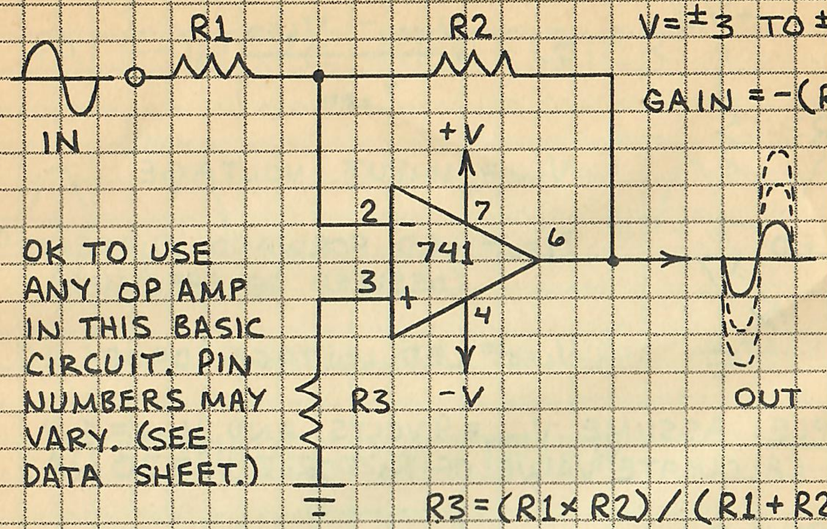
INVERTING AMPLIFIER

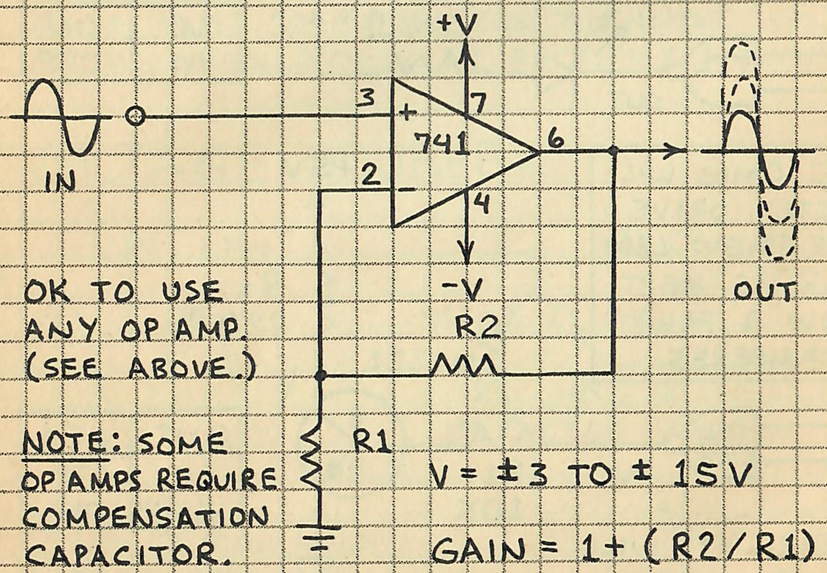


OK TO USE ANY OP AMP IN THIS BASIC CIRCUIT. PIN NUMBERS MAY VARY. (SEE DATA SHEET.)

$R3 = (R1 \times R2) / (R1 + R2)$

EXAMPLE: IF R1 = 4,700 OHMS AND R2 = 47,000 OHMS, THEN GAIN IS -(47,000/4,700) OR -10. R3 = 4,273 OHMS (USE CLOSEST STANDARD VALUE).

NON-INVERTING AMPLIFIER



OK TO USE ANY OP AMP. (SEE ABOVE.)

