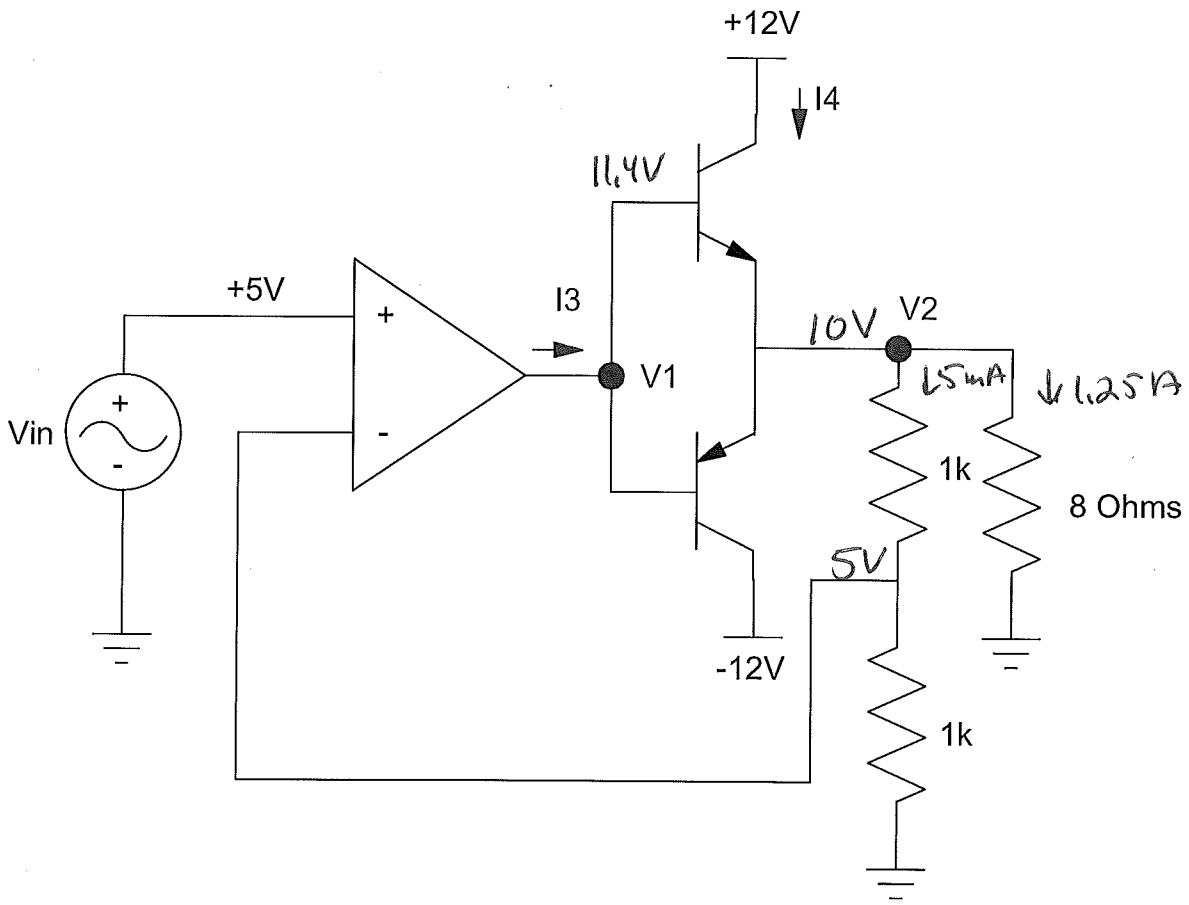
ECE 321 - Quiz #1 - Name _____

Push-Pull Amplifiers, Op-Amp Amplifiers, November 8, 2018

1) Determine the voltages and currents for the following push-pull amplifier. Assume TIP transistors:

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

V1	V2	I3	I4
11.4V	10V	1.254mA	1.254A
		≈ 1.255mA	≈ 1.255A



$I_b + I_c = 1.255A = (1+\beta) I_b$

2) Determine the voltages and currents for the following current amplifier. Assume TIP112 transistors:

