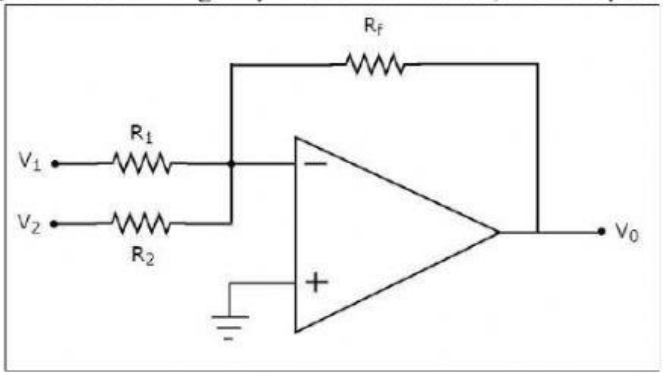
The summing Amplifier is used to precisely add two signals, voltages, or values. This can be applied in communication and filters to amplify week signals, codes signals and remove noise.

This Worksheet provides evidence for PC6.2.

PC6.2	Build a **summing** op-amp circuit using 741 IC to demonstrate its operation, and measure the output voltage using the multimeter or oscilloscope for different input voltages. Compare the measured and calculated theoretical values.

Q1) Part 1: For the summing amplifier shown below, answer questions a to h.



Ana a) What is the output expression of the operation amplifier configuration?

a. $V_{out} = -R_f(\frac{V_1}{R_1} + \frac{V_2}{R_2})$
b. $V_{out} = R_f(\frac{V_1}{R_1} + \frac{V_2}{R_2})$
c. $V_{out} = V_{in}(1+R_2/R_1)$
d. $V_{out} = V_{in}(1+R_1/R_2)$

App b) If $R_f = R_1 = R_2 = 10K\Omega$, $V_1 = V_2 = 2.5V$. Calculate the voltage Gain A?

c) If $R_f = R_1 = R_2 = 10K\Omega$, $V_1 = V_2 = 2.5V$. Calculate V_{out}?

d) If $R_1 = 2K\Omega$, $R_f = R_2 = 10K\Omega$, $V_1 = 1V$, $V_2 = 2V$. Calculate V_{out}?

EvL e) Use www.MultiSim.com to simulate the circuit, use the setup in the table below, what is the value of V_{out}?

R_f	R_1	R_2	V_1	V_2	V-	V+	V_{out} (V)
10KΩ	10KΩ	10KΩ	5V	5V	-12V	+12V	

insert the link of your circuit in the box below:

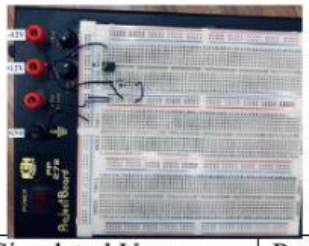
Hint: All your evidence, circuit pictures, videos and screen shots should be saved in Teams-General-Term 3 Practicals - Your group- PC6.2

LIVEWORKSHEETS

C/Re

f) Build the circuit in step **e** and tabulate your readings in the table below:

Hint: you need to add V_2 and R_2



	Calculated **V_{out}**	Simulated V_{out}	Practically measured V_{out}
V_{out}			
% Error			

Und

g) examine the summing amplifier circuit you have built and practically complete the addition table below:

V_1 (V)	V_2 (V)	V_{out} (V)
5	5	
0	5	
2.5	2.5	

Group

h) Record a video for your circuit. Store the video in the class team and past the link of your video below.

Part 2:

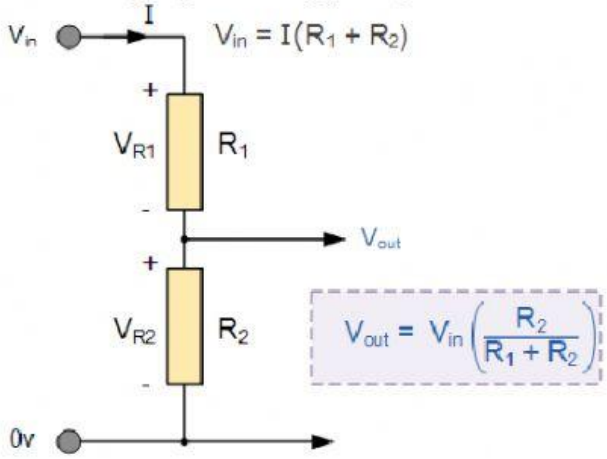
Design a summing amplifier to add three input voltages according to the formula below. Then complete the table with the design parameters you suggest. You have to use 2K, 5K, 10K Ohms resistors only.

$V_{out} = -(5V_1 + 2V_2 + V_3)$

R_1 **KΩ**	R_2 **KΩ**	R_3 **KΩ**	R_f **KΩ**

LIVEWORKSHEETS

To create multiple power supplies you can use the voltage divider circuit.



- % error formula

$$\%\ \text{Error} = \left| \frac{\text{Theoretical Value} - \text{Experimental Value}}{\text{Theoretical Value}} \right| \times 100$$

Theoretical Value = Actual ... Known ...True Value

Theoretical value is also the calculated value.

LIVEWORKSHEETS