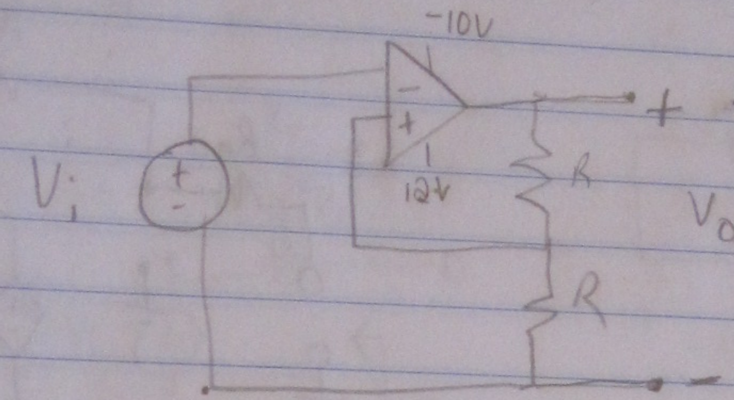
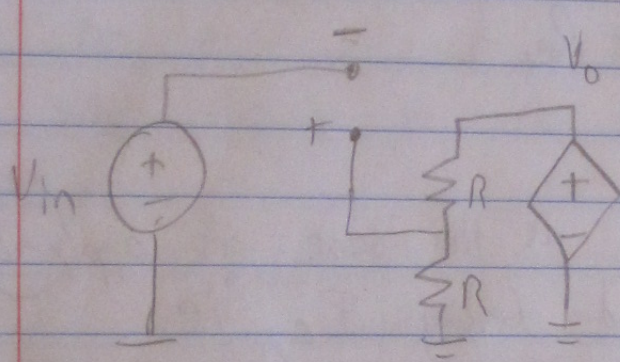
Positive Feedback:



$F_{-10,12}$

$V_{min} = -10\,V$

$V_{max} = 12V$

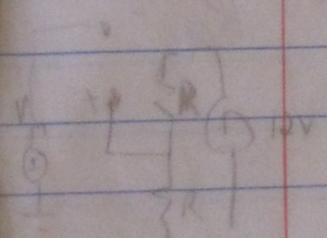


$[-10, \; A(V^+ - V_{in}), \; 12]$

$$V_o = [-10, \; A(V^+ - V_{in}), \; 12]$$

V^+ node: $\frac{V^+}{R} + \frac{V^+ - V_o}{R} = 0$

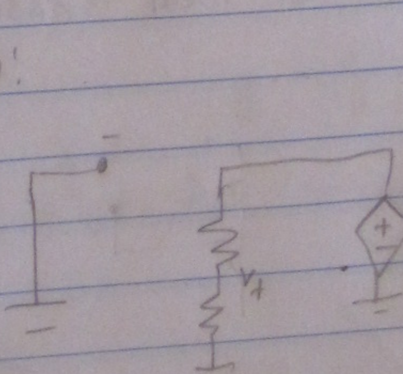
$$\frac{V^+}{R} + \frac{V^+ - [-10, A(V^+ - V_{in}), 12]}{R} = 0$$



$$V^+ = \frac{[-10, \; A(V^+ - V_{in}), \; 12]}{2}$$

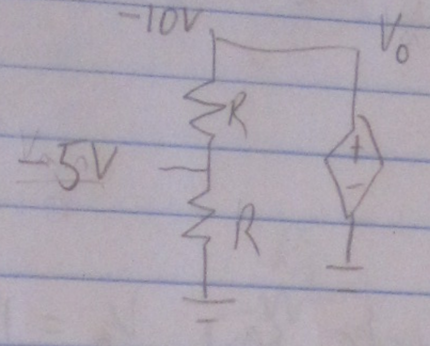
Step back and think!

Consider $V_{in} = 0$:



$[-10, \; AV^+, \; 12]$

If $V^+ = -5V$



Voltage divider says $V_0 = -10V$

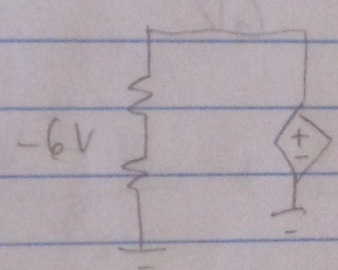
Op-amp says:

$V_0 = [-10V, -5 \cdot A, 12V] =$

gain, not amps!

Everything is consistent!

If $V^+ = -6V$



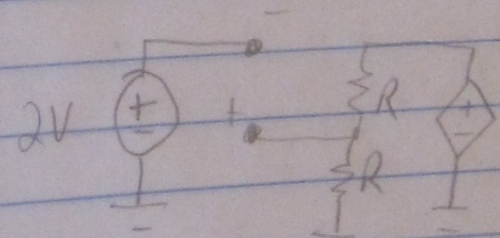
Voltage divider says $V_0 = -12V$

Op-amp says:

$V_0 = [-10V, -6 \cdot A, 12V] = -10V$

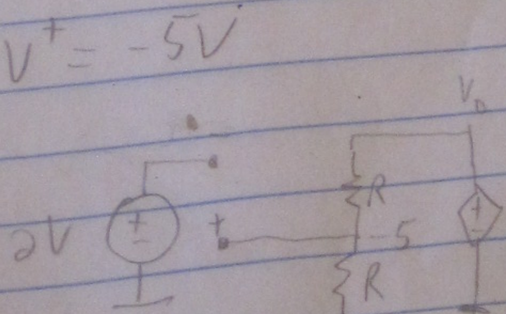
disagreement

Interestingly, if we have:



$[-10, A(V^+ - 2), 12V]$, then:

If $V^+ = -5V$



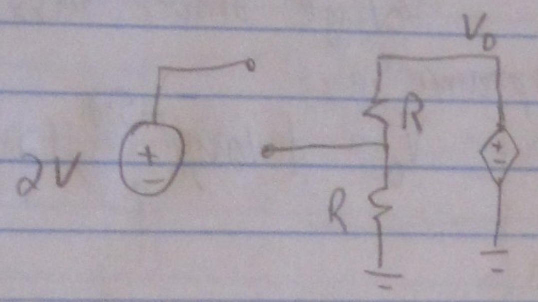
Current divider says $V_0 = -10V$

Op-amp says:

$[-10, A \cdot (-7), 12V] = -10V$

OK!

and if we assume $v^+ = 6V$



Current divider says $V_o = 12V$

op amp says:

$$[-10, A \cdot (3V), 12] = 12V$$

Consistent! V^+ can be $-5V$ or $6V$