Warm-up problems to be done BEFORE recitation #7
Physics 272, Spring 2018 (from HRW 10th ed Chapter 27)

Single loop circuit

15 ILW The current in a single-loop circuit with one resistance \( R \) is 5.0 A. When an additional resistance of 2.0 \( \Omega \) is inserted in series with \( R \), the current drops to 4.0 A. What is \( R \)?

Single loop circuit with real batteries

17 SSM In Fig. 27-33, battery 1 has emf \( \varepsilon_1 = 12.0 \text{ V} \) and internal resistance \( r_1 = 0.016 \) \( \Omega \) and battery 2 has emf \( \varepsilon_2 = 12.0 \text{ V} \) and internal resistance \( r_2 = 0.012 \) \( \Omega \). The batteries are connected in series with an external resistance \( R \). (a) What \( R \) value makes the terminal-to-terminal potential difference of one of the batteries zero? (b) Which battery is that?

Multiloop circuit

23 In Fig. 27-35, \( R_1 = 100 \) \( \Omega \), \( R_2 = 50 \) \( \Omega \), and the ideal batteries have emfs \( \varepsilon_1 = 6.0 \text{ V} \), \( \varepsilon_2 = 5.0 \text{ V} \), and \( \varepsilon_3 = 4.0 \text{ V} \). Find (a) the current in resistor 1, (b) the current in resistor 2, and (c) the potential difference between points \( a \) and \( b \).

Power dissipation in multiloop circuit

39 In Fig. 27-50, two batteries of emf \( \varepsilon = 12.0 \text{ V} \) and internal resistance \( r = 0.300 \) \( \Omega \) are connected in parallel across a resistance \( R \). (a) For what value of \( R \) is the dissipation rate in the resistor a maximum? (b) What is that maximum?