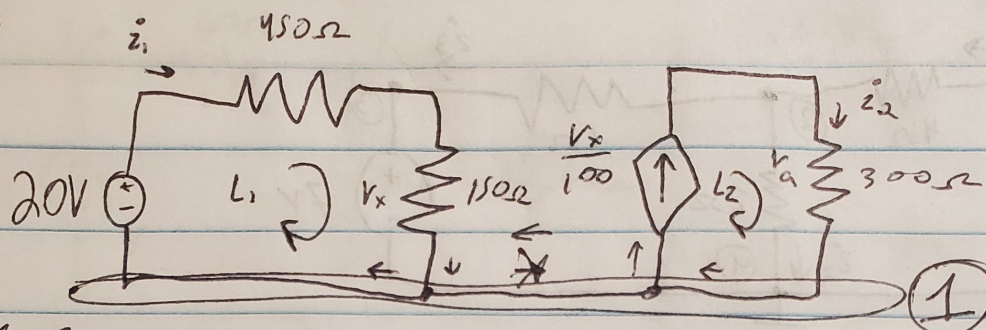


2.33



$$L_1: 20V = 450i_1 + 150i_1, \quad 600i_1 = 20V$$

$$v_x = 150 \cdot 0.033 = 5V$$

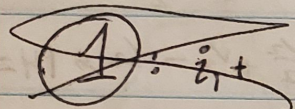
$$i_1 = \frac{2}{60} = 33mA = 0.033A$$

$$V_{450\Omega} = i_1 \cdot 450\Omega = 15V$$

$$i = \frac{v_x}{100} = \frac{5}{100} = 0.05A = 50mA$$

$$v_a = i \cdot 300\Omega = 15V$$

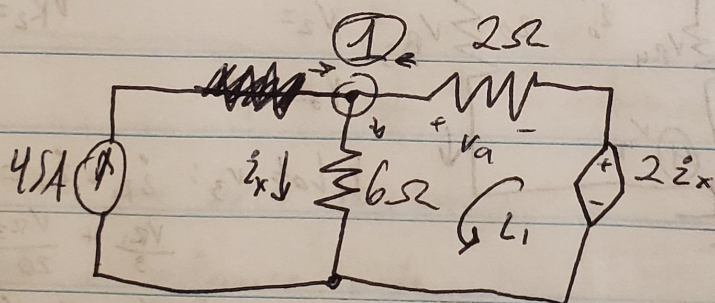
V i P



$R_{450\Omega}$	15V	0.033A	0.5W
$R_{150\Omega}$	5V	0.033A	0.17W
$R_{300\Omega}$	15V	0.05A	0.75W

1.42W absorbed

2.34



$$L_1: 45 + \frac{v_a}{2} = i_x$$

$$L_1: 2i_x = v_a + 6i_x, \quad v_a = 4i_x$$

$$45 + \frac{4i_x}{2} = i_x$$

$$45 + 2i_x = i_x, \quad 45 = -i_x, \quad i_x = -45$$

$$v_a = 4(-45) = -180V$$

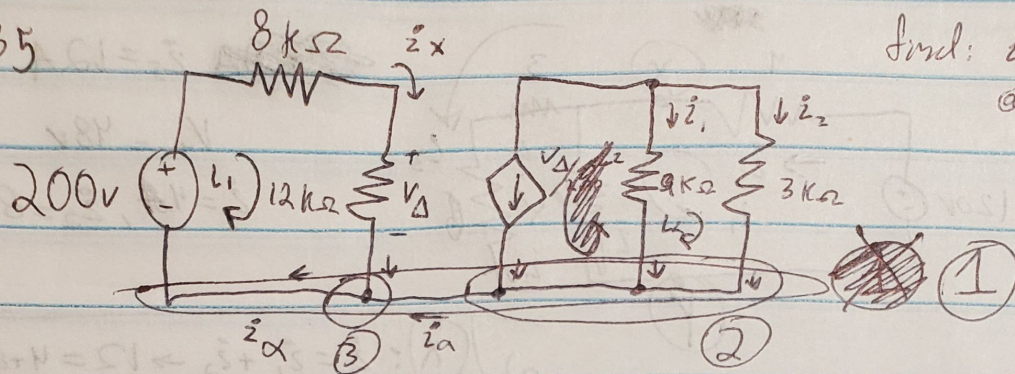
$$i_a = \frac{v_a}{2} = \frac{-180}{2} = -90$$

$$v_x = i_x \cdot 6 = -45 \cdot 6 = -270$$

$R_{2\Omega}$	-180V	-90A	16,200W
$R_{6\Omega}$	-270V	-45A	12,150W

28,350W absorbed

2.35



find: i_a, i_1, i_2
a) b) c)

L1: $200V = i_x \cdot 8000 + \underbrace{i_x \cdot 12000}_{V_{\Delta}}$ $i_x(20,000) = 200 \Rightarrow i_x = 0.01A$

~~①: $\frac{V_{\Delta}}{200} + i_x + i_1 + i_2 = 0$~~ ②: $\frac{V_{\Delta}}{200} + i_1 + i_2 = i_a$ ^{6A}

