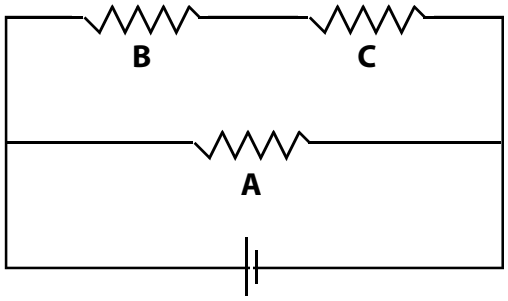
PhyzSpringboard: Beyond a Slippery Affair

Compound Circuits

Consider the compound circuits given below. Assume each is made with three identical resistors. If the resistors were bulbs, indicate what would happen when certain bulbs were removed from their sockets (or burned out). Indicate the relationships in the size of the current in each resistor, the voltage drop across each resistor, and the power dissipated in each resistor.

1. One in Parallel With Two in Series



a. If bulb A goes out, B and C remain lit.

b. If bulb B goes out, A remains lit; C goes out.

c. If bulb C goes out, A remains lit; B goes out.

d. If bulbs A and B go out, C goes out.

e. If bulbs B and C go out, A remains lit.

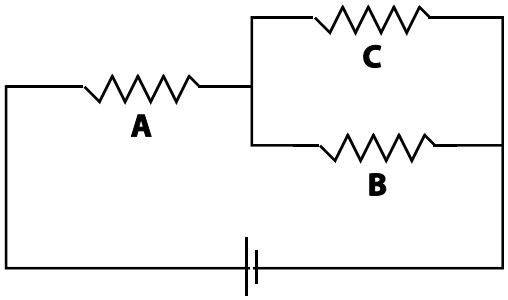
f. Insert symbols of equality or inequality

$I_A > I_B = I_C$

$V_A > V_B = V_C$

$P_A > P_B = P_C$

2. One in Series With Two in Parallel



a. If bulb A goes out, B and C go out.

b. If bulb B goes out, A and C remain lit.

c. If bulb C goes out, A and B remain lit.

d. If bulbs A and B go out, C goes out.

e. If bulbs B and C go out, A goes out.

f. Insert symbols of equality or inequality

$I_A > I_B = I_C$

$V_A > V_B = V_C$

$P_A > P_B = P_C$

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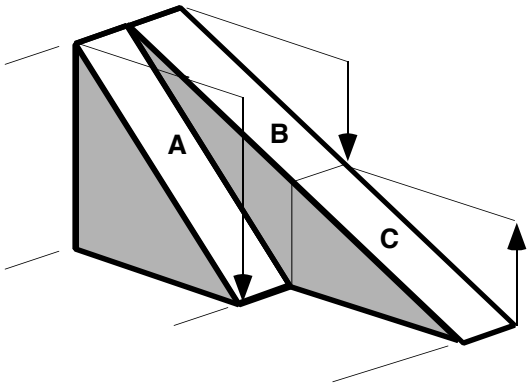
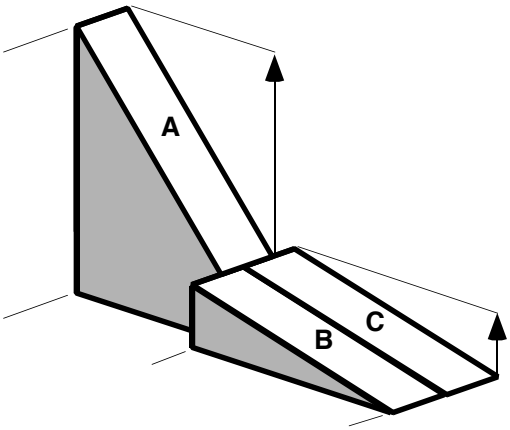
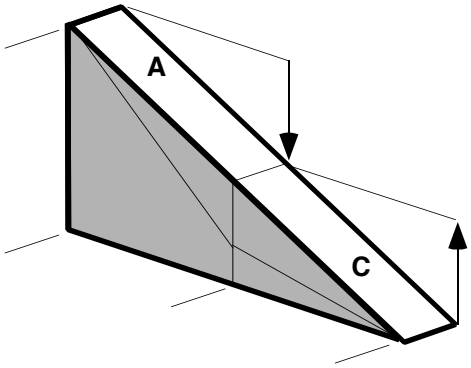
Hey! Whad'ya lookin' at? There's nothing to see back here; please go back to the front.



This diagram shows the slide corresponding to circuit 1: one in parallel with two in series.



This diagram shows the slide corresponding to circuit 2: one in series with two in parallel.



This diagram shows what circuit 2 becomes if bulb B is removed. It would be the same if bulb C were removed (in which case the C in the diagram becoms a B.)

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