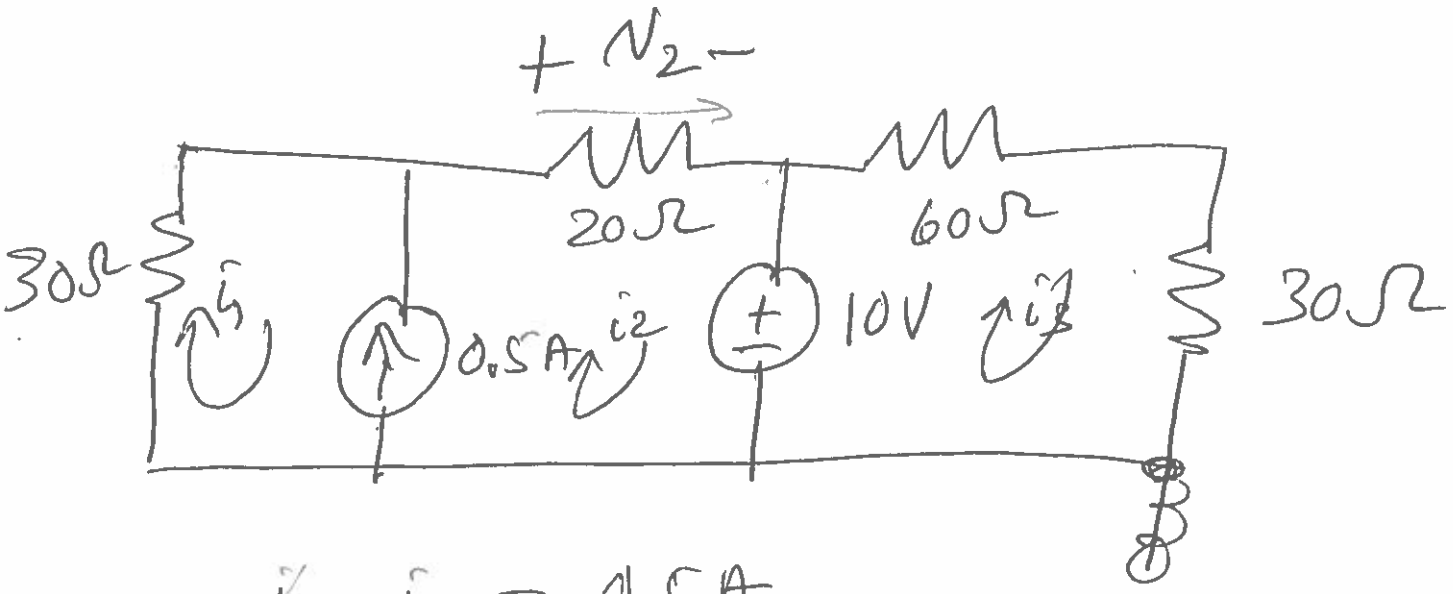


$$i_2 - i_1 = 0.5\,A$$

$$-10V = i_1(30\Omega) + i_2(20\Omega)$$

(using $i_2 = .5A + i_1$)

