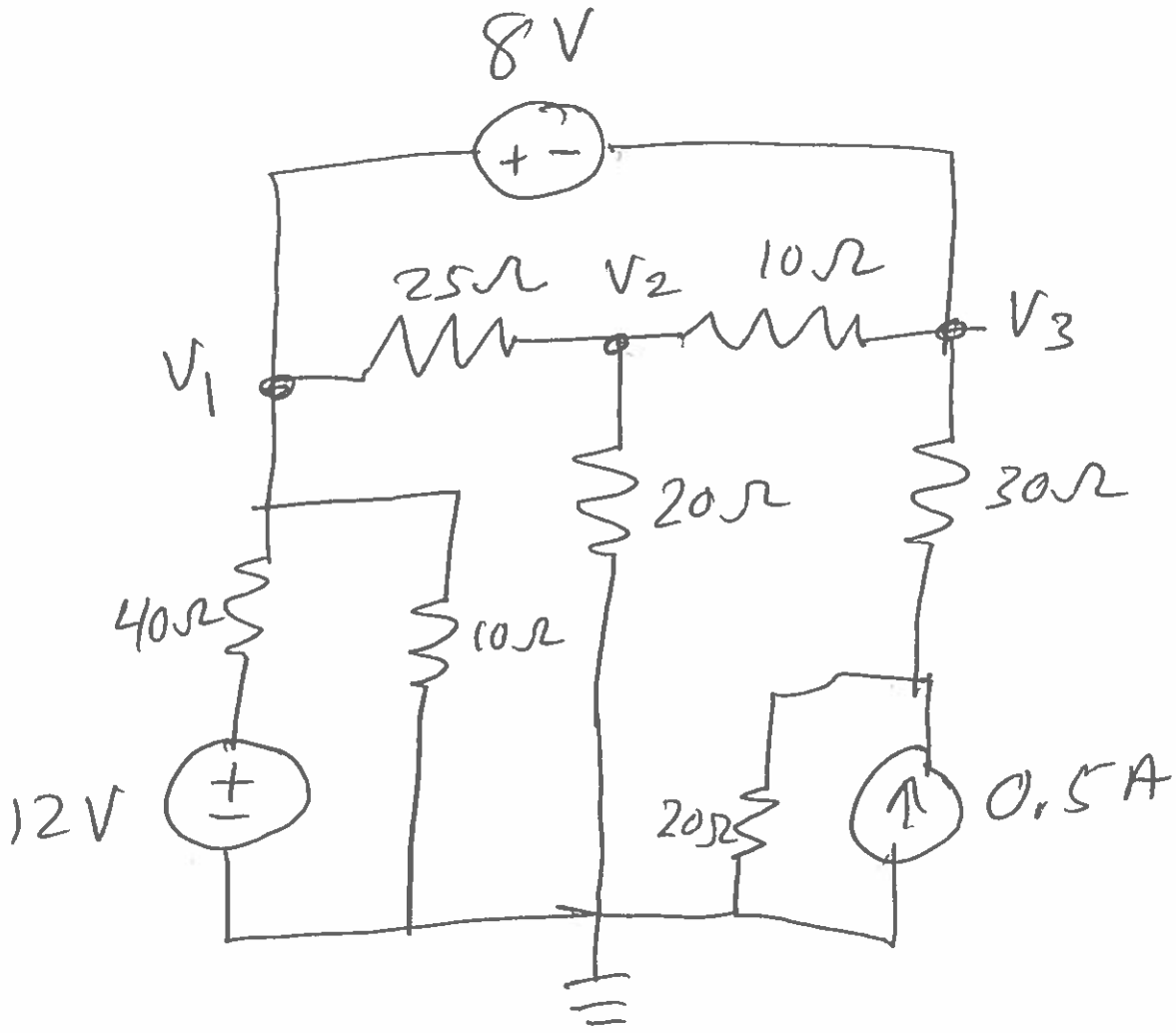
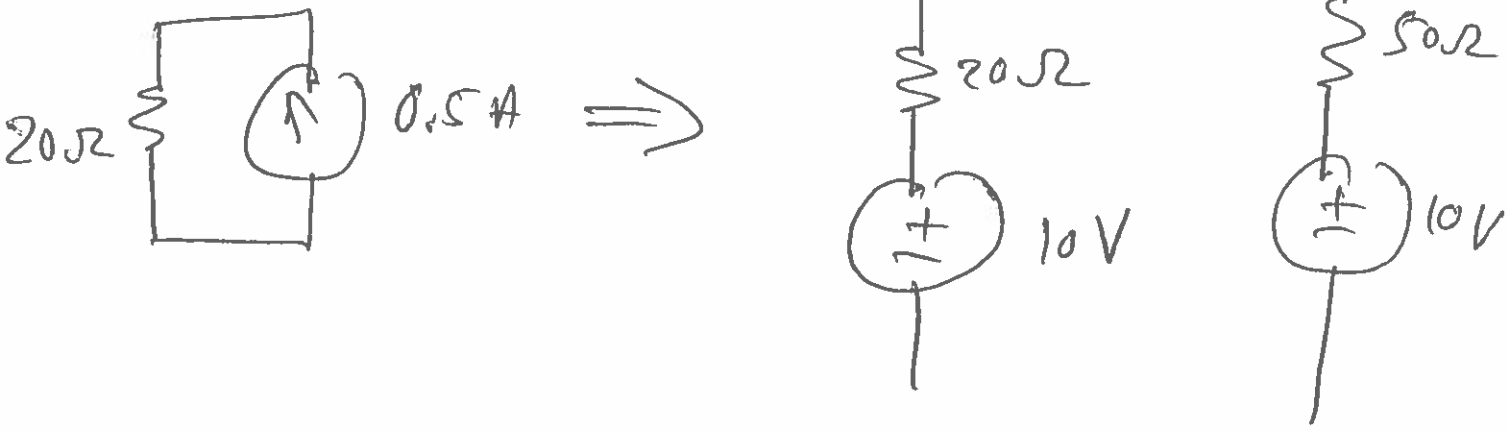