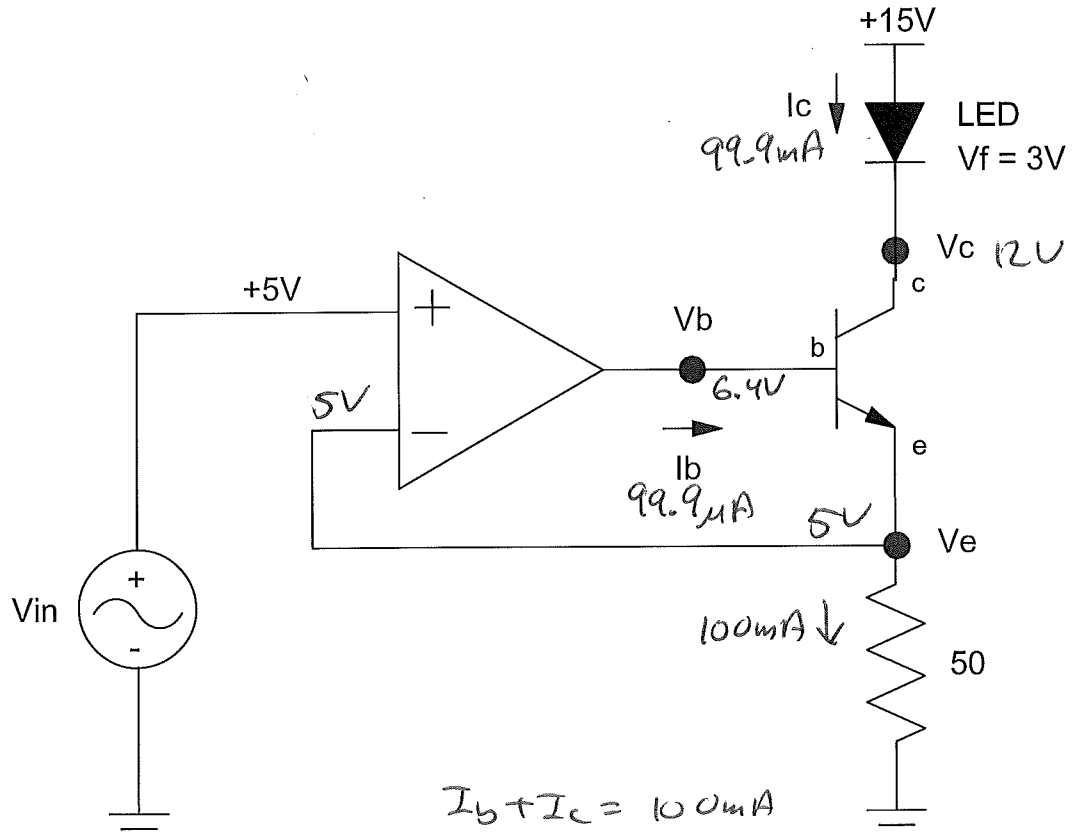
- $\beta = 1000$
- $V_{be} = 1.4V$
- $\min(V_{ce}) = 0.9V$

