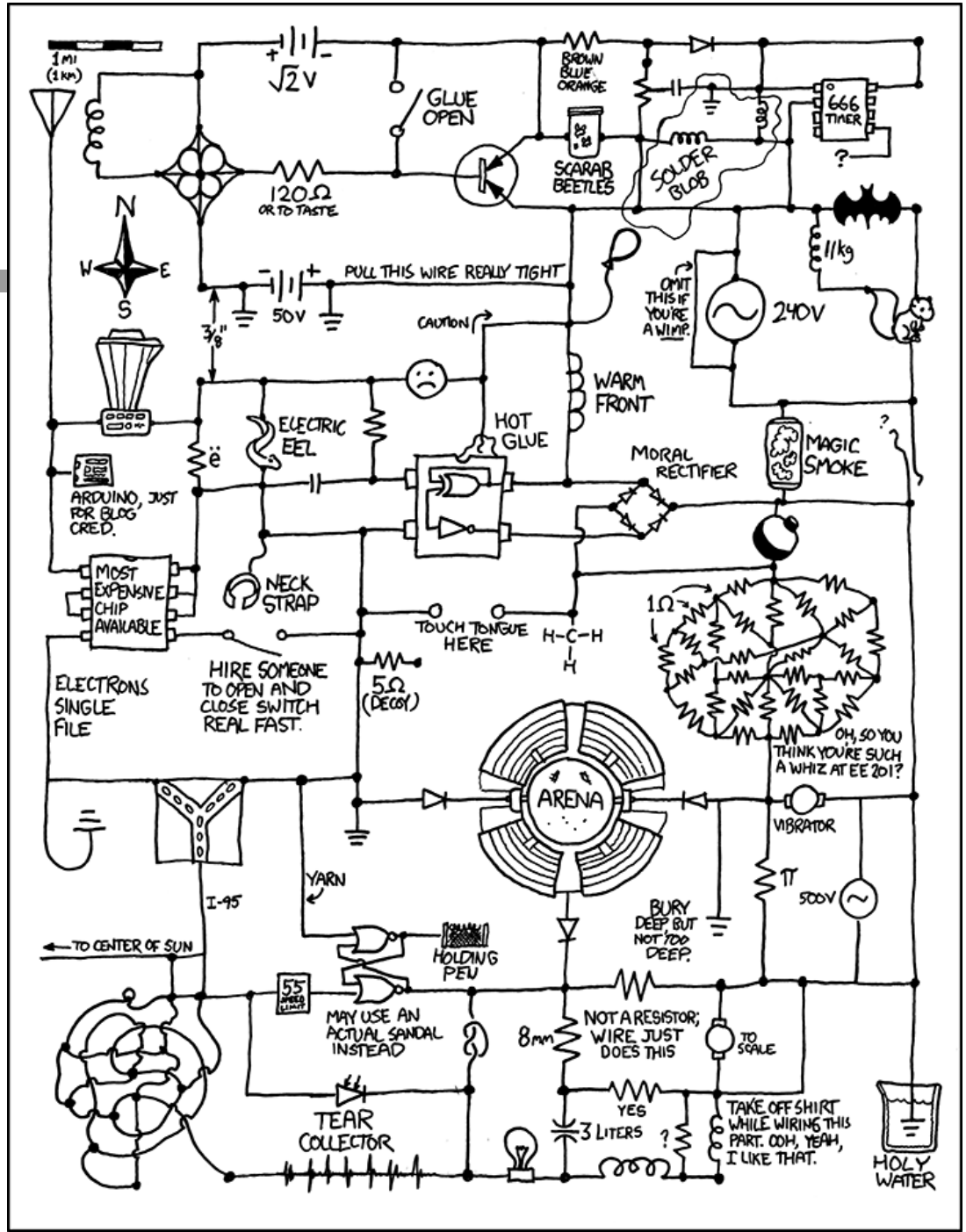
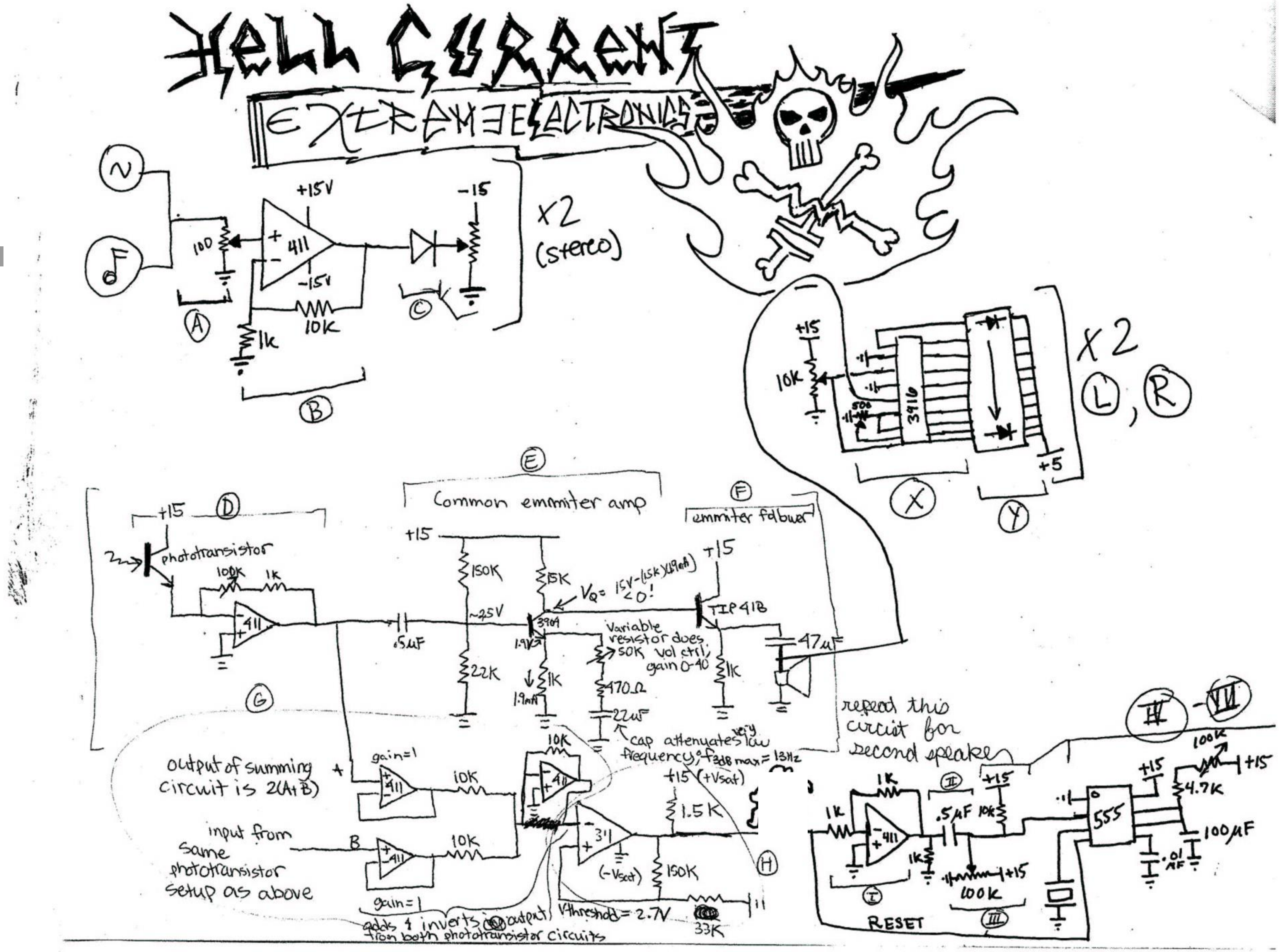
XKCD