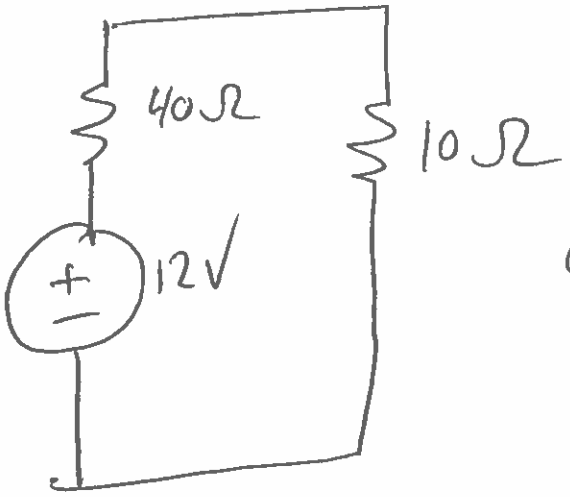
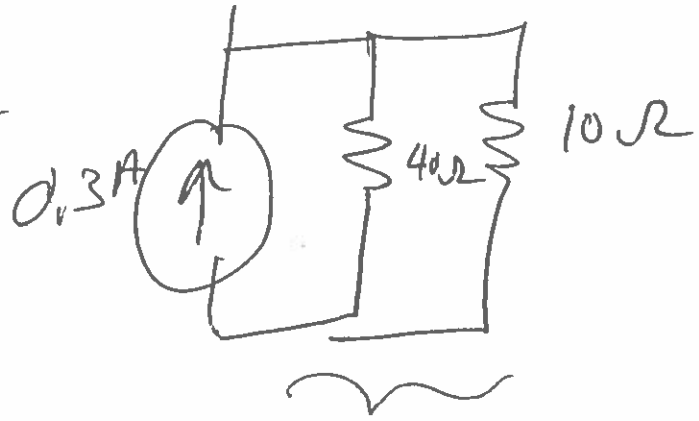


