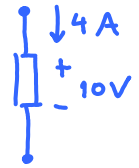
[Alexander and Sadiku, 2009, Q1.16]

Monday, June 10, 2013 7:50 PM

(a)



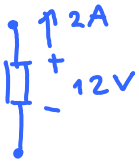
The arrow of the current points from the positive to the negative polarity of the voltage.

This conforms with the passive sign convention.

In which case, $P = IV$.

Power absorbed $= 4 \times 10 = 40$ W

(b)



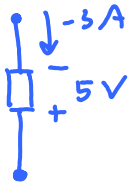
In this diagram, the arrow of the current points from the negative to the positive polarity of the voltage.

This does not conform with the passive sign convention.

In which case, $P = -IV$.

Power absorbed $= -2 \times 12 = -24$ W

(c)



In this diagram, the arrow of the current points from the negative to the positive polarity of the voltage.

This does not conform with the passive sign convention.

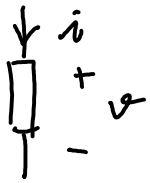
In which case, $P = -IV$.

Power absorbed $= -(-3) \times 5 = 15$ W

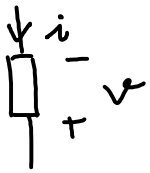
[Alexander and Sadiku, 2009, Q1.18]

Monday, June 10, 2013 7:51 PM

We calculate the power using the passive sign convention.

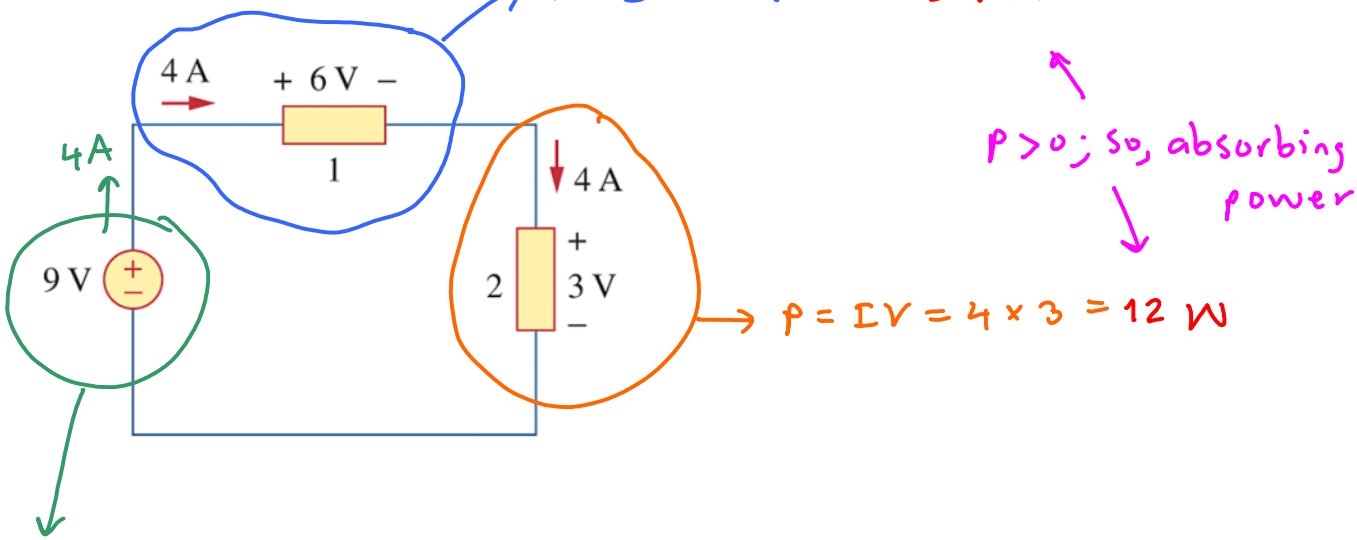


$\Rightarrow p = iv$



$\Rightarrow p = -iv$

(a)



