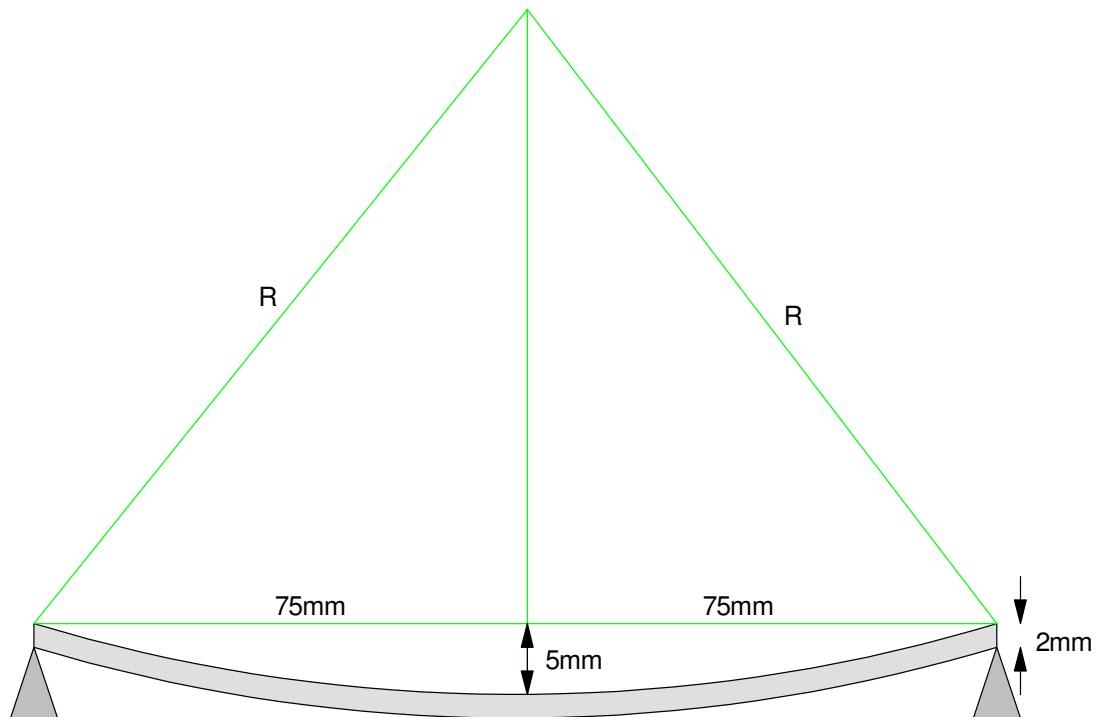


# ECE 321 - Quiz #2 - Name \_\_\_\_\_

Strain Gages, Audio Sensors, Calibration. Fall 2019

1) A beam that is 150mm long deflects 5mm when a force is applied in the middle. Determine the radius of curvature and the strain on the inside and outside edge. Assume the center line has zero strain.

Radius, R	Strain on inside edge	Strain at center line	Strain on outside edge
		0.0000	

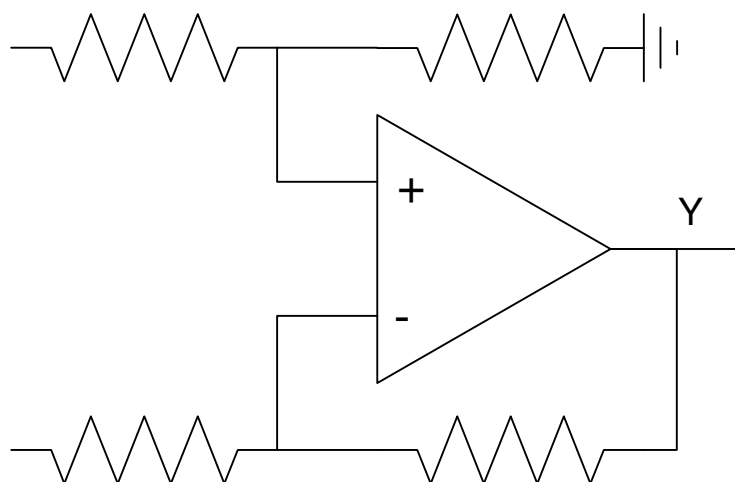
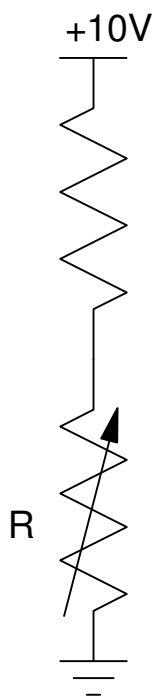