What is power supplied by 3 Power Sources

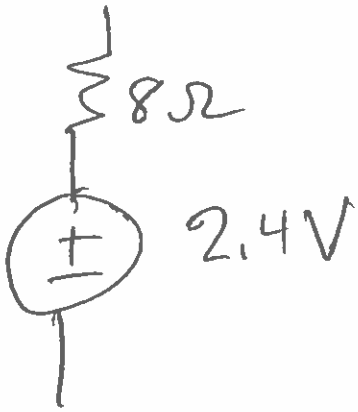


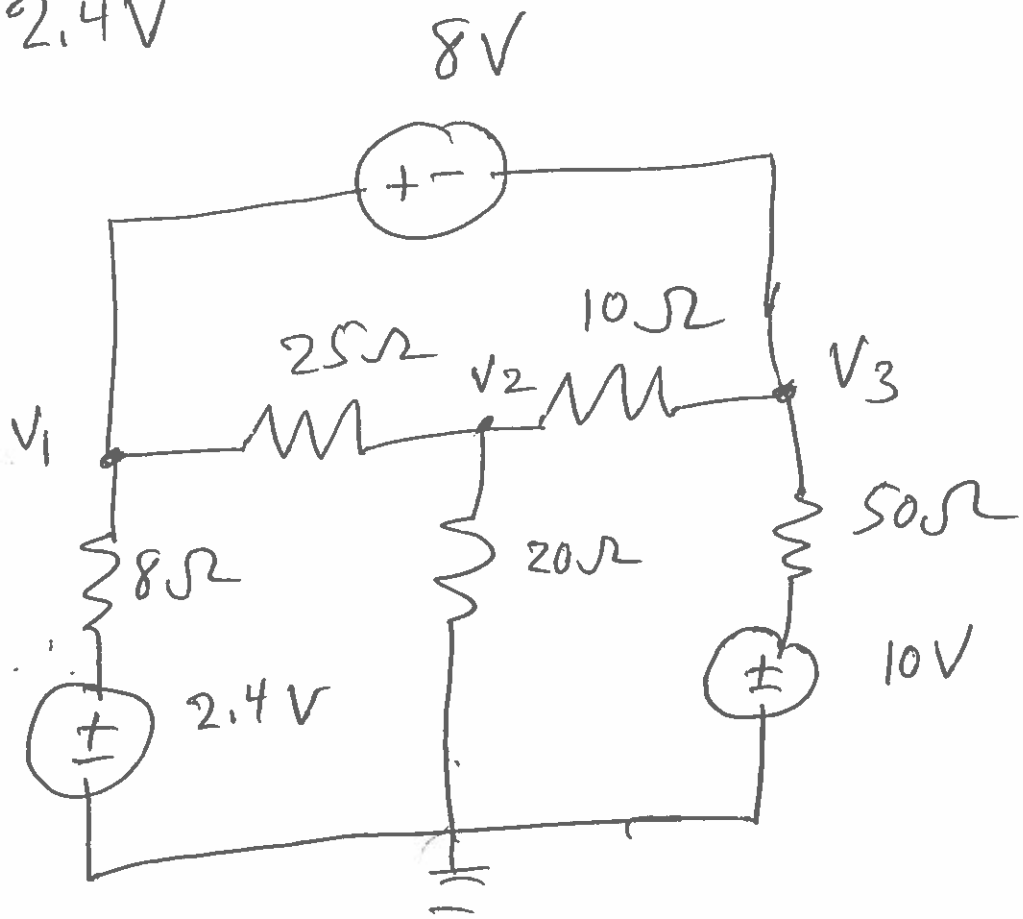




$$\frac{1}{40\Omega} + \frac{1}{10\Omega} = \frac{1+4}{40\Omega}$$

$$\Rightarrow 8\Omega$$





Node analysis

Super node

$$V_1 = V_3 + 8\,V$$

$$0 = V_1\left(\frac{1}{8\,V} + \frac{1}{25\,\Omega}\right) + V_3\left(\frac{1}{10\,\Omega} + \frac{1}{50\,\Omega}\right)$$

$$- V_2\left(\frac{1}{25\,\Omega} + \frac{1}{10\,\Omega}\right) - \frac{2.4\,V}{8\,\Omega} - \frac{10\,V}{50\,\Omega}$$

V_2 node

$$0 = V_2\left(\frac{1}{25\,\Omega} + \frac{1}{20\,\Omega} + \frac{1}{10\,\Omega}\right) \quad 0.2\text{A} - 0.3\,\text{A} - 0 - 1.5\,\text{A}$$

$$- V_1\left(\frac{1}{25\,\Omega}\right) - V_3\left(\frac{1}{10\,\Omega}\right)$$