1 MI (1 KM)
√2V
GLUE OPEN
BROWN BLUE ORANGE
666 TIMER
SCARAB BEETLES
SOLDER BLOB
120Ω OR TO TASTE
N
W
E
S
PULL THIS WIRE REALLY TIGHT
50V
3/8"
CAUTION
OMIT THIS IF YOU'RE A WIMP.
240V
1/kg
WARM FRONT
ELECTRIC EEL
HOT GLUE
MORAL RECTIFIER
MAGIC SMOKE
ARDUINO, JUST FOR BLOG CRED.
MOST EXPENSIVE CHIP AVAILABLE
NECK STRAP
TOUCH TONGUE HERE
H-C-H
H
1Ω
ELECTRONS SINGLE FILE
HIRE SOMEONE TO OPEN AND CLOSE SWITCH REAL FAST.
5Ω (DECOY)
OH, SO YOU THINK YOU'RE SUCH A WHIZ AT EE 201?
ARENA
VIBRATOR
YARN
I-95
TO CENTER OF SUN
HOLDING PEN
BURY DEEP BUT NOT TOO DEEP.
500V
55 SPEED LIMIT
MAY USE AN ACTUAL SANDAL INSTEAD
8mm
NOT A RESISTOR; WIRE JUST DOES THIS
TO SCALE
TEAR COLLECTOR
YES
3 LITERS
?
TAKE OFF SHIRT WHILE WIRING THIS PART. OOH, YEAH, I LIKE THAT.
HOLY WATER


HELL CURRENT
EXTREME ELECTRONICS
+15V
-15
-15V
411
100
10K
1k
x2
(stereo)
A
B
C
+15
10K
3916
x2
L, R
X
Y
+5
E
Common emmiter amp
D
+15
phototransistor
100K
1K
F
+15
150K
15K
~2.5V
3904
TIP 41B
47µF
.5µF
22K
1K
1.9mA
Variable resistor does 50K vol ctrl, gain 0-40
470 Ω
22µF
cap attenuates very low frequency, f3dB max = 13Hz
G
output of summing circuit is 2(A+B)
gain=1
input from same phototransistor setup as above
gain=1
adds & inverts output from both phototransistor circuits
Vthreshold = 2.7V
33K
+15 (+Vsat)
1.5K
311
(-Vsat)
150K
H
repeat this circuit for second speaker
IV - VII
100K
+15
4.7K
555
100µF
.01 µF
.5µF
I
II
III
RESET
100K

D. Balick

All the physics you Need To Know

All the physics you Need To Know

- Like charges repel, opposites attract

Ohm's 3 Laws

(from U.S. Army Manual)

Ohm's 3 Laws

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- **V = IR**

Ohm's 3 Laws

(from U.S. Army Manual)

- **V = IR**
- **I = V / R**

Ohm's 3 Laws

(from U.S. Army Manual)

- **V = IR**
- **I = V / R**
- **R = V / I**

Ohm's 3 Laws

(from U.S. Army Manual)

- **V = IR**
- **I = V / R**
- **R = V / I**

Ohm's 3 Laws

(from U.S. Army Manual)

- **I = V / Z (impedance)**
- **V = IR**
- **I = V / R**
- **R = V / I**

Beatles or Stones?

