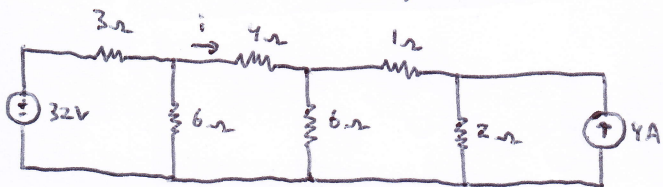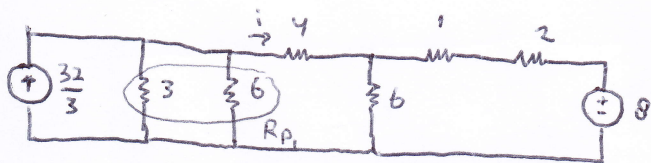**1). Find i using source transformation**

3Ω ⟶i 4Ω, 1Ω

32V, 6Ω, 6Ω, 2Ω, 4A

Answer

$\frac{32}{3}$, 3, 6 (Rp₁), →i 4, 1, 2, 6, 8

$$R_{P_1} = \frac{3 \times 6}{3+6} = 2$$

$\frac{32}{3}$, 2, →i 4, 6, 3 (Rp₂), $\frac{8}{3}$

$$R_{P_2} = \frac{6 \times 3}{6+3} = 2$$

$\frac{64}{3}$, 2, →i 4, 2, $\frac{8}{3}$

2, →i 4, 2, $\frac{64}{3}$, $\frac{16}{3}$
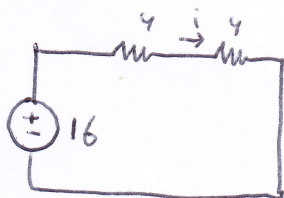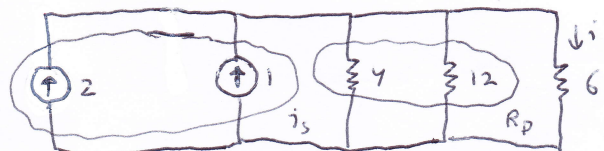

4, →i 4, 16

$$i = \frac{16}{8} = 2A$$
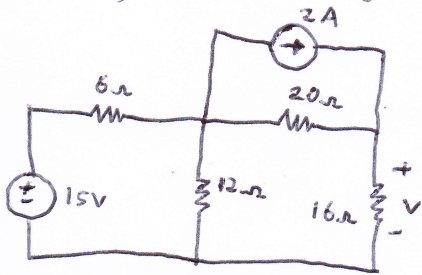
2). Find i using source transformation

4Ω, 1A, 12Ω, ↓i, 6Ω, 8V

Answer:

2, 4, 1, 12, ↓i 6

2, 1, 4, 12 (Rp), ↓i 6, i_s

$$i_s = 3$$

$$R_p = \frac{4 \cdot 12}{4+12} = \frac{\cancel{4} \cdot 12^3}{\cancel{16}_4} = 3$$
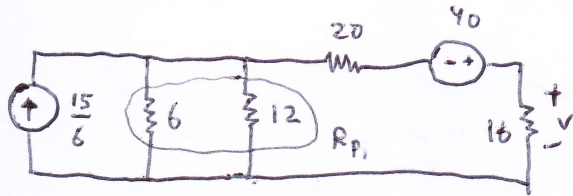

3, 3, ↓i 6

3, 9, ↓i 6
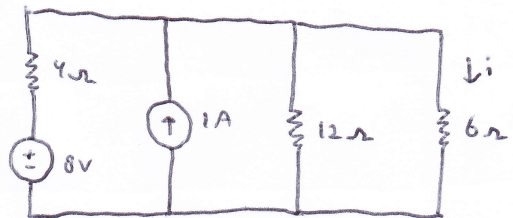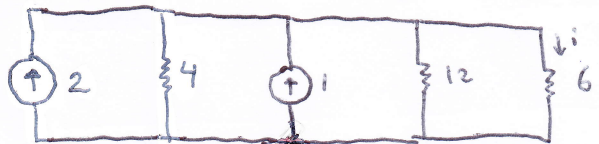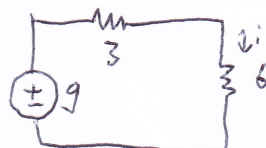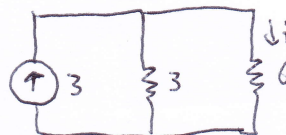
$$i = \frac{9}{3+6} = 1\,A$$

