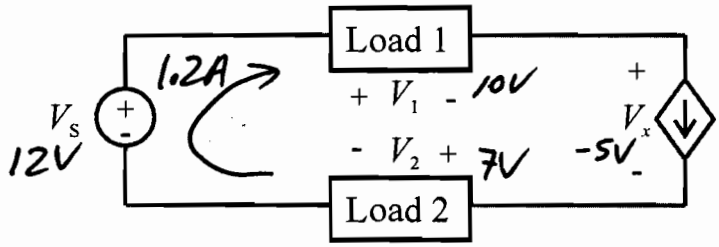
EE 220 Circuits I (Fall 2017) Quiz #1

Name Key A

Instructions: **Closed** notes & homework. Place answers in indicated spaces & show all work for credit.

Useful equations: $v = iR$, $p = vi = i^2R = v^2/R$, $i = dq/dt$, $v_{ab} = dw/dq$, $\sum_{\text{circuit}} p = 0$, $w = \int p\,dt$, $q = \int i\,dt$

1) For the circuit elements shown, calculate the power **absorbed** by each circuit element (remember passive sign convention) if $V_S = 12$ V, $V_1 = 10$ V, $V_x = -5$ V, and $V_2 = 7$ V,



$I_x = 0.1V_S$
$= 0.1(12) = 1.2A$

$p_{V_S} = -(12)(1.2) = -14.4\,W$

$p_1 = +(10)(1.2) = 12\,W$

$p_2 = +(7)(1.2) = 8.4\,W$

$p_x = +(-5)(1.2) = -6\,W$

Check $\sum p_{abs} = 0$? $\Rightarrow -14.4 + 12 + 8.4 - 6 = 0$ ∴

$p_{Vs} =$ -14.4 W $p_1 =$ 12W $p_x =$ -6 W $p_2 =$ 8.4W

2) Solve the given problems involving complex numbers in the specified formats.

used TI-68

$(-9 + j3) / (5 - j6) =$ -1.0328 - j0.6393

(express answer in rectangular format)

$(4\angle 45°) + (2\angle -60°) =$ 3.9823 ∠ 15.9805°

(express answer in polar/phasor format with angle in degrees)

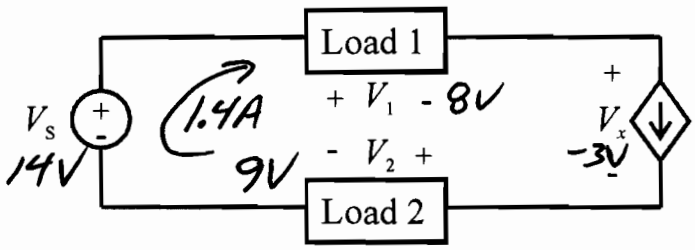
EE 220 Circuits I (Fall 2017) Quiz #1

Name Key B

Instructions: **Closed** notes & homework. Place answers in indicated spaces & show all work for credit.

Useful equations: $v = iR$, $p = vi = i^2R = v^2/R$, $i = dq/dt$, $v_{ab} = dw/dq$, $\sum_{\text{circuit}} p = 0$, $w = \int p\,dt$, $q = \int i\,dt$

1) For the circuit elements shown, calculate the power **absorbed** by each circuit element (remember passive sign convention) if $V_S = 14$ V, $V_1 = 8$ V, $V_x = -3$ V, and $V_2 = 9$ V,



$I_x = 0.1 V_S = 0.1(14) = 1.4\,A$

$p_{VS} = -(14)(1.4) = -19.6\,W$

$p_1 = +(8)(1.4) = 11.2\,W$

$p_x = +(-3)(1.4) = -4.2\,W$

$p_2 = +(9)(1.4) = 12.6\,W$

check $\sum p_{abs} = 0$? $\Rightarrow -19.6 + 11.2 - 4.2 + 12.6 = 0$ ✓

$p_{VS} =$ -19.6W $p_1 =$ 11.2W $p_x =$ -4.2W $p_2 =$ 12.6W

2) Solve the given problems involving complex numbers in the specified formats.

Used TI-68

$(8 - j4) / (-5 + j6) =$ $-1.0492 - j\,0.4590$

(express answer in rectangular format)

$(6\angle -25°) + (3\angle 30°) =$ $8.1024\angle -7.3441°$

(express answer in polar/phasor format with angle in degrees)