$$-10V = i_1(30\Omega) + (.5A + i_1)(20\Omega)$$

$$-10V = i_1(50\Omega) + 10V$$

$$i_1 = \frac{-20V}{50\Omega} = -0.4\,A$$

~~$V_2 = (-0.4A)(20\Omega) = -8V$~~

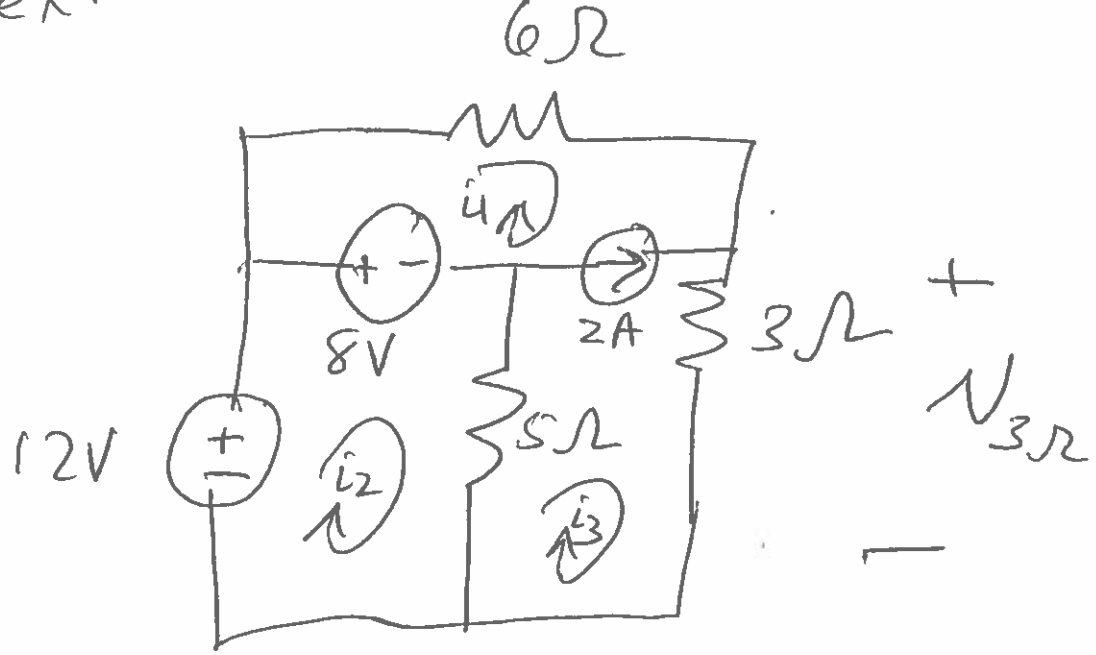
$$i_2 = .5A + i_1 = .5A + (-.4\,A)$$

$$\Rightarrow i_2 = .1\,A$$

$$V_2 = i_2(20\Omega) = +20V$$

---

example



Mesh

$$i_3 - i_1 = 2A$$

$$+8V = i_1(6\Omega) + i_3(3\Omega + 5\Omega) - i_2(5\Omega)$$

$$-8V + 12V = i_2(5\Omega) - i_3(5\Omega)$$

$$i_3 = 2A + i_1$$

$$8V = i_1(6\Omega) - i_2(5\Omega) + i_3(8\Omega)$$

$$4V = i_2(5\Omega) - i_3(5\Omega)$$

$$12V = i_1(6\Omega) + i_3(3\Omega)$$

$$12V = i_1(6\Omega) + (2A + i_1)(3\Omega)$$

$$12V = i_1(6\Omega) + 6V + i_1(3\Omega)$$

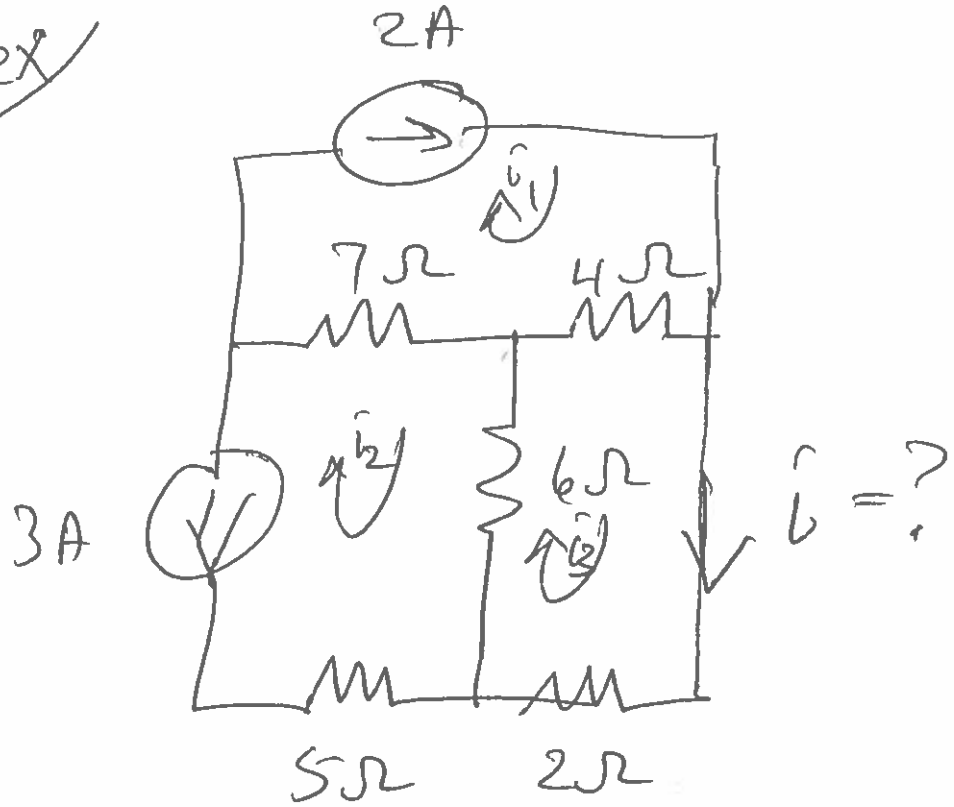
$$6V = i_1\, 9\Omega \Rightarrow i_1 = \frac{2}{3}A$$