2) A strain sensor has a strain - resistance relationship of

$$R = 120(1 + 2.14\varepsilon) \Omega$$

Design a circuit which outputs

- 0V when the strain is 0.000
- +10V when the strain is +0.01

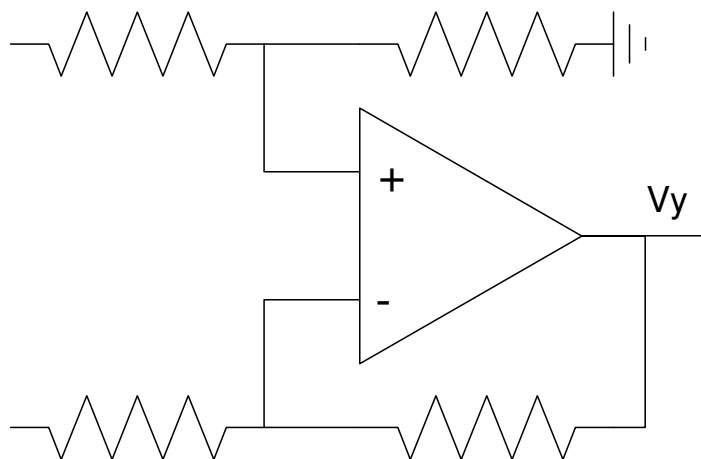
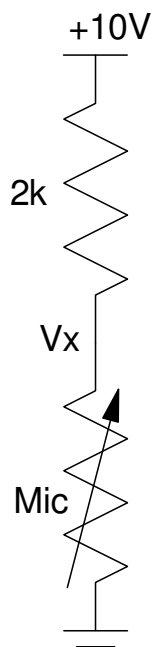


3) The voltage at a microphone is

$$V_x = 2.00 + 0.1 \sin(\omega t)$$

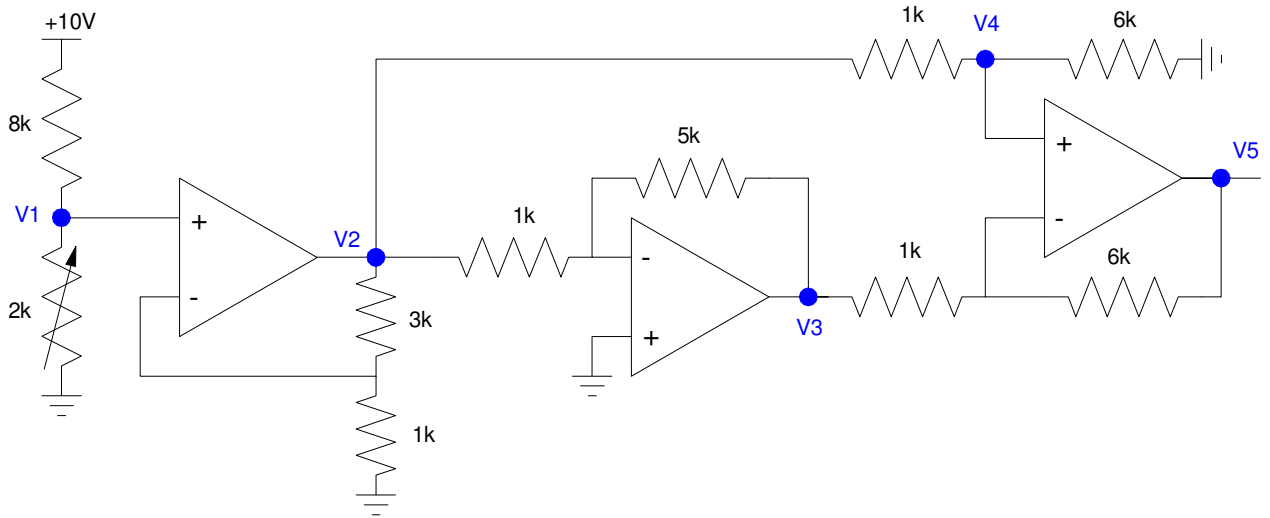
Design a circuit so that the output is

$$V_y = 0.00 + 10.0 \sin(\omega t)$$



4) Determine the voltages V1..V5 for the following op-amp circuit. Assume ideal op-amps.