③ $i_x = i_a, i_a = 0$ $V_{\Delta} = i_x \cdot 12,000 = 120V$

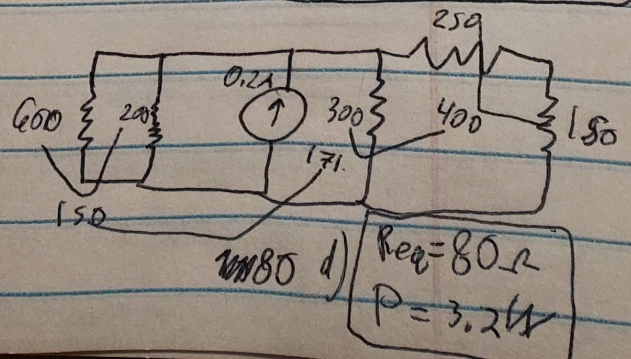
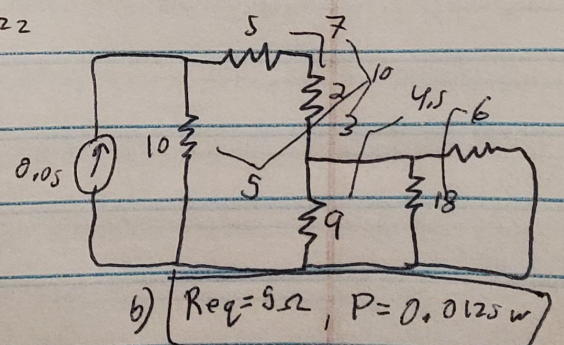
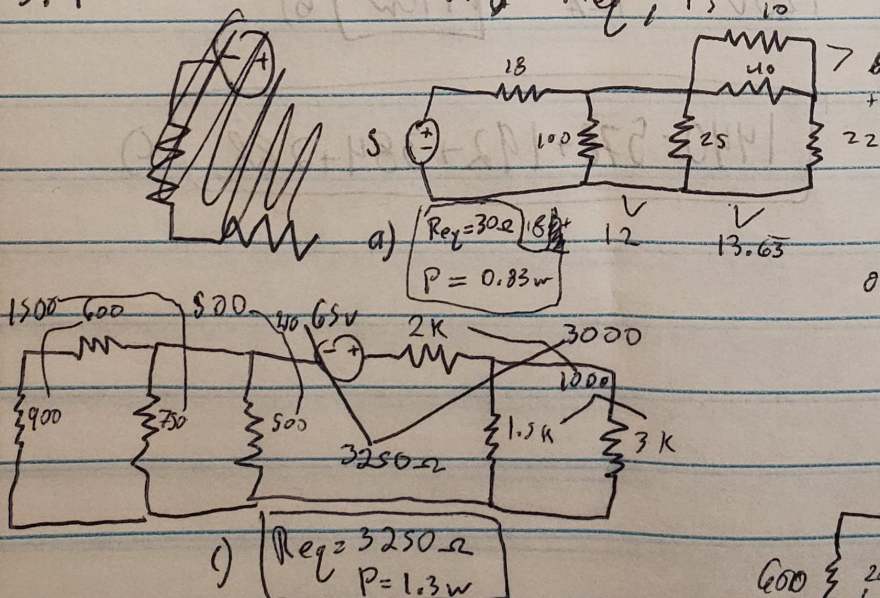
①: $6 + 0.01 + i_1 + i_2 = 0.01 \Rightarrow i_1 + i_2 = -6$ $4i_1 = -6 \Rightarrow i_1 = -1.5A$ ^{b)}

L2: $i_1 = 9000 \Rightarrow i_2 = 3000 \Rightarrow i_1 = i_2 = \frac{1}{3}, i_2 = 3i_1$ $i_2 = -4.5A$ ^{c)}

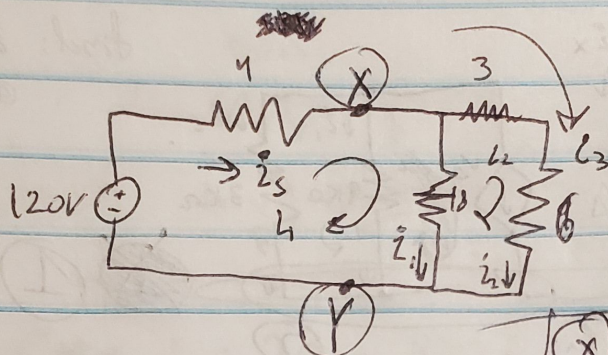
3.4

find R_{eq}, P_s

$P = IV, I = \frac{V}{R}, V = IR$
 $P = \frac{V^2}{R}, P = I^2 R$



3.8



$$\bar{i}_s = 12A$$

$$V_{4\Omega} = 48V$$

$$\bar{i}_1 = 4A, \bar{i}_2 = 8A$$

a)

$$\text{X: } \bar{i}_3 = \bar{i}_1 + \bar{i}_2 \rightarrow 12 = 4 + 8$$

$$\text{Y: } \bar{i}_1 + \bar{i}_2 = \bar{i}_s \rightarrow 4 + 8 = 12$$

$$L_1: 120 = V_{4\Omega} + V_{18\Omega} \rightarrow 120 = 48 + 72$$

b)

$$L_2: V_{18\Omega} = V_{3\Omega} + V_{6\Omega} \rightarrow 72 = 24 + 48$$

$$L_3: 120 = V_{4\Omega} + V_{3\Omega} + V_{6\Omega} \rightarrow 120 = 48 + 24 + 48$$

3.9

	V	I	P
$R_{4\Omega}$	48V 48V	12A	576W
$R_{3\Omega}$	24V	8A	192W
$R_{6\Omega}$	48V	8A	384W
$R_{18\Omega}$	72V	4A	288W
supply	120V	12A	1440W

$$1440 = 576 + 192 + 384 + 288 \quad c)$$