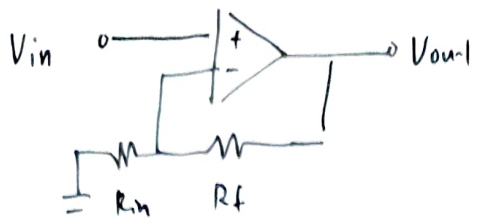
Week 8 studio 2

Activity 1

1. 

voltage at + & - the same and draws no current

$$V_{in} = \frac{R_{in}}{R_{in}+R_f} V_{out}$$

$$\frac{V_{out}}{V_{in}} = \frac{R_{in}+R_f}{R_{in}}$$

$$= 1 + \frac{R_f}{R_{in}}$$

2.

R_f	R_{in}	Gain = $\frac{V_{out}}{V_{in}}$	V_{out} (V_{pp}) measured	V_{out} (V_{AVG}) measured
100 Ω	100 Ω	2	336mV	158 mV
300 Ω	100 Ω	4	630 mV	286 mV
1k Ω	100 Ω	11	1.742 V	704 mV
2k Ω	100 Ω	21	3.08 V	1.245 V
10k Ω	100 Ω	101	3.941 V	2.238 V

V_{in} = 200mV

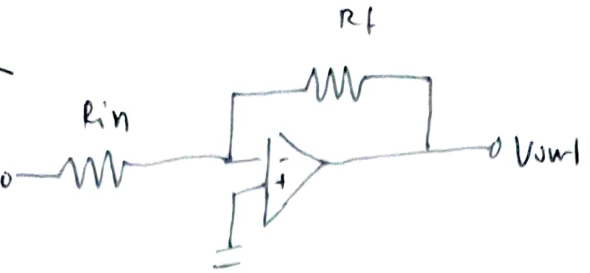
7. The output voltage measured is slightly less than what is expected from gain but follows the magnitude of amplification

8. The output voltage is in phase with V_{in} (sinusoidal)

9. The output is saturated to be about 1V below V_{cc} which is 5V

Activity 2

1.



voltage at + & - try to stay the same

$$\frac{Vin - 0}{Rin} = \frac{0 - Vout}{Rf}$$

$$Vout = -\frac{Rf}{Rin} Vin$$

2.

Rf	Rin	Gain = $\frac{Vout}{Vin}$	Vout (Vpp) measured	Vout (VAVG) measured
100 Ω	100 Ω	-1	156mV	83mV
300Ω	100Ω	-3	447mV	222mV
1kΩ	100Ω	-10	1.408V	709mV
2kΩ	100Ω	-20	2.471V	1.279V
10kΩ	100Ω	-100	4.674V	-3.478V

Vin ≈ 160mV

6. Yes, the output voltage is amplified and reversed

7. The output voltage is inverted from input voltage. phase difference

8.