3). Find v using source transformation

2A
6Ω   20Ω
15V   12Ω   16Ω   + v -

Answer

20   40
$\frac{15}{6}$ 6   12 R_{P_1} 16   + v -

$$R_{P_1} = \frac{6 \cdot 12}{6+12} = \frac{6 \cdot 12}{18} = 4$$
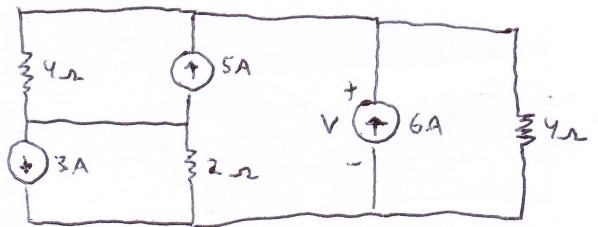

20   40
$\frac{15}{6}$ 4   16   + v -
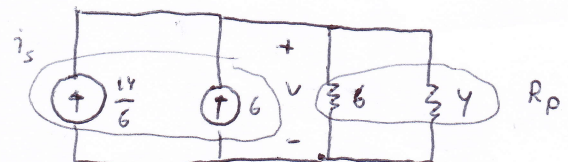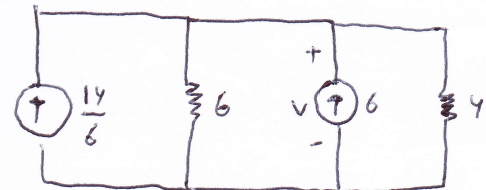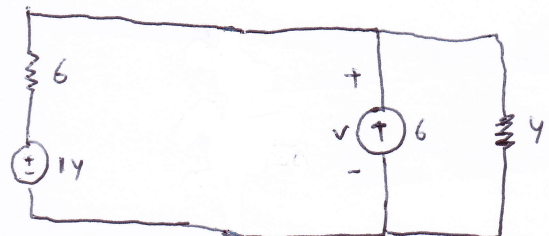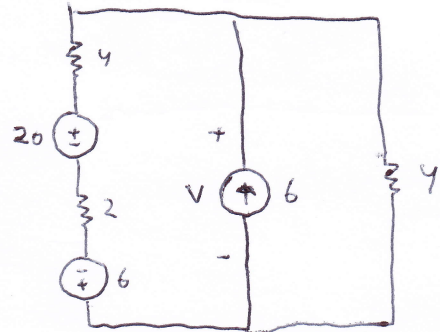

4   20   40
10   16   + v -

24
50   16   + v -
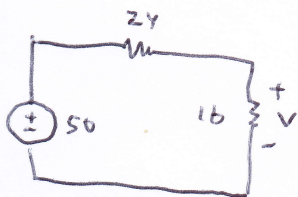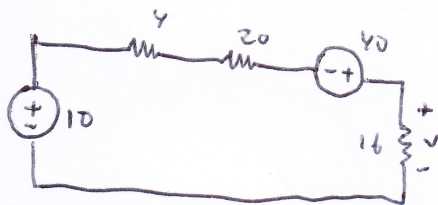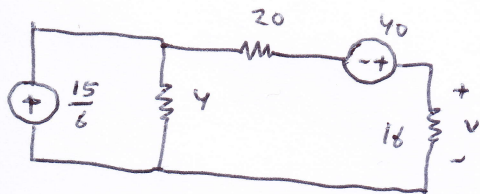
$$V = 50 \times \frac{16}{24+16} = 50 \times \frac{16}{40} = 20 \ Volt$$