- A Beatles
- B Stones
- C who cares?
- D 42

Voltage Divider

IF

Vin = 10 V

R1 = 4k R2 = 6k

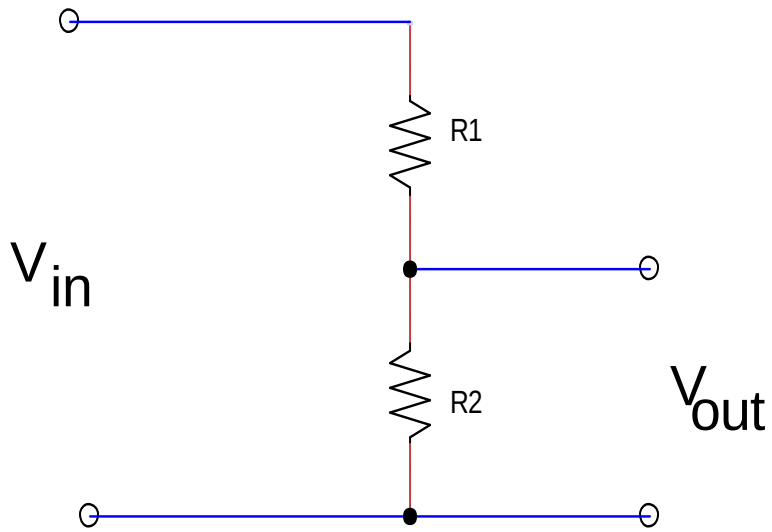
Then

A. Vout = 4V

B. Vout = 1.67V

C. Vout = 6V

D. Vout = 2.5V



Voltage Divider

IF

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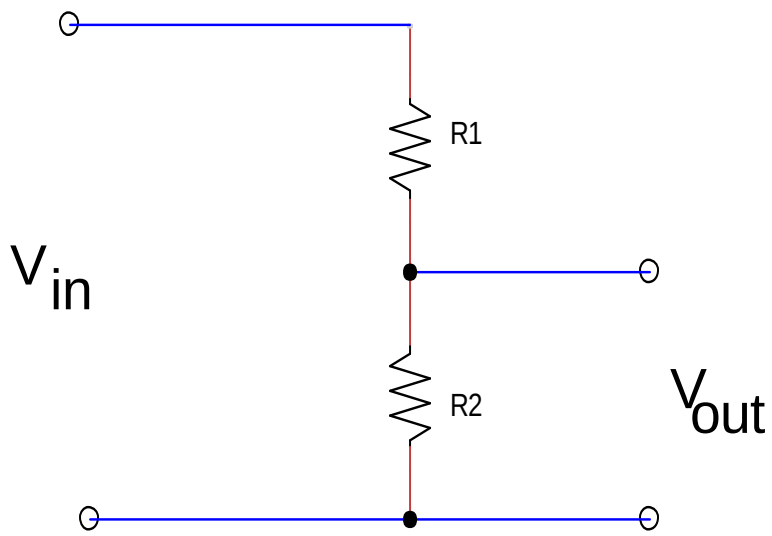


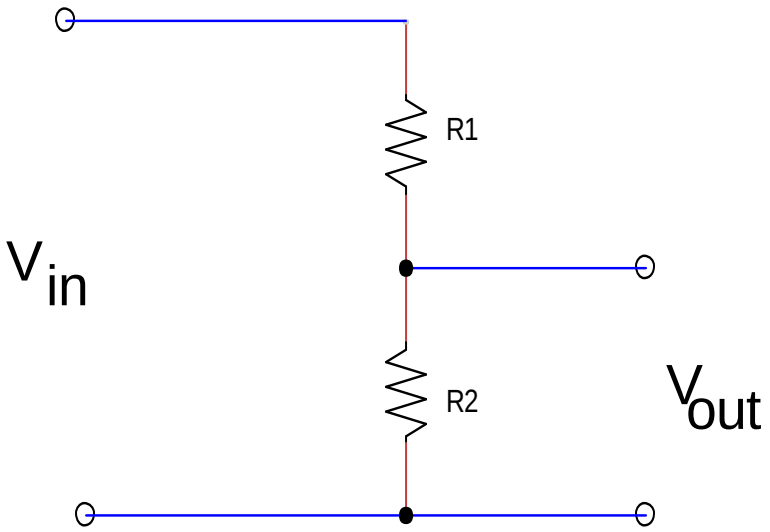
Voltage Divider

A. Vout = Vin * R2/(R1 + R2)

B. Vout = Vin * (R1+R2)/R1

C. Vout = Vin * R1/(R1+R2)

D. Vout = Vin * (R1+R2)/R2



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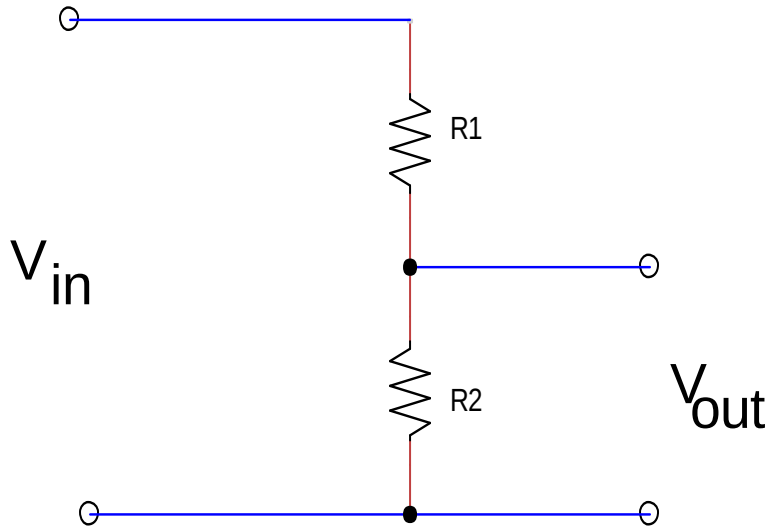


Current Divider

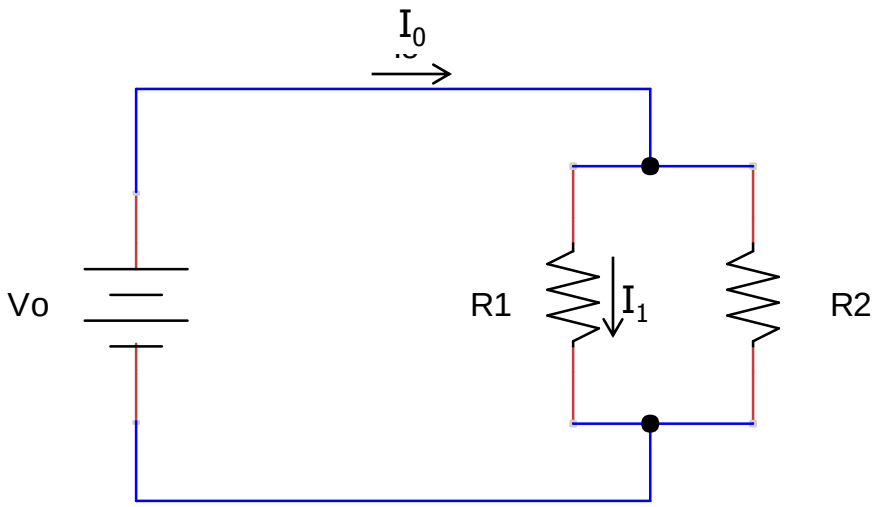
- What is I_1, the current through R_1?