Goto MATLAB

$$V_1 = 4.79\,V$$

$$V_2 = -0.68\,V$$

$$V_3 = -3.21\,V$$

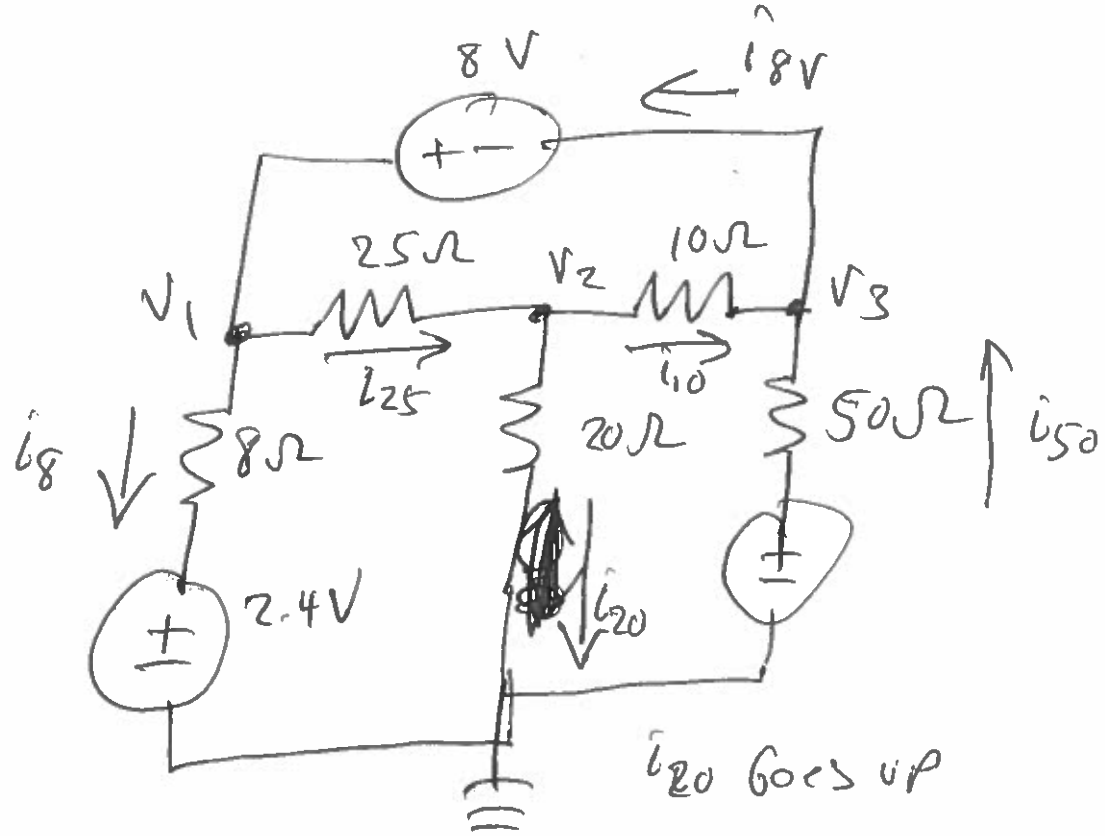
```
%Program to solve PH 320 Class Example 2021 02 26 DW
Donovan

clear all;

R =  [1 0 -1;
    (1/8 + 1/25) -(1/25 + 1/10) (1/10 + 1/50);
    -(1/25) (1/25 + 1/20 + 1/10) -(1/10)];

ii = [8 0.5 0]';

V = R\ii;

V1 = V(1)
V2 = V(2)
V3 = V(3)

%{
V1 =

    4.7873


V2 =

   -0.6831


V3 =

   -3.2127

%}
```

