

9. Assume that, for the two resistors in series, the second has a resistance that is 2 ohms more than the first one in the series. The single resistor has a resistance that is 3 ohms more than the resistance of the first resistor in series, and the total resistance of the circuit is 2Ω . Write an equation to model this situation, and solve this equation. What is the solution set of the equation? What is the resistance of the each of the resistors?

$$\frac{1}{2} = \frac{1}{x+3} + \frac{1}{2x+2}$$

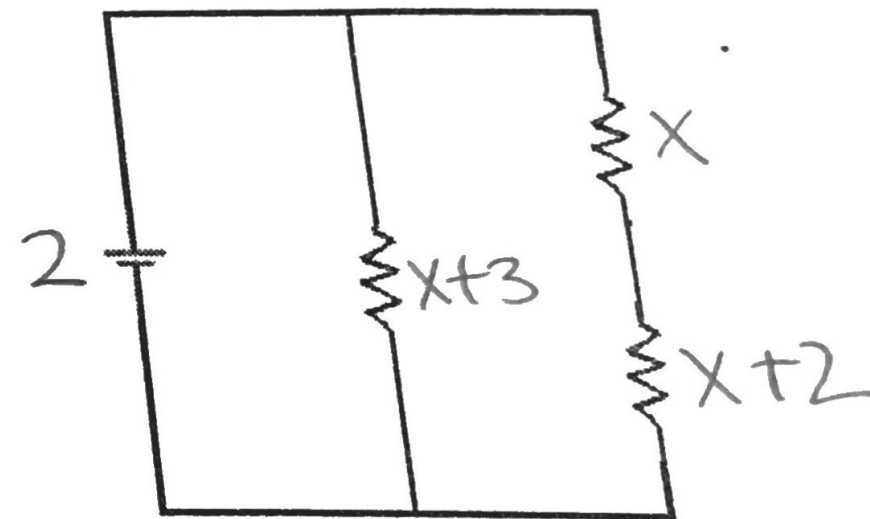
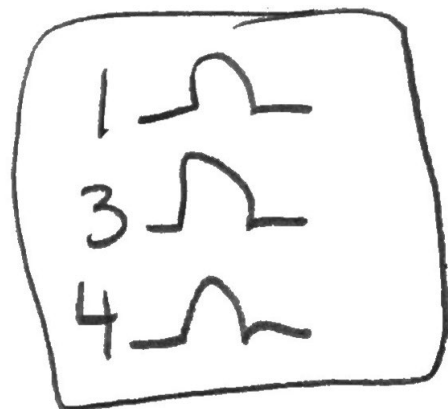
$$(x+1)(x+3) = 2(x+1) + x+3$$

$$x^2 + 4x + 3 = 2x + 2 + x + 3$$

$$x^2 + x - 2 = 0$$

$$(x+2)(x-1) = 0$$

$$x = -2 \quad \text{or} \quad x = 1$$



10. Assume that, for the two resistors in series, the second has a resistance that is 4 ohms more than the first one in the series. The single resistor has a resistance that is 3 ohms less than the resistance of the first resistor in series, and the total resistance of the circuit is 4Ω . Write an equation to model this situation, and solve this equation. What is the solution set of the equation? What is the resistance of the each of the resistors?

$$\frac{1}{4} = \frac{1}{x-3} + \frac{1}{2x+4}$$

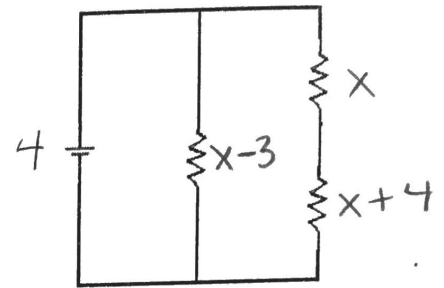
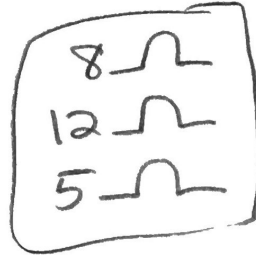
$$(x+2)(x-3) = 4(x+2) + 2(x-3)$$

$$x^2 - x - 6 = 4x + 8 + 2x - 6$$

$$x^2 - 7x - 8 = 0$$

$$(x-8)(x+1) = 0$$

$$x = 8 \quad x = -1$$



11. A circuit has three resistors in parallel. The second resistor has a resistance that is 4 ohms more than the first. The third resistor has a resistance of 8 ohms. The total resistance is one-half the resistance of the first resistor. Find each of the unknown resistances.

$$\frac{2}{x} = \frac{1}{x} + \frac{1}{x+4} + \frac{1}{8}$$

$$16(x+4) = 8(x+4) + 8x + x(x+4)$$

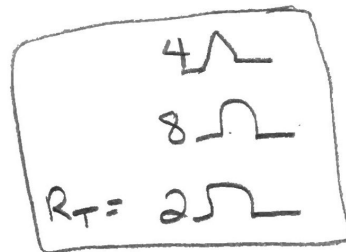
$$16x + 64 = 8x + 32 + 8x + x^2 + 4x$$

$$16x + 64 = x^2 + 20x + 32$$

$$0 = x^2 + 4x - 32$$

$$0 = (x+8)(x-4)$$

$$x = -8 \quad x = 4$$



12. How many hours will it take Sam, Joe, and Peter to build a model airplane together if it takes Sam 3 hours to build one alone, Joe takes twice as long as Joe, and Peter two more hours than Joe?

$$\frac{24}{3} + \frac{24}{6} + \frac{24}{8} = 1$$

$$8x + 4x + 3x = 24$$

$$15x = 24$$

$$x = 1.6 \text{ hrs.}$$