$$V_{3\Omega} = i_3(3\Omega)$$

$$i_3 = 2A + i_1 = 2A + \frac{2}{3}A = \frac{8}{3}A$$

$$V_{3\Omega} = \left(\frac{8}{3}A\right)(3\Omega) = \boxed{+8\,V}$$

ex



$i_1 = +2A \quad i_2 = -3A$

i_3 mesh

$$0 = i_3(6\Omega + 4\Omega + 2\Omega) - i_1(4\Omega) - i_2(6\Omega)$$

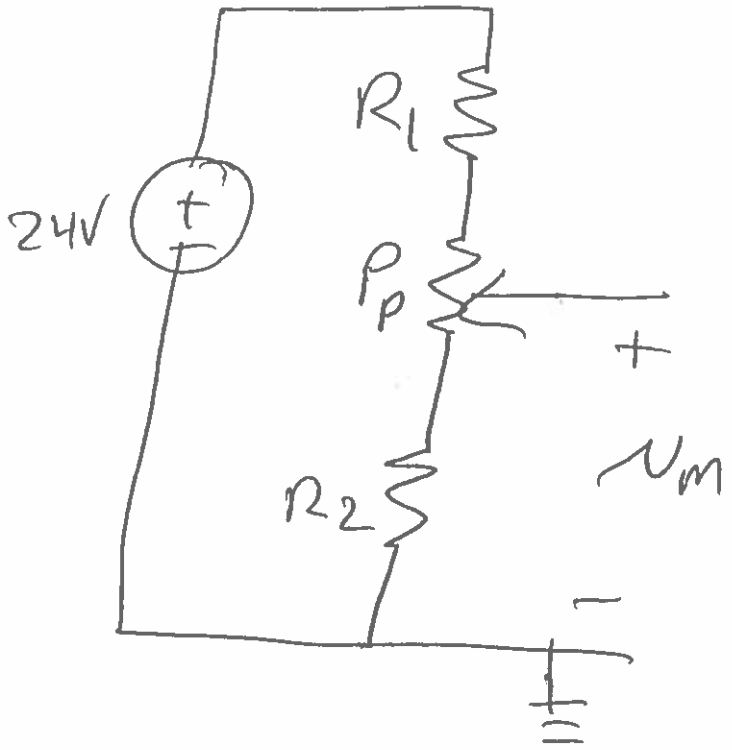
$$0 = i_3(12\Omega) - (2A)(4\Omega) - (-3A)(6\Omega)$$

