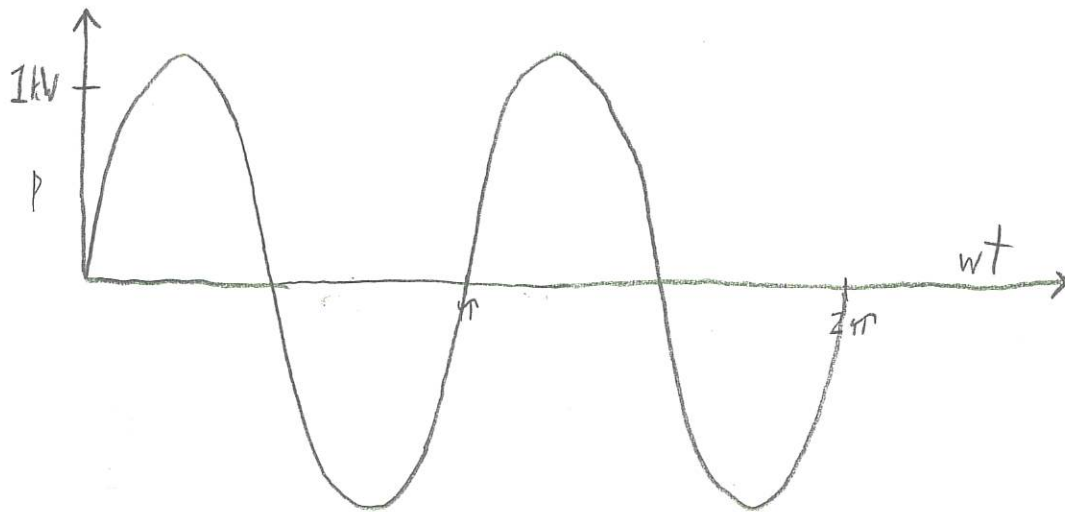
2.5d



$$\begin{aligned}
 b) P &= v i = -\sqrt{2} \operatorname{Re}[V e^{j\omega t}] \sqrt{2} \operatorname{Re}[I e^{j\omega t}] \\
 &= 2 \operatorname{Re}[V (\cos(\omega t) + j \sin(\omega t)) \operatorname{Re}[I (\cos(\omega t) + j \sin(\omega t))]] \\
 &= 2 V \cos(\omega t) I \cos(\omega t) \\
 &= 2,400 \cos^2(\omega t)
 \end{aligned}$$



$$\begin{aligned}
 2.5c \quad P = v i &= \sqrt{2} \operatorname{Re}[V e^{j\omega t}] \sqrt{2} \operatorname{Re}[I e^{j(\omega t - \psi)}] \\
 &= 2 \operatorname{Re}[V(\cos(\omega t) + j \sin(\omega t))] \operatorname{Re}[I(\cos(\omega t - \psi) + j \sin(\omega t - \psi))] \\
 &= 2VI \cos(\omega t) \cos(\omega t - \frac{\pi}{2}) \\
 &= VI(\cos(\frac{\pi}{2}) + \cos(2\omega t - \frac{\pi}{2})) \\
 &= VI \cos(2\omega t - \frac{\pi}{2}) \\
 &= VI \sin(2\omega t)
 \end{aligned}$$



$$\text{part c} = \frac{1200}{\sqrt{2}} e^{j(\omega t - \frac{\pi}{2})}$$

$$\text{part b} = \frac{1200}{\sqrt{2}} e^{j\omega t}$$

part b =

part c =



$$2.6a \quad V_r = \frac{V_s R}{R + jX}$$

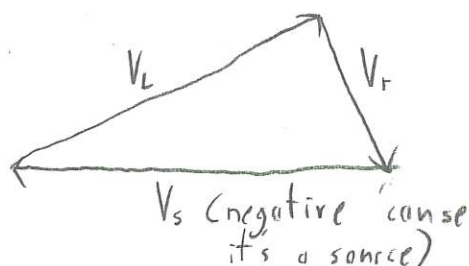
$$= 24 - j48$$

recall that $X = \omega L$

$$b \quad V_L = \frac{V_s jX}{R + jX}$$

$$= 16 + j48$$

scale:
 $j12 \uparrow$
 $12 \rightarrow$



$$c \quad \text{current} = \frac{V_s}{R + jX}$$

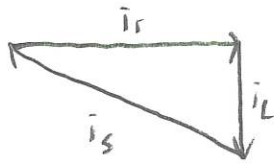
$$= 2.4 - j4.8$$

Real power = 288 W

Reactive power = 576 VAR

$$2.7d \quad \begin{aligned} i_r &= \frac{I_s X}{R + jX} \\ i_s &= \frac{V_s}{R + jX} \\ &= \frac{V_s (R - jX)}{R^2 + X^2} \\ i_s &= 12 - j6 \\ i_r &= 12 \end{aligned}$$

$$b \quad \begin{aligned} i_L &= \frac{I_s R}{R + jX} \\ &= -j6 \end{aligned}$$



$$\frac{j2}{2}$$

Real power: 1440 W
Reactive power: 720 VAR