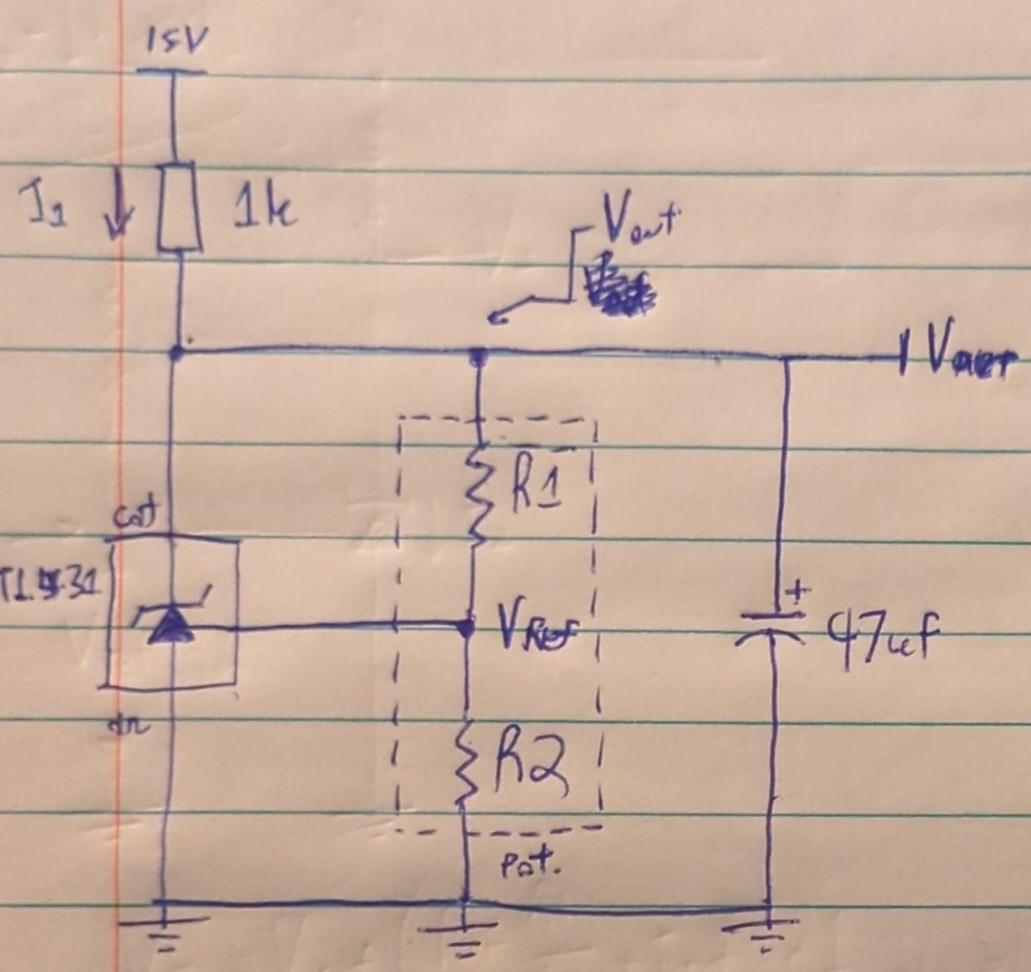
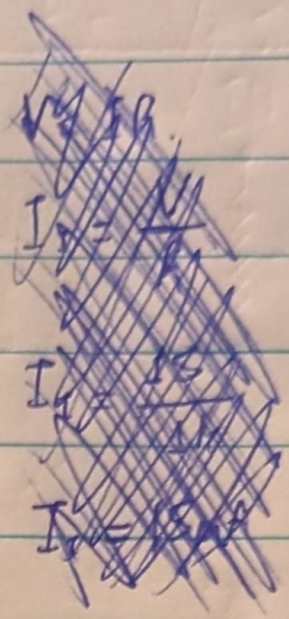
0

V_{REF} (TL431)





$$\frac{V_{out} - V_{REF}}{R1} = \frac{V_{REF} - 0}{R2}$$

$$R2(V_{out} - V_N) = R1(V_{REF})$$

$$R2(V_{out}) = V_{REF}(R1+R2)$$

$$V_{REF} = \left(\frac{R2}{R1+R2}\right)(V_{out})$$

$$V_{out} = \left(\frac{R1+R2}{R2}\right)(V_{ref})$$

$$\downarrow$$

$$V_{out} = \left(\frac{R1+R2}{R2}\right)(2.495V)$$

~~if $V_{REF} \leq 2.495V$~~

~~is cathode pulled to gnd (15V)~~

~~$V_{out\ MIN} = \left(\frac{R1+R2}{R2}\right)(2.495) = 2.495V$~~

R1: ↓ R2: ↑

~~$V_{out\ MAX} = \left(\frac{R1+R2}{R2}\right)(2.495V) =$~~

DOES NOT WORK.

* **NOTE**: V_{out} cannot supply more than cathode supply voltage.

* Due to saturation margin, we can assume max V_{out} is 14V.