4). Find v using source transformation

4Ω   5A
3A   2Ω   v + 6A -   4Ω

Answer

4
20   2   v + 6 -   4
6

6
14   v + 6 -   4

$\frac{14}{6}$ 6   v + 6 -   4
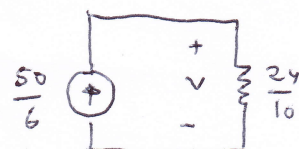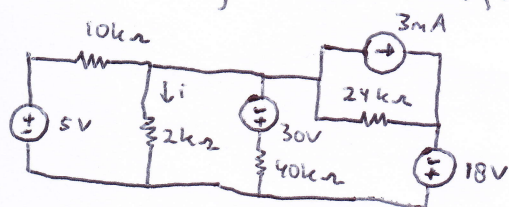

i_s
$\frac{14}{6}$ 6   v + 6 -   6   4 R_P

$$i_s = \frac{14}{6} + \frac{36}{6} = \frac{50}{6}$$
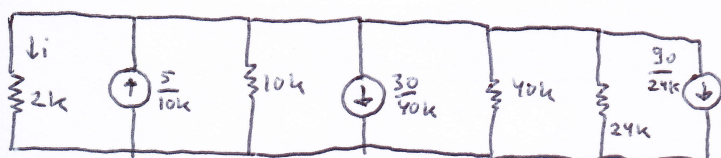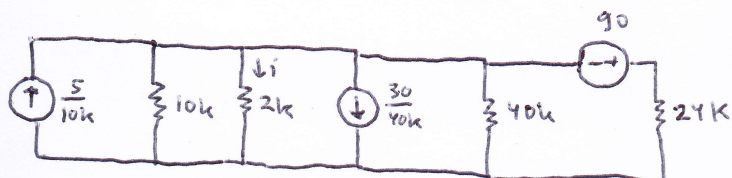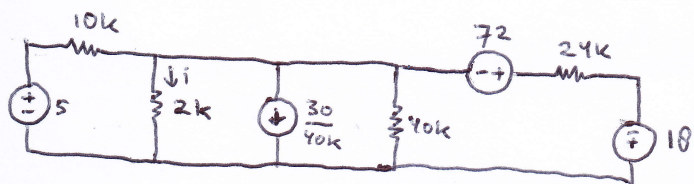
$$R_P = \frac{6 \times 4}{10} = \frac{24}{10}$$

$\frac{50}{6}$ v + 6 - $\frac{24}{10}$

$$V = \frac{\overset{5}{\cancel{50}}}{\cancel{6}} \times \frac{24}{\overset{4}{\cancel{10}}} = 20 \ Volt$$

5). Find i using source transformation

10kΩ
3mA
5V   ↓i   2kΩ   30V   24kΩ   40kΩ   18V

Answer:

10k
5   ↓i 2k   30/40k   40k   72   24k   18

90
5/10k   10k   ↓i 2k   30/40k   40k   24k

↓i
2k   5/10k   10k   30/40k   40k   90/24k   24k

↓i
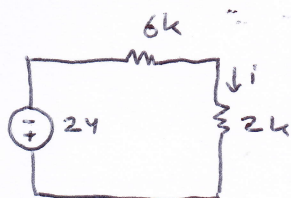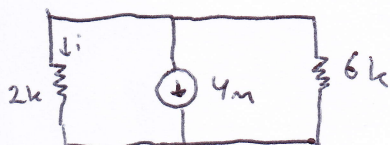2k   5/10k   30/40k   90/24k   10k   40k   24k R_p

i_s
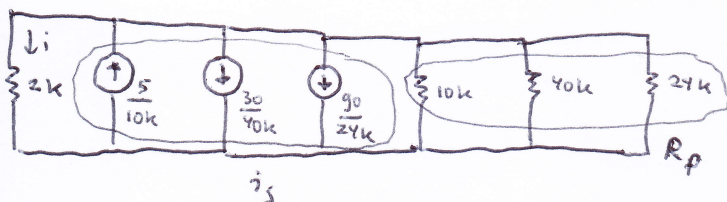
$$i_s = \frac{5}{10k} - \frac{30}{40k} - \frac{90}{24k} = \frac{60}{120k} - \frac{90}{120k} - \frac{450}{120k} = \frac{-480}{120k}$$

$$= \ \ -4m$$

$$\frac{1}{R_p} = \frac{1}{10k} + \frac{1}{40k} + \frac{1}{24k} = \frac{12+3+5}{120k} = \frac{20}{120k}$$

$$R_p = 6k$$

↓i
2k   4m   6k

6k
24   ↓i 2k

$$i = \frac{24}{8k} = 3mA$$