ECE 321 - Homework #1

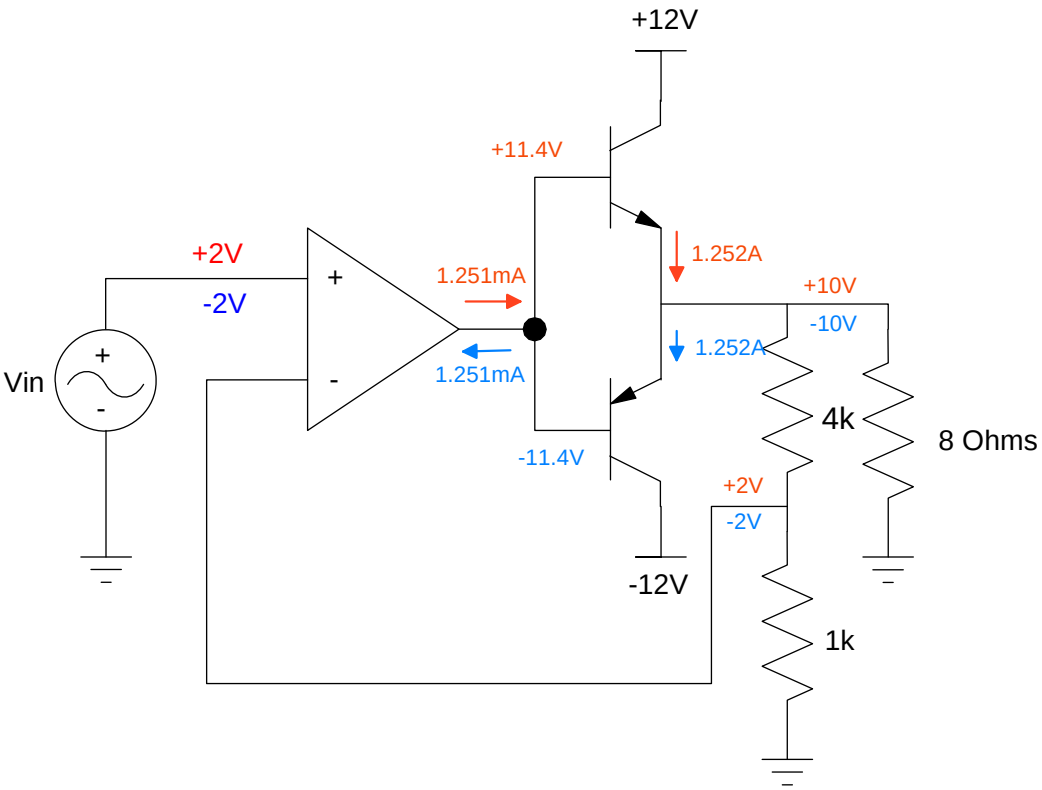
Push-Pull Amplifiers, Op-Amp Amplifiers. Due Monday, November 5th, 2018

For the following sections, assume TIP112 (NPN) and TIP117 (PNP) transistors:

- $\beta = 1000$
- $|V_{be}| = 1.4V$
- $\min(|V_{ce}|) = 0.9V$
- $\max(|I_c|) = 3A$

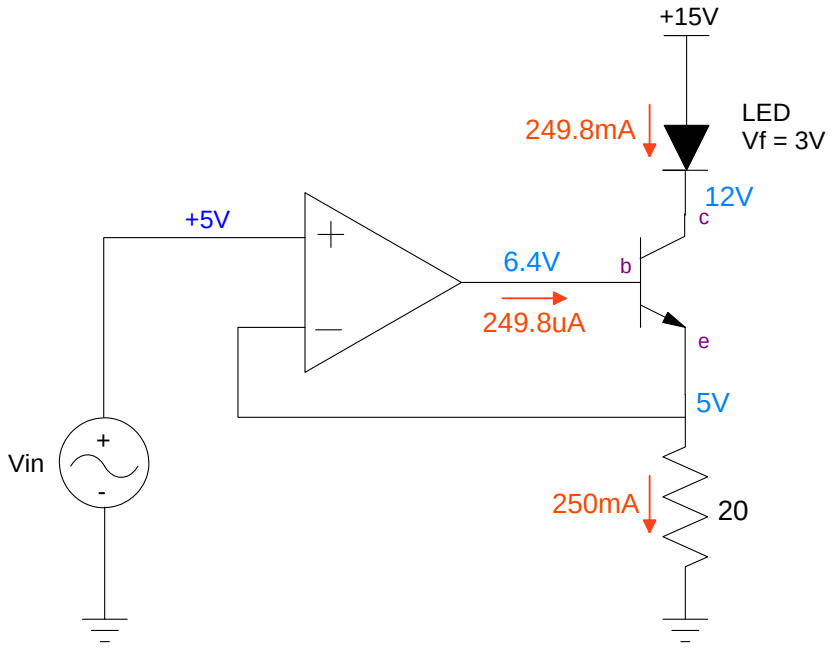
Push-Pull Amplifiers

2) Specify the voltages and currents for the following voltage amplifier for
   - Vin = +2V
   - Vin = -2V



3) Specify the voltages and currents for the following current amplifier for

- Vin = +5V



Note:

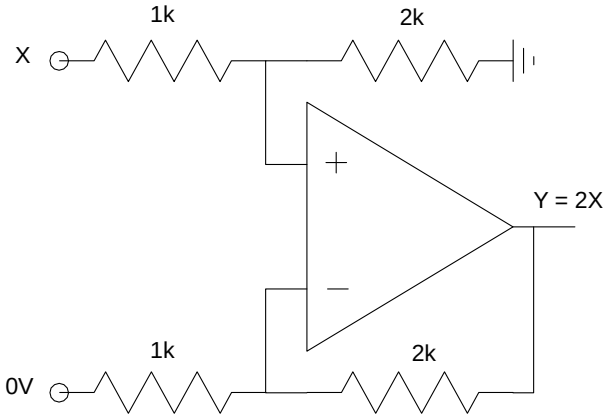
$$V_{ce} = 7V$$

The transistor is in the active region.

Op-Amp Amplifiers

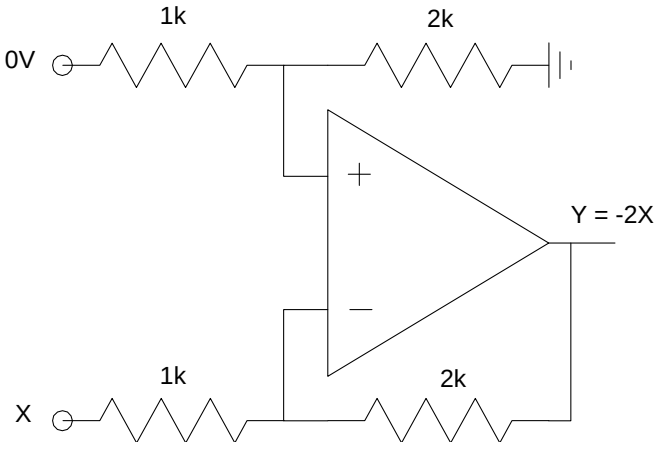
4) Design a circuit which implements the function

Y = 2X



5) Design a circuit which implements the function

Y = -2X



6) Design a circuit which implements the function

Y = 2X - 7

Rewrite as

$$Y = 2(X - 3.5)$$