$$i_{50} = \frac{10V - (-3,21V)}{50\Omega} = +0,264A \uparrow$$

$$i_8 = \frac{4,79V - 2,40V}{8\Omega} = +0,299A \downarrow$$

$$i_{10} = \frac{-0,68V - (-3,21V)}{10\Omega} = +0,253A \rightarrow$$

$$i_{25} = \frac{4,79V - (-0,68V)}{25\Omega} = +0,219A \rightarrow$$



2A

$$i_{20} = i_{25} - i_{10} = 0,219A - 0,253A = -0,034A$$

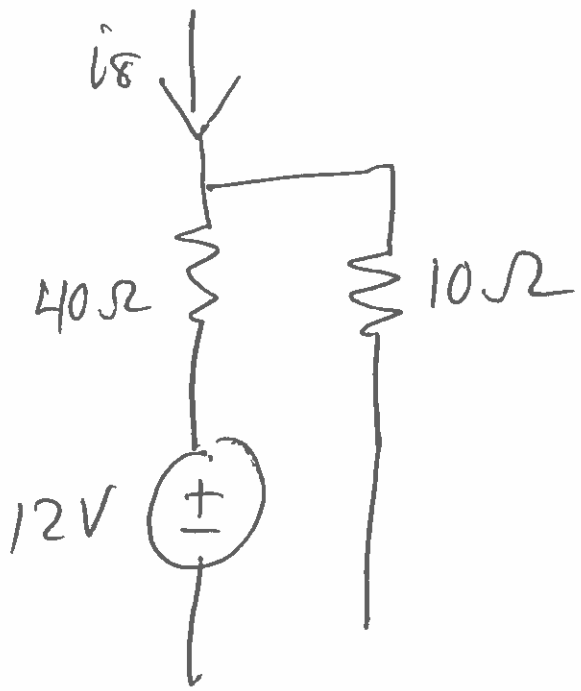
$$i_{8V} = i_{10} + i_{50} = 0.264\,A + 0.253\,A$$

$$= 0.517\,A$$

or $$i_{8V} = i_8 + i_{25} = 0.299\,A + 0.219\,A$$

$$= 0.518\,A \sim$$

$$P_{8V} = 8V(0.5175A) = \boxed{4.14\,W}$$

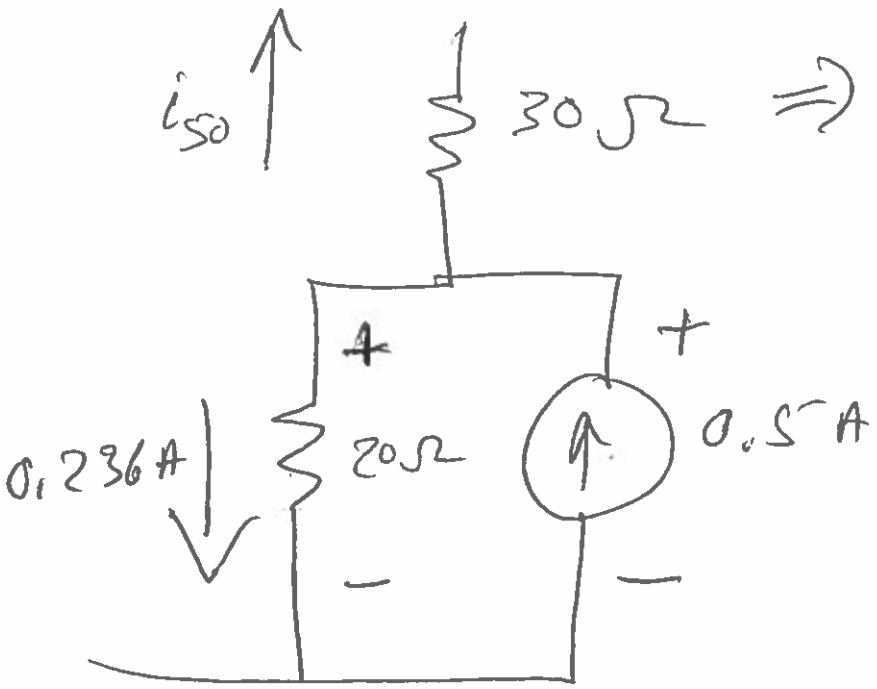


$$i_{12V} = \left(\frac{\frac{1}{40}}{\frac{1}{40}+\frac{1}{10}}\right) i_8$$

$$= \frac{\frac{1}{40}}{\frac{5}{40}}\, i_8 = \frac{1}{5}\, i_8$$

$$i_{12} = \frac{1}{5}(0.299A) = 0.0600\,A$$

$$P_{12V} = -12V(0.06A) = \boxed{-0.72\,A}$$



$i_{\delta} = 0.299A \rightarrow$

$i_{20} = 0.034A \uparrow$

$i_{\text{otro}} = 0.236A \downarrow$

$0.299A - 0.034A + 0.236A = 0.501A$

$V = (0.236A)(20\Omega) = 4.72V$

$P_{0.5A} = (0.5A)(4.72V) = \boxed{2.36W}$