- A $$I1 = Iin \frac{R2}{R1 + R2}$$

- B $$I1 = Iin \frac{R2}{R1}$$

- C $$I1 = Iin \frac{R1 + R2}{R2}$$

- D $$I1 = Iin \frac{R1}{R1 + R2}$$



Current Divider

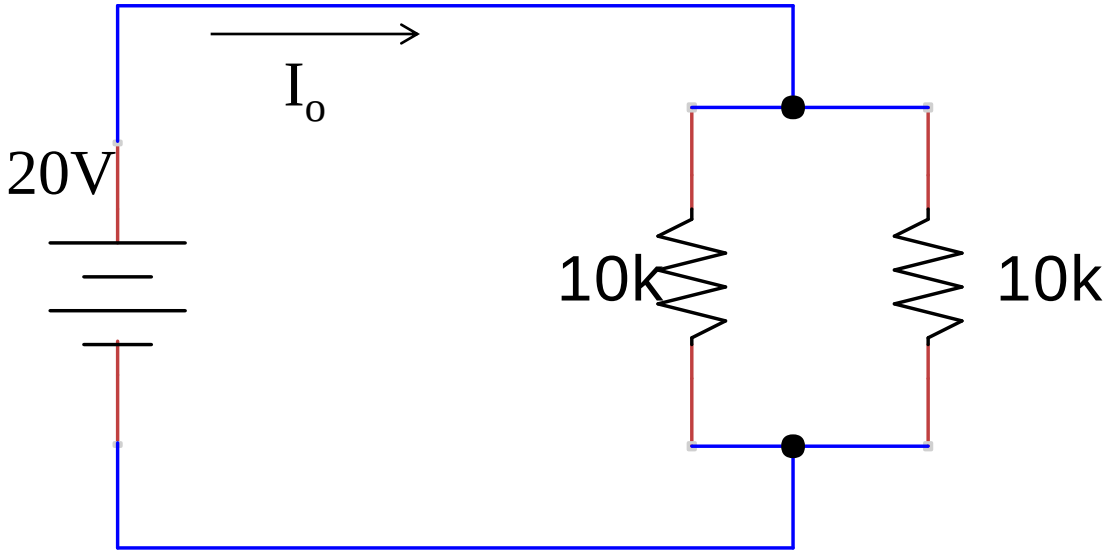
What is I_o?

A. 1 mA

B. 2 mA

C. 4 mA

D. 8 mA



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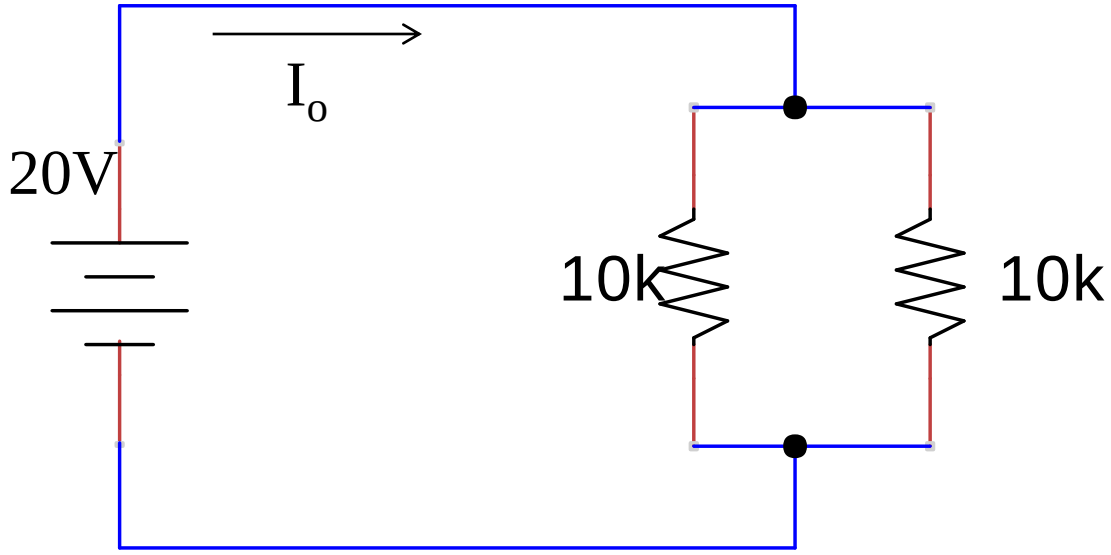
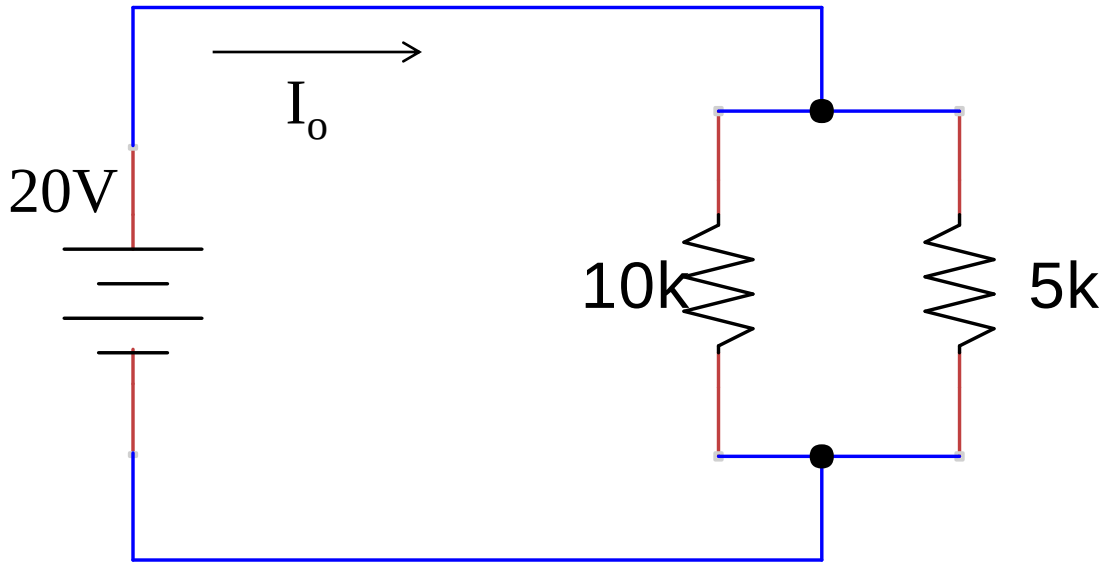


Current Divider

One of the resistors is changed to 5k. Which is true about I_o?