V1	V2	V3	V4	V5

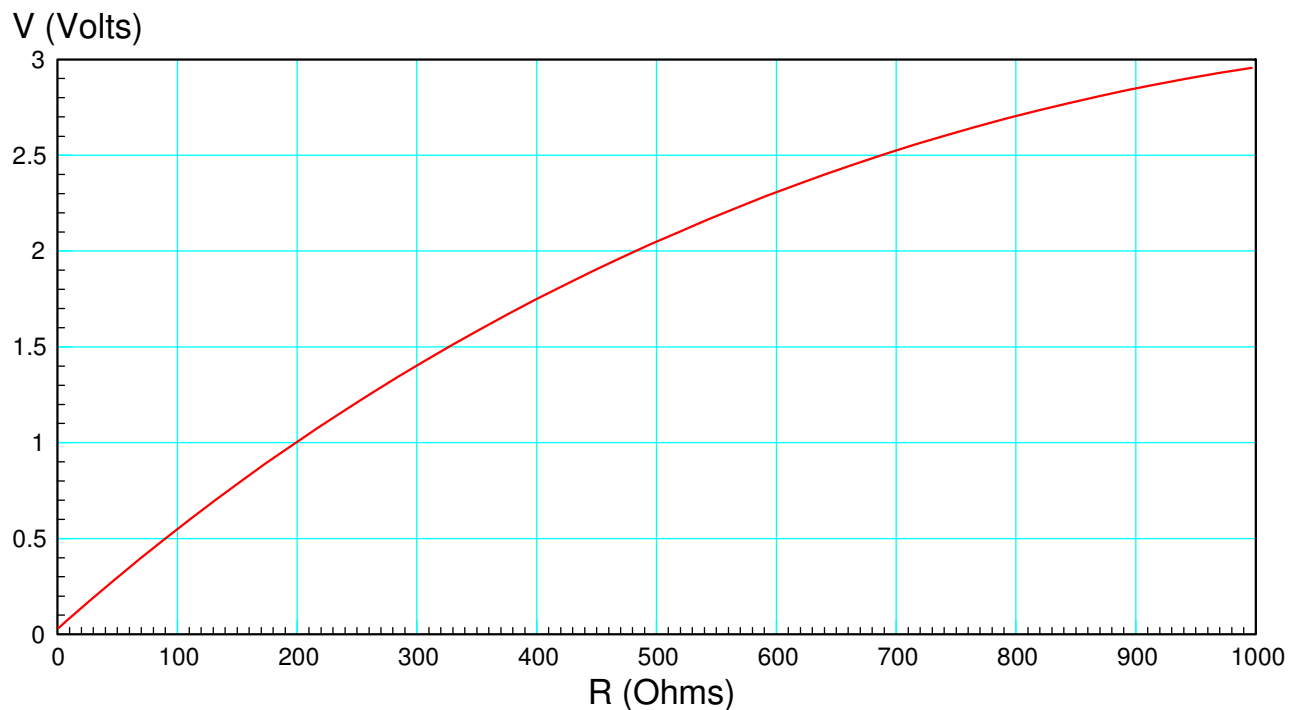


5) The voltage across a voltage divider is shown below. Determine a calibration function

$$R = aV + b$$

to approximate this curve for  $0 < R < 1000$  Ohms

Straight-Line Approximation	Linear Curve Fit $R = aV + b$
show on plot	



Phinneas and Ferb Bonus! What was the purpose of the Go-Away-Inator?

- Make door-to-door salesmen go away
- Make Dr. Doofenschmirtz invisible to avoid having to take his girlfriend shopping
- Make the green beans on his plate disappear so Dr. Doofenschmirtz can get to dessert faster
- Keep those pesky neighbor kids off of Dr. Doofenschmirtz's front lawn