$p = IV = 4 \times 6 = 24\ W$

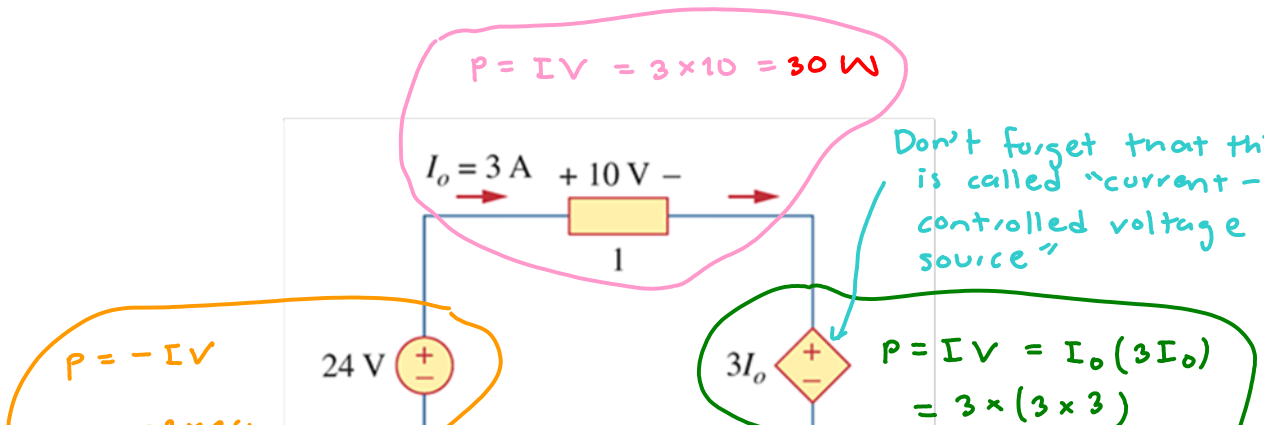
$p > 0$; so, absorbing power

$p = IV = 4 \times 3 = 12\ W$

$p = -IV = -4 \times 9 = -36\ W$ ← $p < 0$; so, supplying power.

Again, the negative sign is here because the current flows from the negative to the positive polarity of the 9 V.

(b)

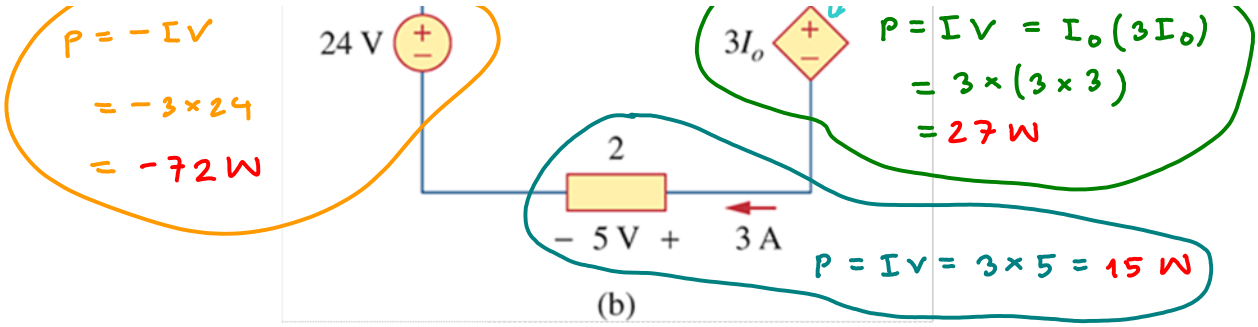


$p = IV = 3 \times 10 = 30\ W$

Don't forget that this is called "current-controlled voltage source"

$p = -IV$

$p = IV = I_o(3I_o) = 3 \times (3 \times 3)$



Note that when we add all the powers, we have $-72+30+27+15=0$.