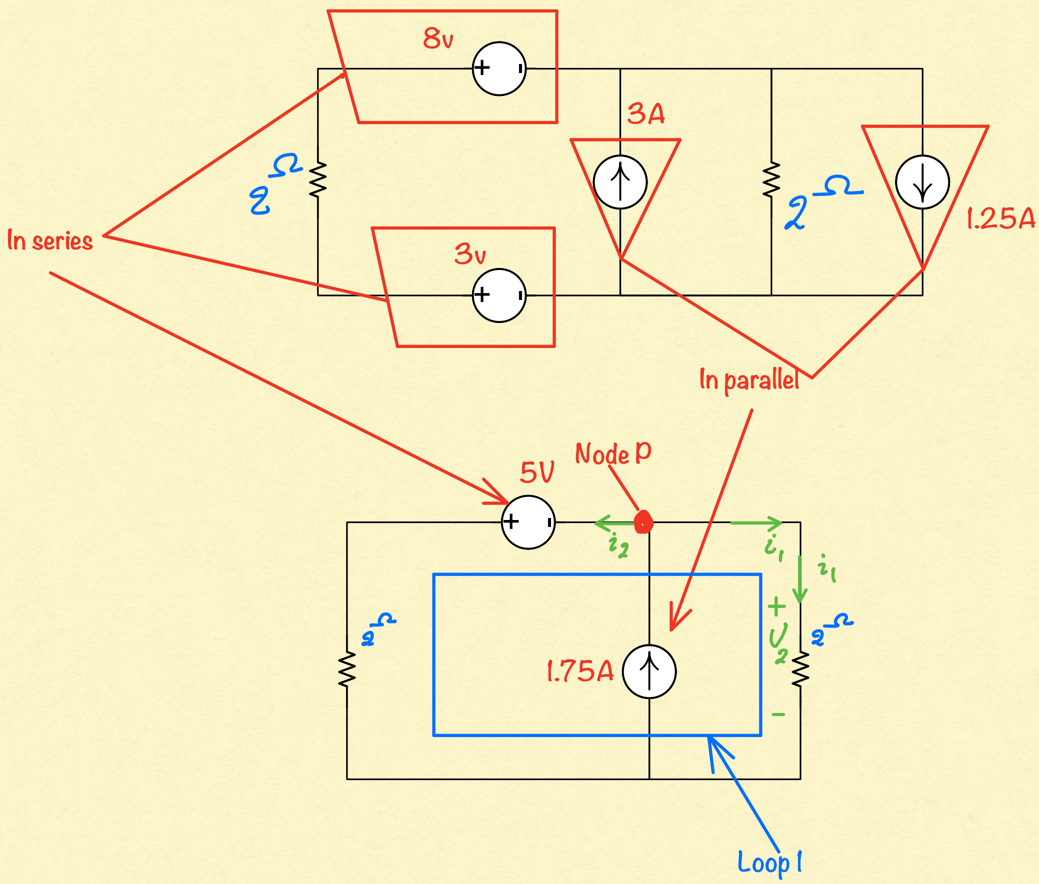

8v
3A
2Ω
2Ω
1.25A
In series
3v
In parallel
Node p
5V
i_2
i_1
i_1
2Ω
+
V_2
2Ω
1.75A
−
Loop 1

KCL @ node P

$$i_1 + i_2 = 1.75\ A \qquad \text{— (1)}$$

KVL @ loop 1

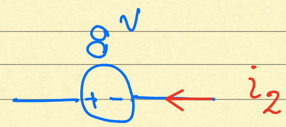
$$-2 i_2 + 5 + 2 i_1 = 0 \qquad \text{— (2)}$$

Solving Equation (1) & (2), we get

$$i_1 = -0.375\ A$$
$$i_2 = 2.125$$

- The currents in the two series voltage sources is the same current as the current in their equivalent source, which is i_2

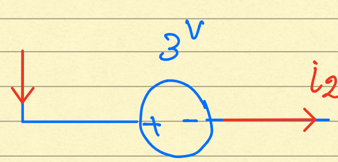
The current flows from −ve to +ve



That means that this source does generate or deliver power.

$$P_{8V}\ \text{(Power delivered)} = 8^V \times i_2 = 8^V \times 2.125^A = 17\ W$$

For the 3^V source, the current flows from the +ve, or high potential to the −ve, or low potential. This means that this source consumes power (or that it delivers negative Power)



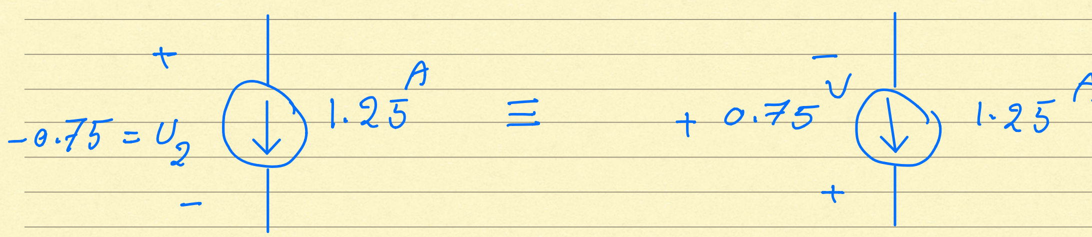
$$P_{3V}\ \text{(Power consumed or absorbed)} = 3^V \times i_2 = 6.375\ W$$

The voltage across the two parallel current sources is the same voltage across their equivalent source, i.e, the 1.75A.
This voltage is

$$U_2 = i_1 \times 2^{\Omega} = -0.375 \times 2^{\Omega}$$
$$= -0.75\ V$$

For the 3A current flows from the +ve to the -ve. So this source consumes or absorbs power

$$P_{3A}\ (\text{Power absorbed}) = 3^A \times 0.75 = 2.25\ W$$



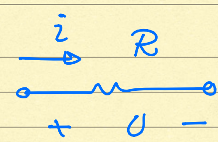
For the 1.75 A source, the current flows from the -ve to the +ve. This means that this source that generates or delivers power. Thus

$$P_{1.75A}\ (\text{Power delivered}) = 0.75 \times 1.25$$
$$= 0.9375\ W$$

Total power delivered $= 0.9375 + 17$
(By the Source) $= 17.9375$ W

Total power absorbed $= 6.375 + 2.25$
(By the sources) $= 8.625$

We note here that the total power **delivered** by the sources exceeds the total power **absorbed (consumed)**. This is and should be expected since only **independent** sources are the only circuit elements that are capable of delivering net power.
Now, the difference between these two (which is equal to 9.1325 W) should be the power which is absorbed by the resistors since those are the only element that absorb or consume the net power delivers by the source. We will now calculate the power absorbed by the two resistors independently and verify that this power is the difference between the net power delivered and absorbed by the sources.



Power (absorbed) in Resistor R
$= v \times i$

But since $v = iR$ (By Ohm's Law)

then Power in $R = i^2 R$

For our circuit we have two resistors, both $2\,\Omega$

Thus
Total Power (absorbed) $= i_1^2 \times 2\,\Omega + i_2^2 \times 2$

By the two resistors $= 2 * (0.375^2 + 2.125^2)$
$= 9.3125$ Watt

We can now see clearly that the above absorbed power is indeed equal to the net (I.e., total delivered - total absorbed) power delivered by all the sources, which confirms the principle of the preservation of power within a closed system.