$$-8V \quad +18V$$

$$i_3(12\Omega) = -10V$$

$$\Rightarrow i_3 = -\frac{5}{6}A$$

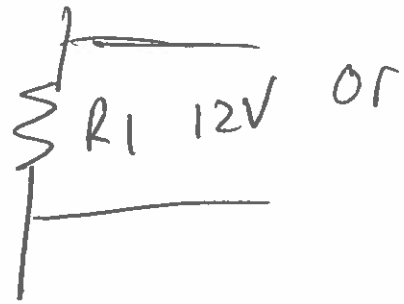
PP -3-1



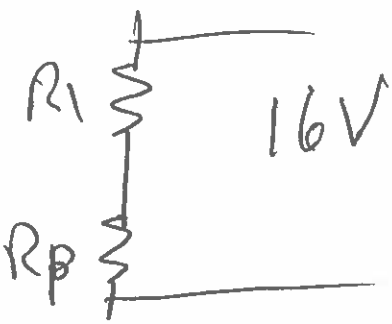
$8\,V \leq V_m \leq 12\,V$

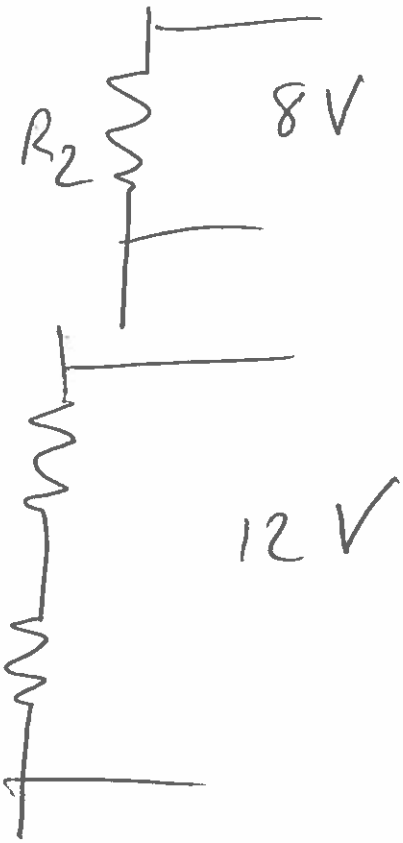
$P_{24V} < 0{,}5\,W$

$P_R < 0{,}25\,W$



or





$$V_{R_p+R_2} = (24V)\left(\frac{256+128}{256+128+384}\right)$$

$$= 24V\left(\frac{1}{2}\right) = 12V \checkmark$$

$$V_{R_2} = 24V\left(\frac{256}{256+128+384}\right) =$$

$$= 24V\left(\frac{1}{3}\right) = 8V \checkmark$$

$$I = \frac{24V}{2(384)} = 0.03125A$$

$$P_{24V} = 24V(.03125A) = .75W \times$$

$R_1 = 384 \quad R_2 = 256 \quad R_p = 128$

multiply each by 3

$$V_{R_2} = 24V\left(\underbrace{\frac{3(256)}{3(384+256+128)}}_{1/3}\right) = 12V$$

Need $R_1 = R_p + R_2$

End $R_1 + R_p = 2R_2$

V. $R_2 = \frac{1}{3} V_S$

$V_{R_2} = 8V \Rightarrow P_{R2} - .25W = \frac{(8V)^2}{R_2}$

$R_2 = \frac{64V^2}{.25W} = 4(64) = 256\ \Omega$

$R_1 + R_p = 2R_2 = 512 \quad R_1 = (512 - R_p)$

~~$R_p + R_2 + R_p = 2$~~

$R_1 = R_p + 256$

$512 - R_p = R_p + 256$

$2R_p = 256 \Rightarrow R_p = 128$

$R_1 = 384$

$P_{24} = i(24V)$ $\quad i = \dfrac{24V}{3(384+256+128)}$

$i = \frac{1}{3}(.03125A)$

$i = 0.0104A$

$P = (.0104A)(24V) = 0.25W$ ✓

$P_{R_1} = (.0104A)^2(3(384)) = 0.124W$ ✓

$P_{R_P} = (.0104A)^2(128)(3) = 0.042W$ ✓

$P_{R_2} = (.0104A)^2(256)(3) = 0.083W$ ✓