Also assume a 5W white LED

- $V_f = 3.0V@1.6A$

Vb	Vc	Ve	Ib	Ic
~~99.9μA~~	~~99.9mA~~	5V	~~6.4V~~	~~12V~~

≈ 100mA 6.4V ≈100mA 12V 5V 99.9μA 99.9mA

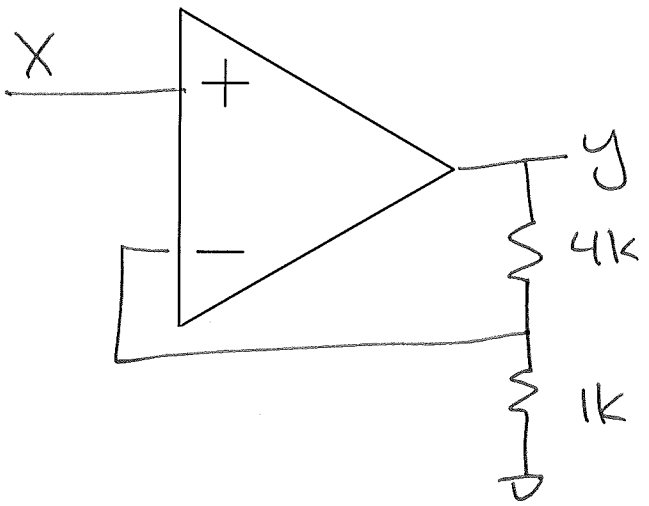


$I_b + I_c = 100mA$

$(1+\beta) I_b = 100mA$

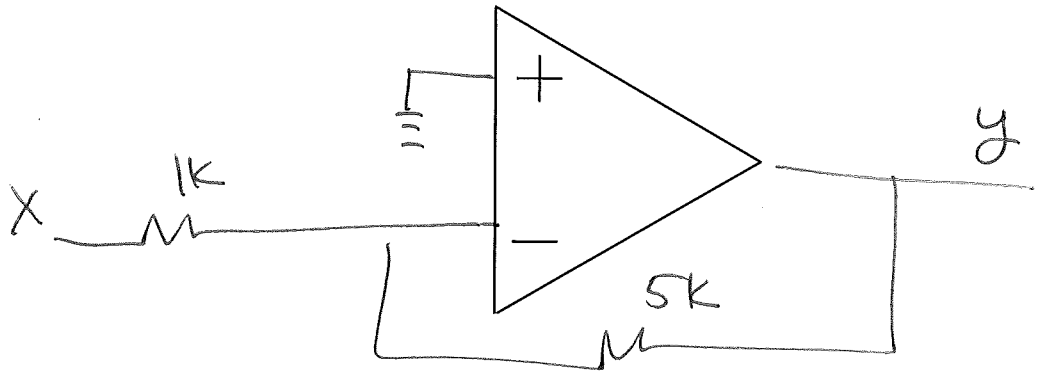
3a) Design an op-amp circuit with a gain of +5

Y= 5X



3b) Design an op-amp circuti with a gain of -5

Y = -5X

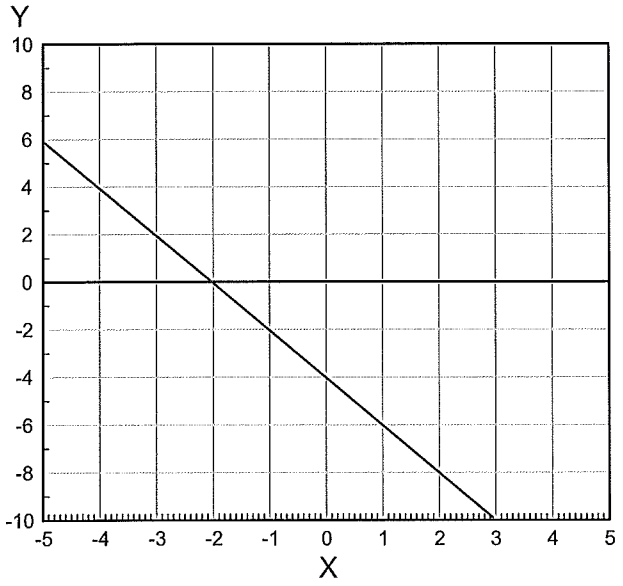


4a) Determine the relationship between X and Y from the following graph.

