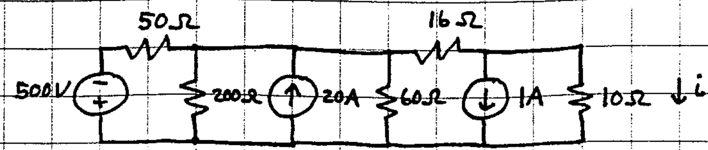
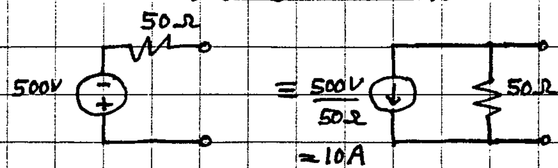
ex:

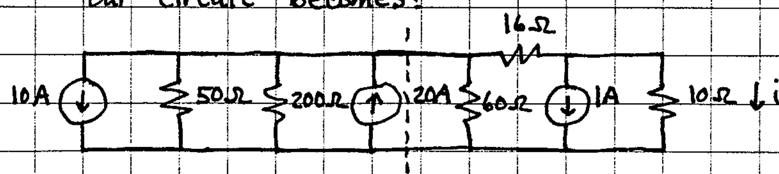


a) Use superposition to find i thru 10Ω R.

sol'n: We can save some work by first transforming 500V and 50Ω to Norton equiv.

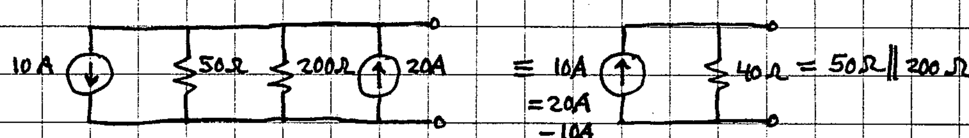


Our circuit becomes:



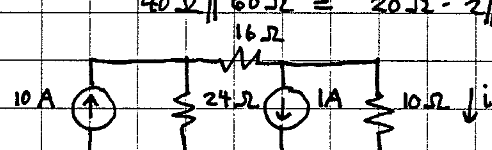
To the left of the dotted line we can combine the parallel R's and sum the currents for the current sources.

Note: $50\Omega \| 200\Omega = 50\Omega \cdot 1 \| 4 = 50\Omega \cdot \frac{4}{5} = 40\Omega$



Substitute ↗ and combine 40Ω and 60Ω in parallel:

$40\Omega \| 60\Omega = 20\Omega \cdot 2 \| 3 = 20\Omega \cdot \frac{6}{5} = 24\Omega$

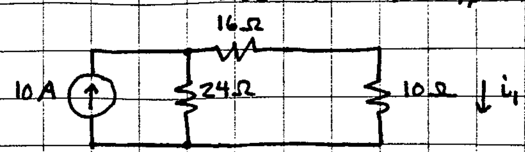


Now use superposition: Turn on one independent current (or voltage) source at a time. Set other independent current or voltage sources to zero.

Note: $i = 0 \Rightarrow$ open circuit, $v = 0 \Rightarrow$ short circuit (wire)

Our two circuits are, (one for each source):

Circuit 1: 10A source on, 1A source set to 0A.
Use '1' subscripts.

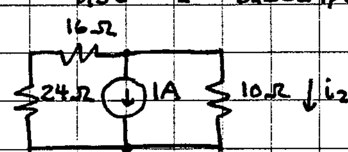


i-divider ⇒

$$i_1 = 10A \cdot \frac{24\Omega}{24\Omega + 16\Omega + 10\Omega}$$

$$i_1 = 10A \cdot \frac{24\Omega}{50\Omega} = \frac{24}{5} A$$

Circuit 2: 10A source set to 0A, 1A source on.
Use '2' subscripts.



i-divider ⇒

$$i_2 = -1A \cdot \frac{24 + 16\ \Omega}{24\Omega + 16\Omega + 10\Omega}$$

$$i_2 = -\frac{40}{50} A = -\frac{4}{5} A$$

Now sum currents (and voltages in general case):

$$i = i_1 + i_2 = \frac{24}{5} + \frac{-4}{5} = \frac{20}{5} = 4.0\ A$$

b) Find power dissipated in 10Ω R.

sol'n: power $p = i \cdot v = i \cdot i R = i^2 R$

$$p = (4A)^2 \cdot 10\Omega = 160 W$$