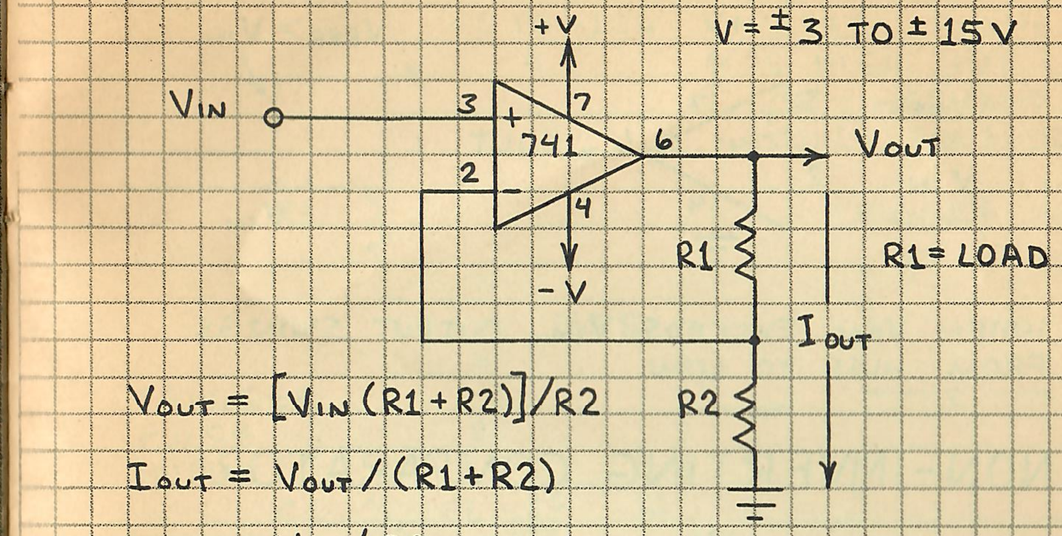
NOTE: SOME OP AMPS REQUIRE COMPENSATION CAPACITOR.

V = ±3 TO ±15 V

$GAIN = 1 + (R2/R1)$

EXAMPLE: IF R1 = 4,700 OHMS AND R2 = 47,000 OHMS, THEN GAIN IS 1 + (47,000 / 4,700) OR 11.

VOLTAGE-TO-CURRENT CONVERTER



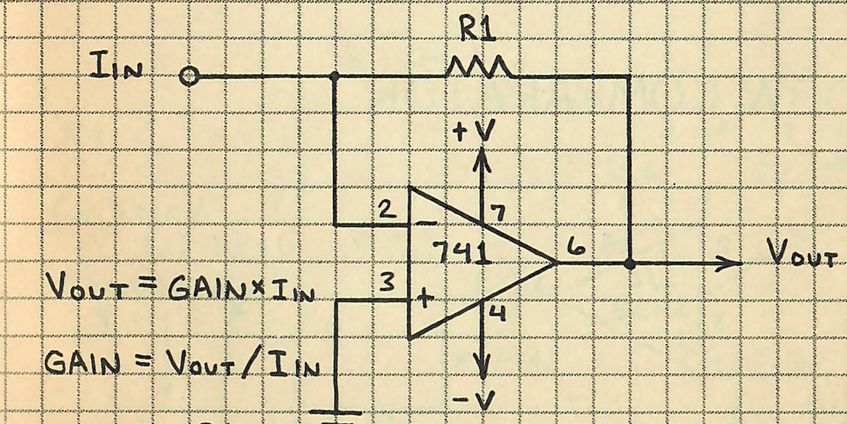
$V_{OUT} = [V_{IN}(R1+R2)]/R2$

$I_{OUT} = V_{OUT}/(R1+R2)$

$I_{OUT} = V_{IN}/R2$

EXAMPLE: ASSUME R1 IS A RESISTOR AND LED WITH COMBINED RESISTANCE OF 1,000 OHMS AND R2 IS 470 OHMS. WHEN V_{IN} = 5 VOLTS, CURRENT (I_{OUT}) THROUGH LED IS 10.6 MA.

CURRENT-TO-VOLTAGE CONVERTER



$V_{OUT} = GAIN \times I_{IN}$

$GAIN = V_{OUT}/I_{IN}$

$GAIN = -R1$

EXAMPLE: ASSUME A SOLAR CELL CONNECTED TO I_{IN} DELIVERS A CURRENT OF 1 MA. IF R1 IS 1,000 OHMS, THEN $V_{OUT} = -(1{,}000 \times 0.001) = -1$ VOLT.