$gain = \frac{-16}{8} = -2$

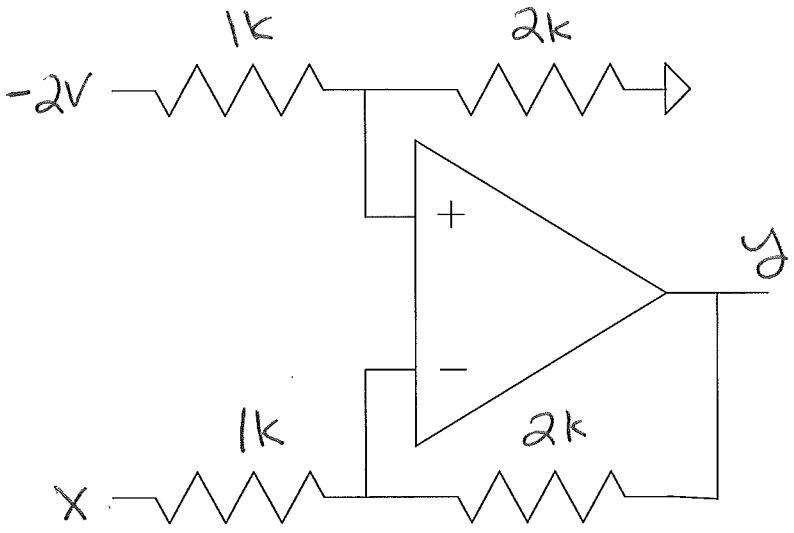
$y = 2(-2 - x)$

$y = -2x - 4$



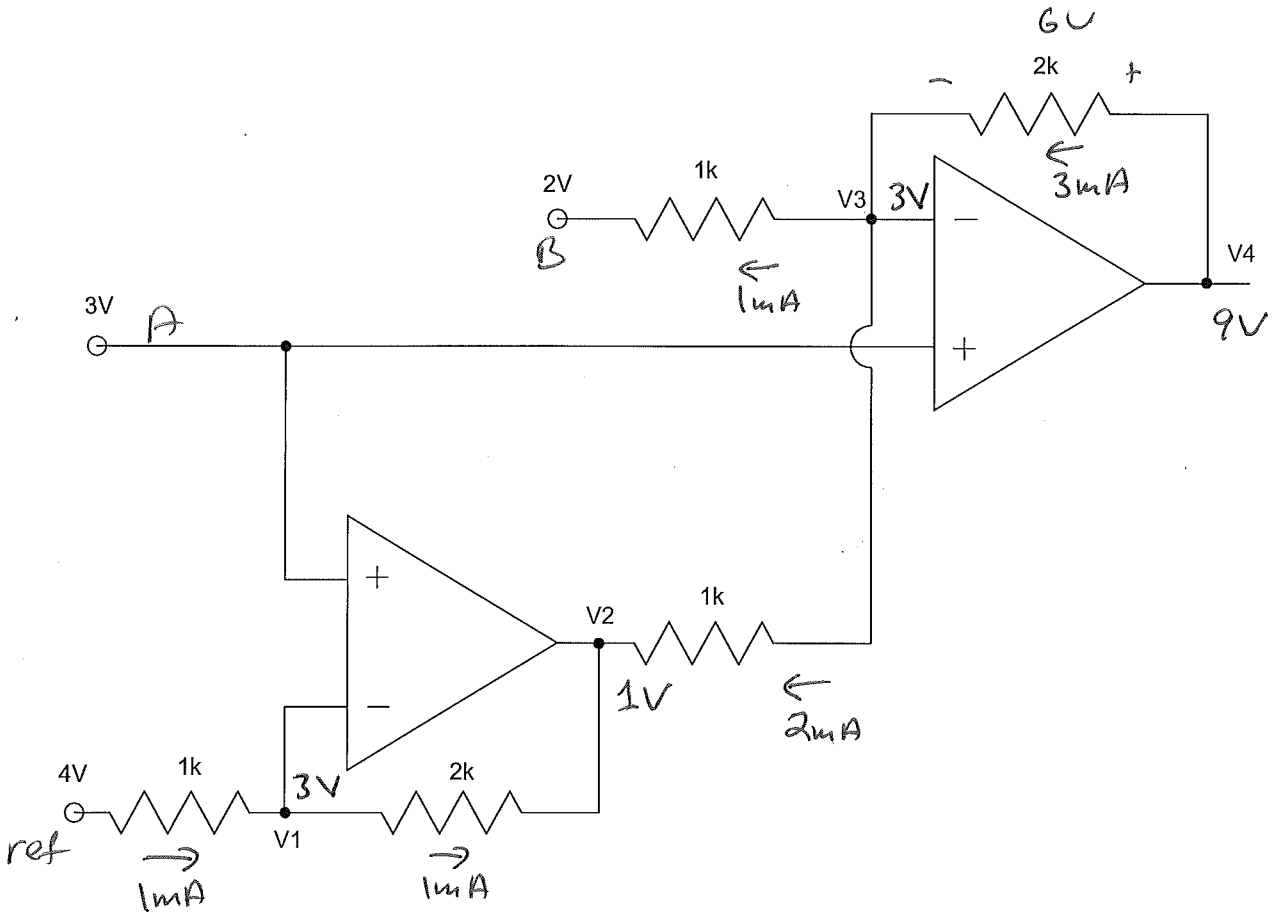
4b) Design an op-amp circuit to match the following relationship between X and Y:

$y = 2(-2 - x)$



5) Determine the voltges for the following op-amp circuit.

V1	V2	V3	V4
3V	1V	3V	9V



Industrial Help Bonus! There are 10 essential amino acirds we need in our diet. How many does hemp seed contain?

all 10!