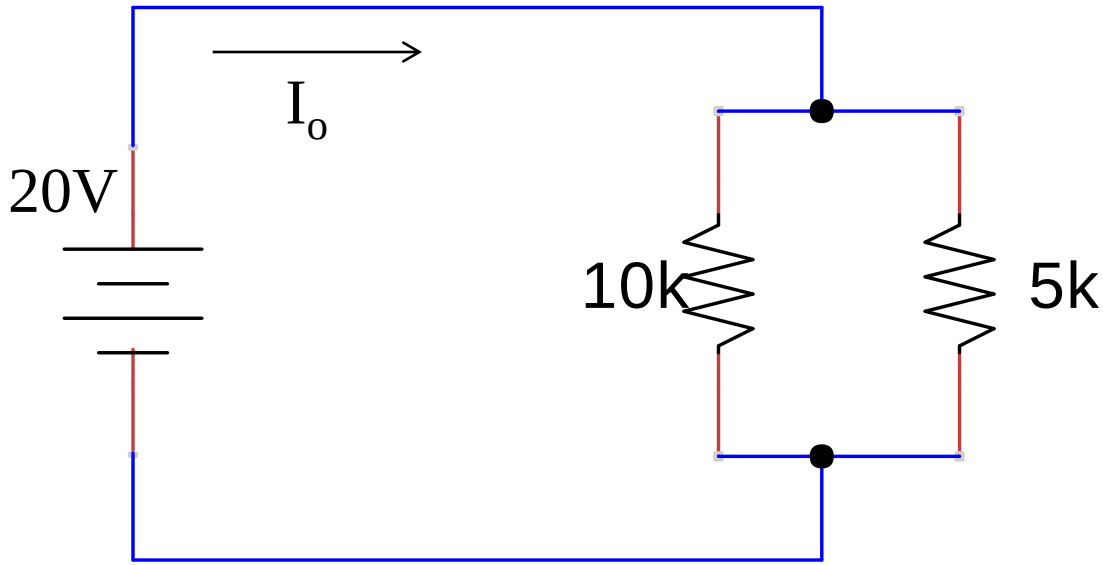
A. I_o decreases

B. I_o increases

C. I_o stays the same

Current Divider

One of the resistors is changed to 5k. Which is true about I_o?



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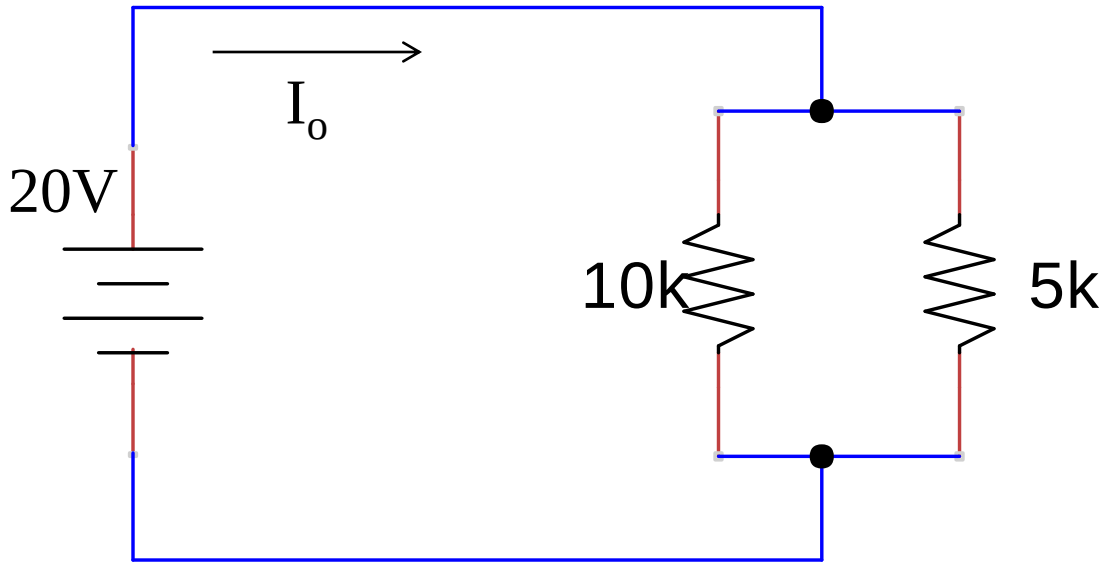
Current Divider

Which carries more current: the 10k or 5k resistor?



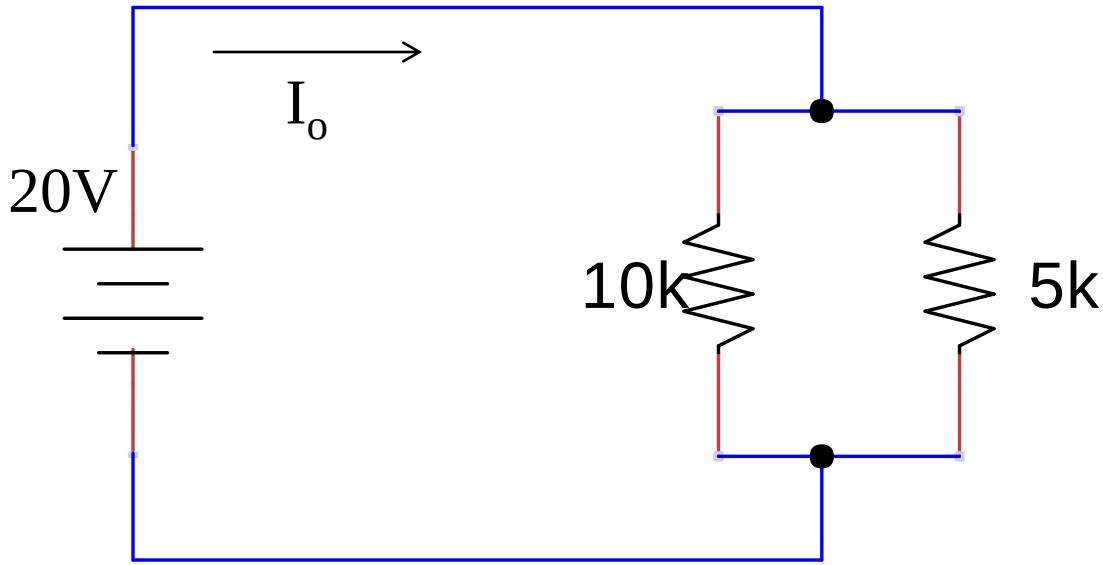
A. 10k

B. 5k

C. Same current

Current Divider

Which carries more current: the 10k or 5k resistor?



