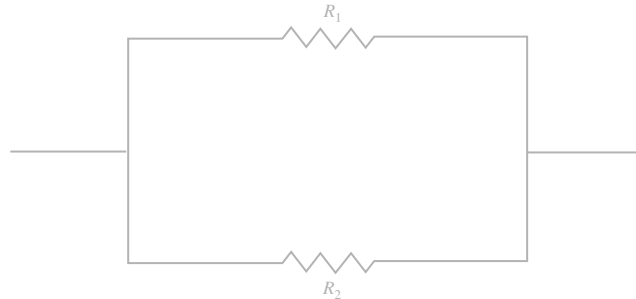


5.17

Algebraic Symbol Manipulation

• Example 1

A parallel electric circuit. The symbol for a resistor is



If two resistors with resistances R_1 and R_2 are connected in parallel, the combined resistance R can be found from

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$$

Solve the formula for R .

First, the LCD is RR_1R_2 , and we multiply:

$$RR_1R_2 \cdot \frac{1}{R} = RR_1R_2 \cdot \frac{1}{R_1} + RR_1R_2 \cdot \frac{1}{R_2}$$

Simplifying yields

$$R_1R_2 = RR_2 + RR_1 \quad \text{Factor out } R \text{ on the right.}$$

$$R_1R_2 = R(R_2 + R_1) \quad \text{Divide by } R_2 + R_1 \text{ to isolate } R.$$

$$\frac{R_1R_2}{R_2 + R_1} = R \quad \text{or} \quad R = \frac{R_1R_2}{R_1 + R_2}$$

• • • CHECK YOURSELF 1

Solve for D_1 .

$$\frac{1}{F} = \frac{1}{D_1} + \frac{1}{D_2}$$

Note: This formula involves the focal length of a convex lens.

• • • CHECK YOURSELF ANSWER

$$1. \frac{FD_2}{D_2 - F}$$

5.17 Exercises

Name _____

Section _____

Date _____

A N S W E R S

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

Solve each equation for the indicated variable.

1. $\frac{1}{x} = \frac{1}{a} - \frac{1}{b}$ for x

2. $\frac{1}{x} = \frac{1}{a} + \frac{1}{b}$ for a

3. $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$ for R_1

4. $\frac{1}{F} = \frac{1}{D_1} + \frac{1}{D_2}$ for D_2

5. $y = \frac{x+1}{x-1}$ for x

6. $y = \frac{x-3}{x-2}$ for x

7. $t = \frac{A-P}{Pr}$ for P

8. $I = \frac{nE}{R+nr}$ for n