A. 10k

B. 5k

C. Same current

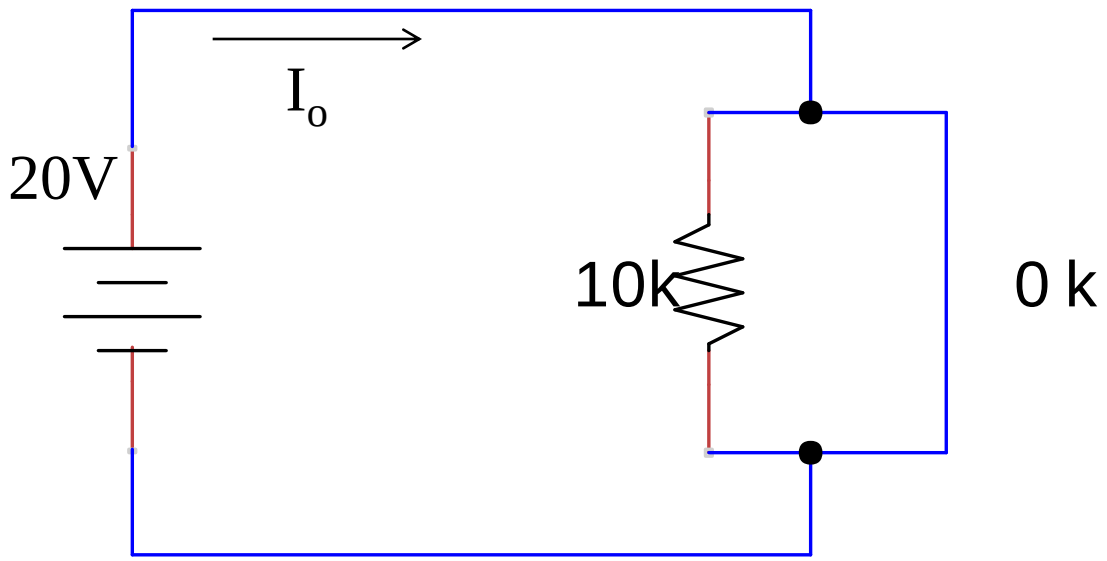
Current Divider

Now, how much current in the 10k resistor?

A. 0

B. 2mA

C. ∞



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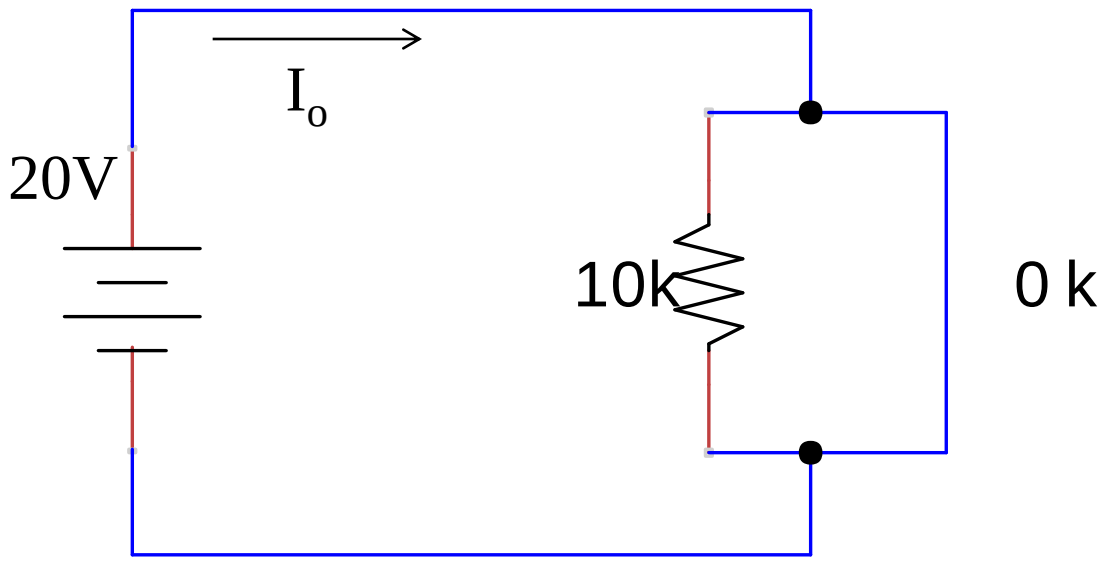


Current Divider

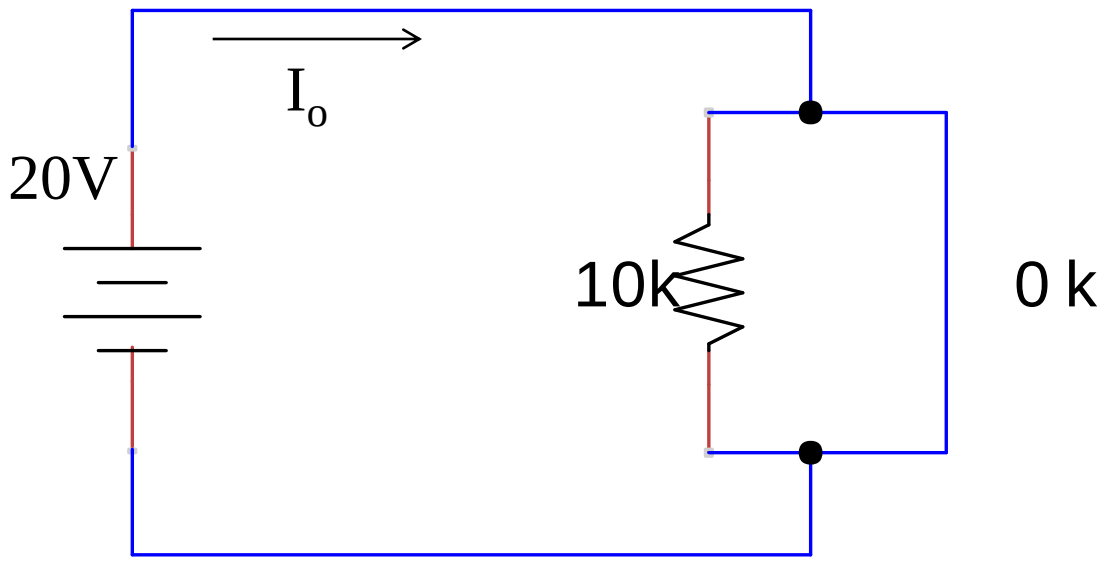
What is I_o ?

A. 0

B. 2mA

C. ∞

D. Cannot be determined



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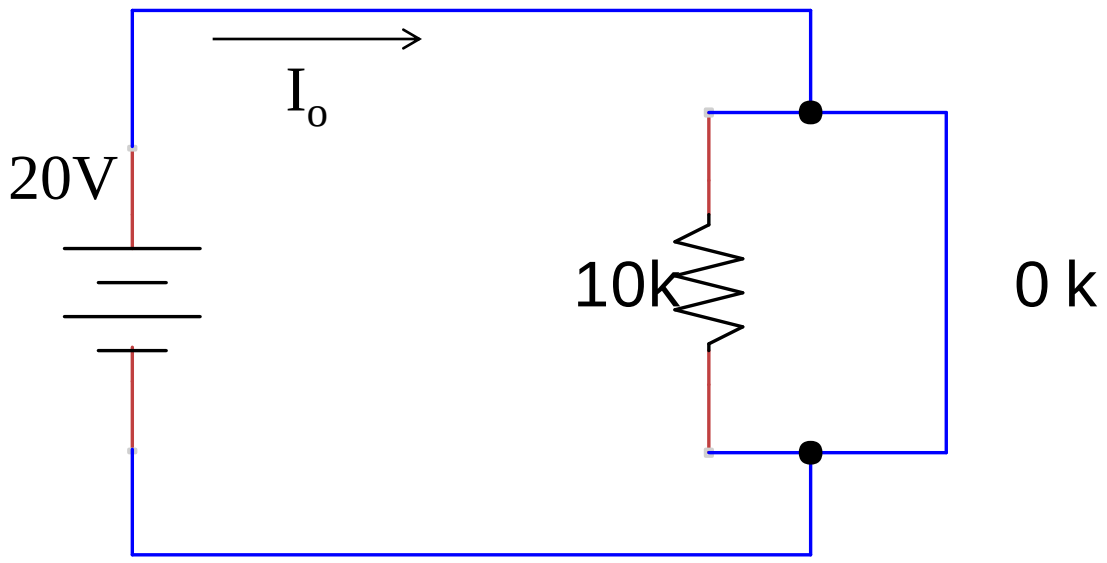
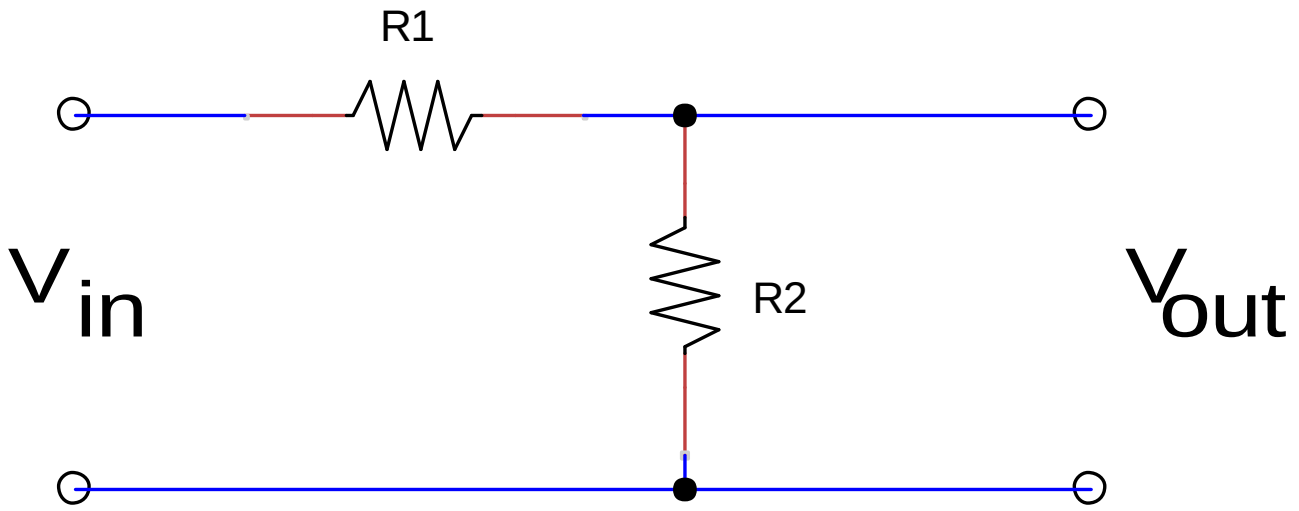


Thevenin
Short Circuit Current

I_{sc} = ?



A. Vin / (R2 + R1)

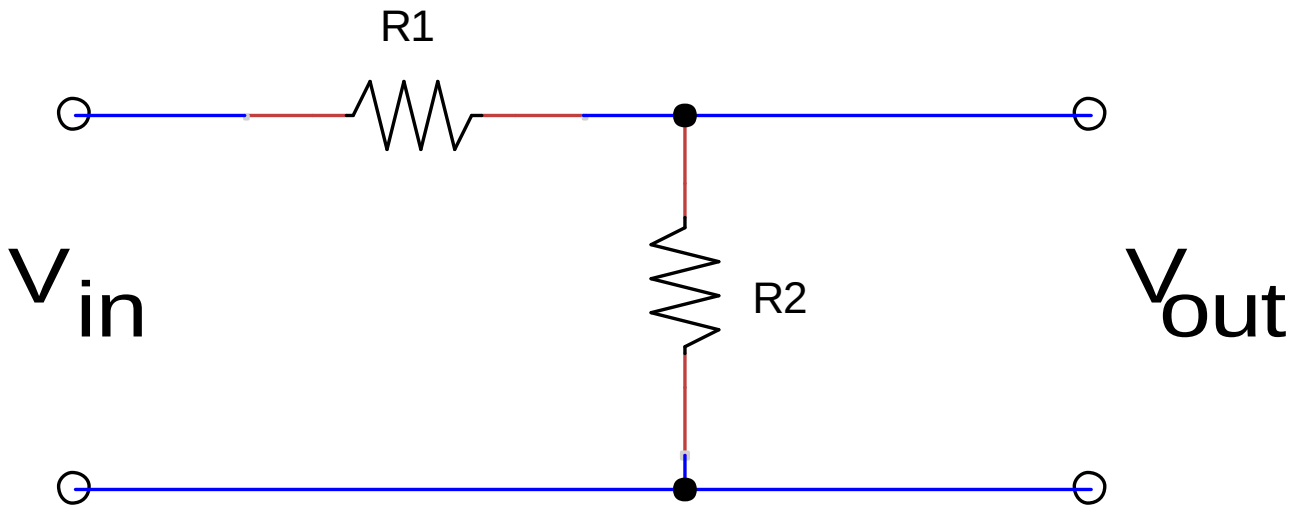
C. Vin * R1

B. Vin / R2

D. Vin / R1

Thevenin
Short Circuit Current

I_{sc} = ?



A. Vin / (R2 + R1)

C. Vin * R1

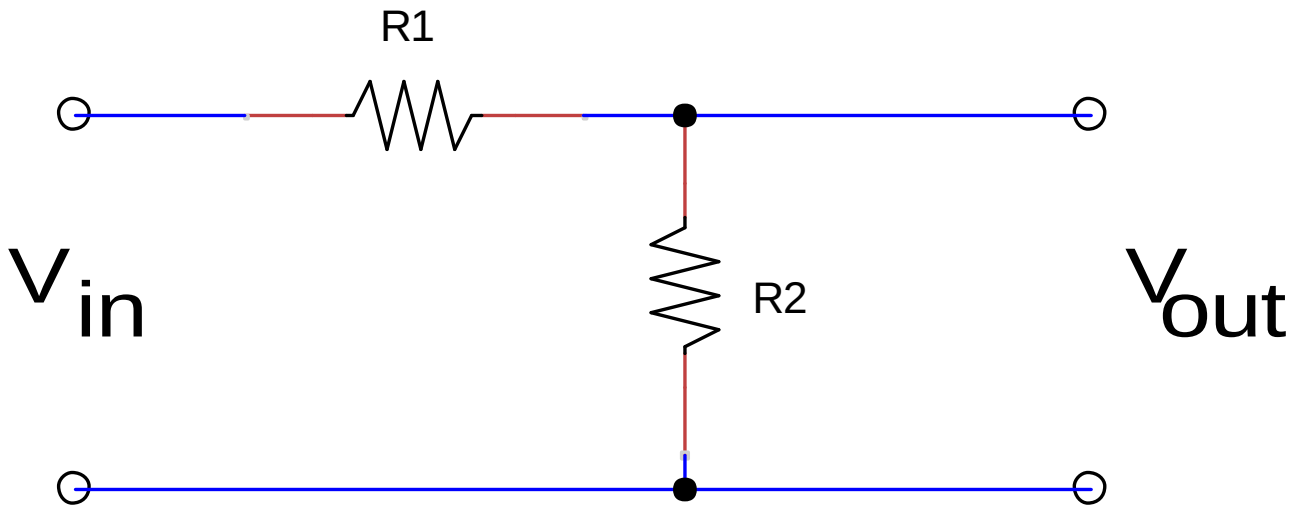
B. Vin / R2

D. Vin / R1

Thevenin

Open Circuit Voltage

$V_{th} = ?$



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B. Vin * R1/(R1 + R2)

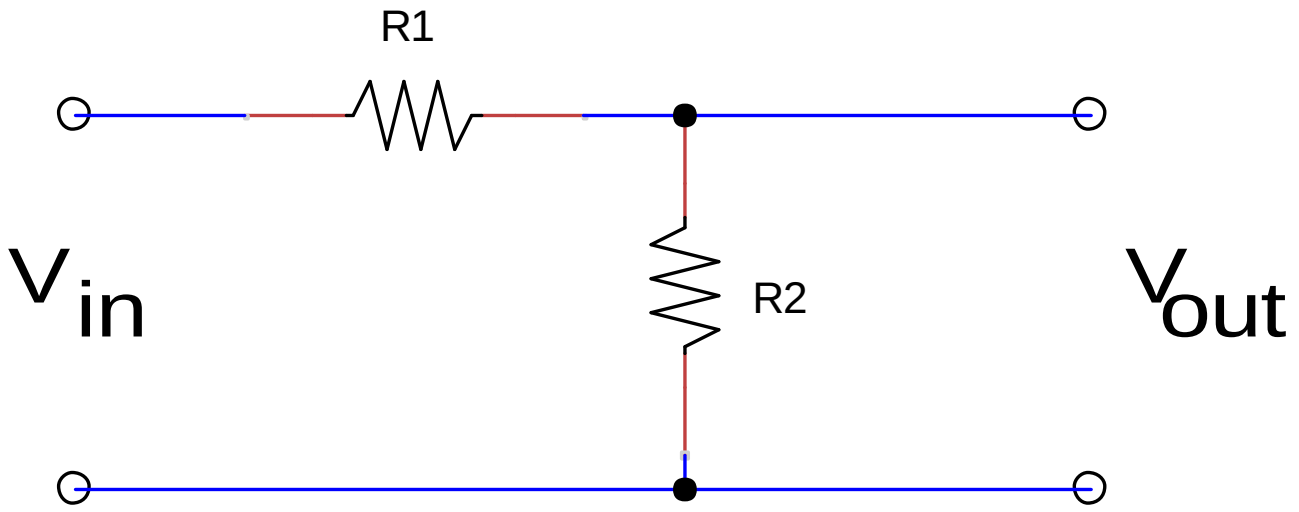
C. Vin * R2/R1

D. Vin * R2/(R1+R2)

Thevenin

Open Circuit Voltage

V_{th} = ?



A. Vin / (R2 + R1)

C. Vin * R2/R1

B. Vin * R1/(R1 + R2)

D. **Vin * R2/(R1+R2)**